FOUL AND SURFACE WATER DRAINAGE STRATEGY

AT

SHOP LANE
KIRKHEATON

ON BEHALF OF

HARTLEY HOMES

ARP ASSOCIATES
CHARTERED CONSULTING ENGINEERS
Northwest House 5/6 Northwest Business Park Servia Hill Leeds LS6 2QH
c 0113 245 8498 m leeds@arpassociates.co.uk w www.arpconsultingengineers.co.uk

Foul and Surface Water Drainage Strategy at Shop Lane, Kirkheaton 0906/09r1			
Revision/Date	**Initial Issue** **1st April 2021**		
Prepared By:	A Tills MEng (Hons) MICE		
Signature			
Reviewed By:			
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Authorised By:			
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APPENDICES

1 INTRODUCTION

1.1 ARP Associates has been commissioned by Hartley Homes to undertake an Outline Drainage Strategy to be an Addendum to the existing Food Risk Assessment for the proposed residential development of a parcel of land located at Shop Lane, Kirkheaton. This land will hereafter be referred to as the 'Site'.

1.2 The consultations and site appraisal have been carried out between January and March 2021.

1.3 The report has been initially prepared for the use and reliance of the Client only. The report shall not be relied upon or transferred to any other parties without the written agreement of ARP Associates. For the avoidance of any doubt, where ARP Associates enters into a letter of reliance for the benefit of a third party, that third party will be permitted to rely on the report. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party without ARP Associates consent.

1.4 Attention is drawn to the requirements of the Construction Design and Management Regulations 2015, and in particular, the duties and obligations of the Client.

2 SITE DETAILS

Site Description

2.1 The site is formed of 2 irregular shaped pieces of land separated by Shop Lane. The 'Main site' extending to an area of approximately 1.44 hectares, with overall dimensions of 151m (north - south) by 100m (east - west). The site is centred approximately on Ordnance Survey Grid Reference 418300; 417990. The 'small site' extends to an area of approximately 0.31 hectares, with overall dimensions of 44m (north - south) by 69m (east - west).

2.2 A site location plan is presented in Appendix A.

Current Use

2.3 The main site consists of demolished former mill buildings. It is bounded by Shop Lane to the East with 2 accesses into the site and Bankfield Lane to the North with 1 access to the site. The Site is surrounded by houses, commercial properties and gardens as shown on the survey. There is a lodge house within the south corner of the site that is self-contained and will be generally unaltered by the development proposals. The site comprises platforms of tarmac and concrete being the remainder of yards and ground floors from the demolished mill buildings. The site at present has banks of demolition rubble between the various platforms and is general overgrown with bushes and small trees.

2.4 The small site contains a fenced off disused carpark of approximately 0.03 hectares that was formerly used as a carpark for the Mill. The carpark is at a lower level with potential access from Orchard Lane/ Daw Knowle. The remainder of the small site consists of a grass field, generally overgrown with areas of mature trees. The site connects to the lower end of the Cockley Hill Lane Site (refer project 0906-05). There is a gated vehicle access from Daw Knowle into the higher section of the small Site and a footpath running through the site into the Cockley Hill Lane site.

2.5 A Topographic Survey is presented in Appendix B.

Boundaries

2.6 The boundaries to the main site are a mixture of Stone walls, metal fencing and retaining walls comprising stone and brick retaining walls. The properties and land surrounding the Site is generally 1-2m higher around the West, North and East. There is currently no boundary between the site and the rear of the cottages on Doctors Row.

Topography

2.7 The main site has a general steep gradient across the site, from the North to South. The high point is 114.5 down to a low point of 99.5 in the South.

2.8 The small site falls East to West from 116m to 108m. the site has a constant steep gradient with n approximate 2m retaining wall at the rear of the old carpark.

2.9 A topographical survey is presented in Appendix B for reference purposes.

Vegetation

2.10 Hedges and large trees are present in the small site, the upper areas are waterlogged. The main site is partially overgrown with recent bushes and small trees in the demolition debris..

3 EXISTING DRAINAGE

3.1 Yorkshire water records indicate large diameter foul and combined sewers in the roads surrounding the site. No live foul drainage on-site has been surveyed. Yorkshire Water records do not show any sewers crossing the site.

3.2 There are 2 surface water culverts crossing the site, these have been surveyed and are shown on drawing 0906-09-SK05 (Appendix D). the North to South Culvert is 1-3m deep and has several changes in construction and pipe size from 600mm diameter Clay to a 1200 diameter brick barrel arch construction.

3.3 The East-West culvert starts at a manhole near the side gate and the cottage on Doctors Row, this culvert starts at 2.8m deep and 600x600mm masonry walled. The culvert ends at a side opening under an old building slab and is 1800x650mm masonry walled.

3.4 The two culverts join, drop steeply and exit the site to the south. The arrangement and condition prevent accurate survey, however it is evident the culvert is a similar masonry walled culvert with flags top construction. The culvert has partially collapsed at the South of the site, but is still flowing.

3.5 The proposed Drainage Layout including the routes of existing drainage is presented in Appendix D for reference purposes. Yorkshire Water sewer records are presented in Appendix E.

4 CONSULTATIONS

Land Drainage Authority Consultation

4.1 A consultation was requested from Kirklees Council who are the Lead Local Flood Authority (LLFA) for this area. Responses were received on 11/02/2021 and a meeting occurred on 17/02/2021 Responses are presented in Appendix G for reference purposes.

4.2 The LLFA has provided a map of 1st generation surface water flood risk overlaid with 3rd generation 1:100 year flood risk. This indicates a route of predicted surface water flooding through the site for the 1:100 year event. The route corresponds to the path of a culvert. The largest areas of flooding are shown as spread out at the top of the site in a flat are of the site, currently a concrete slab and in the lower south-west corner, currently a hollow to the rear of the lodge house. Refer to map, Appendix G.

4.3 The LLFA has recorded flood incidents at 2b Stafford Hill, approximately 75m South of the site and at least 5m lower. It can be seen on the LLFA flooding map this property is at a junction of several culverts including the culvert passing through the site.

4.4 The LLFA has highlighted that the 1st generation maps are an indication of surface water culverts location that are otherwise unverified. This has been confirmed for culverts on the Site. The arrangement is discussed above in section 3.4 and shown on drainage layout drawings in Appendix D. There may be other culverts outside the site in Shop Lane that are unmapped.

4.5 The LLFA maps show a culvert starting or re-emerging at a trough feature on the opposite side of Shop Lane from the site. This has been surveyed and is considered by the LLFA as too small to connect into. The trough and gullies are however part of the existing surface water runoff path for water coming down Shop Lane.

4.6 There are records of flooding within the site as a result of surcharging of the culverts in the South-west corner. This area is a low point, bounded by masonry

walls to the south. The exceedance flood route is past the Lodge house and into Shop Lane. There is currently a pipe cast in the boundary wall that would allow flooding to escae the site via the side alley. We propose to add pipe holes or gaps built into the base of the boundary wall to improve this flood exceedance route. The culvert will also be repaired within the site to decrease flood risk.

4.7 The LLFA consultation has ruled out using pumped surface water or infiltration drainage for the site.

4.8 The authority requires a surface water attenuation from the site for the 1:100 year critical event plus 30% climate change.

4.9 We discussed in the design meeting with the LLFA that the site would be treated as Greenfield due to the time roof drainage positively drained to the culverted drainage system. Surface water designs for the main site are to be based on 5 l/s/hectare calculated upon the built area draining towards roads, ie not including gardens, retaining structures area and POS. The preliminary attenuation design has been calculated on this basis.

4.10 We agreed on a preliminary basis that the smaller site on the other side of Shop Lane could connect unrestricted surface water to the new drainage system as a balance to the small limit on the main site and due to the difficulty in connecting the small site to the attenuation structures on the main site or on the Cockley Hill Site.

4.11 Plots 1-5 are currently shown on the drainage strategy, Appendix D, to connect downstream of the attenuation tank. Thus arrangement is subject to approval from the LLFA.

4.12 The LLFA highlighted the importance of surface water flow routes for flood exceedance; this has informed the design progression of the site layout, site levels and drainage system. Details of the flow routes are shown in drawings 0906-09-SK07 and discussed in the main FRA.

4.13 The main overland flood route corresponds to the existing North-South Culvert. It was agreed with the LLFA to divert the culvert down the spine road and offer

the diverted culvert for section 106 adoption. The potential flood route presented by blockages of this culvert will be moved to the road and future maintenance easier to access.

4.14 The East-West culvert cannot be diverted under a road due to the layout. The culvert will be retained and repaired or rebuilt. The route will be diverted to suit the layout as shown on the drainage layout 0906-09-SK5, Appendix D.

4.15 Site levels have been designed to allow any flow exceedance from within or outside the Site to pass through the site, following the existing flow path, and reduce flood risk to properties. Flow routes are generally on the main road and plot level are set higher.

4.16 There is an area in the South-West corner with potential for flooding if existing culverts are blocked or overloaded, this will be mitigated by raising the plot levels in this area and by increasing the flow capacity of the route through the existing Southern side access to Shop Lane.

4.17 The Cockley Hill Lane site to the North of the small Site is currently waterlogged and presents a source of runoff into the small site. Running water is evident in a small channel in the bottom of the large field, starting at the boundary of the small site, this spreads out again in the small site and we have not found any evidence of a positive drained outfall for the surface water runoff or indication of overland flow into the carpark off Orchard Road. The source of runoff will be dealt by the development of the Cockley Hill Lane site and is discussed in the 0906-05 drainage strategy.

Water Authority Consultation

4.18 A consultation was requested from Yorkshire Water, who is the Water Authority for this area, and a copy of their response, reference X000555, dated 25th January 2021, is presented in Appendix E.

4.19 Yorkshire Water advise that due to recent change in legislation, there could be sewers which have transferred over to the Water Authority that are not shown

on the statutory sewer records, but are located on the Developer's land. The comments reflect the Water Authority's 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 12 months.

4.20 Yorkshire Water requires development of the site to take place with separate systems for foul and surface water drainage. The separate systems would need to extend to the points of discharge to be agreed.

4.21 In terms of foul water, the Water Authority suggested that foul water domestic waste should discharge to the 525mm diameter sewer located in Shop Lane.

4.22 In respect of surface water, under the terms of Section H of the Building Regulations 2010, the disposal of surface water by means of soakaways should be considered as the primary method. The Water Authority advises that 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 not be a suitable solution for surface water disposal appropriate in this situation due to potential groundwater issues and areas of contamination within the footprint of the existing buildings.

4.23 In respect of surface water, Yorkshire Water confirmed that if other methods of surface water disposal are not viable, curtilage surface water discharges to the culverted watercourse will be restricted to the same rate of discharge as existing based on a 1 year storm minus 30%, with the existing flows to be based on surveys of current discharge connections. However this rate is superseded by the LLFA requirements.

4.24 The 300mm surface water overflow from combined system in Bankfield Lane is shown as abandoned on YW plans. Drainage survey confirmed no connection from the combined manhole to the site.

4.25 Yorkshire water records indicate small surface water sewers from the properties on Doctors Row connecting to the East-West culvert, these connections will be retained.

Environment Agency Consultation

4.26 A consultation response neighbouring Shop Lane site was been received on 22/03/21 which provides information on flood risk. A copy of their response is presented in Appendix F for reference purposes.

4.27 The EA response has not highlighted any watercourses or rivers within the site or the vicinity of the site relevant to the drainage design. Flood risk is addressed in the main FRA report.

4.28 EA guidance is to ensure that the proposed development does not create additional run-off compared with the existing situation and meets any LLFA recommended reduction in run-off, a suitable surface water drainage design will be developed to manage surface water flood risk. It is recommended that Sustainable Drainage Systems (SuDS) form an integral part of the Site drainage design.

5 CLIMATE CHANGE

5.1 The National Planning Policy Framework (NPPF) was introduced by the Department for Communities and Local Government in March 2012 and updated February 2019.

- The NPPF and the associated Planning Practice Guidance sets out the Government's planning policies for England and how these are expected to be applied.
- The NPPF sets out the Government's planning policies for England and how these are expected to be applied. The purpose of the policy is ultimately to achieve sustainable development.
- In relation to flood risk, the NPPF stresses the importance of taking into account the consequences, and not just the probability, of future flooding events. It clarifies the sequential test as a risk based approach to be applied at all stages of the planning process, to steer new development to areas at the lowest probability of flooding.
- The NPPF confirms that Strategic Flood Risk Assessments (SFRAs) should be carried out by the local planning authority to inform the preparation of Local Development Documents (LDDs), having regard to catchment wide flooding issues which affect the area. The SFRA will provide the information needed to apply the sequential approach in terms of flood risk.

5.2 The main study requirement is to identify the flood zones and vulnerability classification relevant to the proposed development, based on an assessment of current and future conditions. The NPPF is accompanied by the Planning Practice Guidance (PPG) which on the category of "Flood Risk and Coastal Change" sets out further guidance on the approaches to be adopted in the assessment of flood risk and how to future proof new developments from the impacts of climate change.

5.3 In line with the climate change allowances recommended by the EA in their February 2016 guidance (updated in February 2017) the impact of climate change on the peak rainfall intensities in urban drainage designs should be

assessed by increasing them by 20% and 40% (central and upper end respectively) when designing for the '2080s' scenario (2070 to 2115).

5.4 An allowance of 30% for climate change to account for the impact of global warming has been applied to the design of this proposed surface water drainage strategy to ensure that the proposed development does not flood during a 1 in 100-year event during its lifetime.

5.5 It is understood that the Kirklees Council flood risk requirements for managing on/off-site flood risk from fluvial flooding is to assess the development using a 30% allowance for climate change for the 1 in 100 year event. Therefore, the drainage system should be designed in accordance with this requirement. No urban creep is applied for the 100 year event and default CV values are 0.75/0.84.

Water Quality

5.6 The general principles to mitigate against adverse impacts on water quality of the receiving water environment is described in the CIRIA 753 "The SuDS Manual" (2015). This document recommends the following steps to determine the required water quality management for discharges to surface waters and groundwaters based on the risk posed:

- Interception: Prevent runoff and associated pollutants from the site to receiving surface waters for the majority of small rainfall events (e.g. <5mm rainfall events);
- Determine the pollution hazard level associated with the given type of development;
- Select a risk assessment approach based on receiving water environment and the pollution hazard level; and
- Undertake a detailed risk assessment for each outfall or discharge point taking into account the pollution hazard level, the status of the receiving water environment and effectiveness of the proposed SuDS techniques.

5.7 The extent of the treatment required will depend on the water quality status of receiving watercourses, land use, the level of pollution prevention in the catchment and for groundwater, the natural protection afforded by underlying

soil layers. The pollution hazard level of the development type should be identified. Residential roofs are noted as having 'very low' pollution hazard level and require removal of gross solids and sediments only. Residential car parks, access roads and driveways are shown to present 'low' pollution hazard level and require application of a 'simple index approach' for water quality risk assessment for discharges to surface and ground waters.

6 SURFACE WATER DRAINAGE

6.1 It is a requirement to ensure that surface water run-off from any proposed development has negligible consequence on downstream areas either in sewer capacity or discharge to watercourse.

Existing Surface Water Run-Off

6.2 The topographical survey shows the pre-existing site was drained to the existing Foul sewers and culverted watercourses. However given the time the Site has been unused, the site will be treated as Greenfield and all connections formed from new. Existing positive connections to the culverted watercourse, such as those from Doctors Row Cottages will be retained.

Proposed Drainage Regime

6.3 The surface water culverted watercourses are available as a point of discharge. A drainage survey has confirmed the culverts on Site have sufficient depth and size to connect to the site. Diversion works and repairs will be required as part of the Sites development.

6.4 Based on the proposed masterplan for the Site, the total contributing area has been determined to be 0.6 ha. The proposed development has been designed to drain via a combination of piped attenuation and an attenuation tank to attenuate flows of surface water runoff being discharged into the existing watercourse. The majority of surface water runoff will be stored via the attenuation tank, which has been designed to store and release surface water to the existing watercourse at a restricted discharge rate of 5l/s/ha for all storm events up to and including the 1 in 100 year + 30% climate change return period. To achieve this, the attenuation tank has been sized to provide 403m^3 of storage (based on the current masterplan) which is fitted with a flow restriction device to ensure that the attenuated rate of surface water discharged to the existing watercourse does not exceed 7.2 l/s.

6.5 Any connection will be subject to the prior agreement of the Regulatory Authorities. Any variance in the discharge rate or existing positively drained area may result in a larger attenuation volume being required.

6.6 The surface water from the small site and from the lowest plots 1-5 will connect into the new drainage system un-attenuated. This is a balance to the attenuated main site to represent the pre-existing impermeable area of the site. The sewer connections from the small site will include offsite ewers built in the existing Highway.

6.7 Refer to ARP drawing 0906-09-SK05 Indicative Foul and Surface Water Drainage Strategy in Appendix D for the Proposed Surface Water Drainage Strategy in for an indicative layout of the proposed surface water drainage system. The indicative surface water calculations are presented in Appendix I. However, detailed calculations and proposals will need to be prepared and submitted to the Planning Authority for approval prior to construction.

7 SUSTAINABLE DRAINAGE SYSTEMS (SuDS)

7.1 SuDS are drainage systems that are considered to be environmentally beneficial, causing minimal or no long-term detrimental damage. They are often regarded as a sequence of management practices, control structures and strategies designed to efficiently and sustainably drain surface water, while minimising pollution and managing the impact on water quality of local water bodies.

7.2 Well-designed SuDS provide effective surface run-off drainage and provide opportunities to reduce the causes and impacts of flood risk, remove pollutants from urban run-off at source, and combine water management with green space with benefits for amenity, recreation and wildlife.

7.3 Current drainage networks, and local watercourse networks only have a limited capacity, as the country is developed additional volume is being put into these networks, additionally climate change projections show the amount of heavy rainfall and localised flooding will only get worse. Therefore, to be sustainable for future generations the government, and local authorities have strategies and guidance on reducing flood risk and building Sites that consider sustainability when designing their drainage schemes.

7.4 The LLFA, Kirklees Council, will assess a proposed development for compliance against their published guidance through the planning process. In addition, the NPPF Planning Practice Guidance advocates the use of SuDS and the consideration of SuDS where reasonably practicably.

7.5 SuDS come in a variety of techniques, each with their own benefit and consideration as to the most appropriate type of SuDS and where these should be applied has been incorporated into the masterplanning of this proposed development. Table 7-1 lists those SuD Systems suitable for this type of development, where these could potentially feature within the development and the benefits provided.

7.6 The LLFA guidance should be followed when considering SuDS, which covers construction / use / and maintenance of the SuDS proposed.

Table 7-1: Types of SuDS Features

SuDS Feature	Description	Pros	Cons
Ground Infiltration Systems / Soakaway Tank	Such systems will be proposed if ground conditions prove favourable. These features store runoff via a voided-below ground system that allows surface water runoff to slowly infiltrate into the surrounding ground.	A method of controlling surface water runoff at source, mimicking the natural drainage regime and therefore the favoured method of discharge. Does not contribute to offSite watercourses or sewers, and thus downstream flooding.	Must be Sited 5m from any structure/building. Contaminated ground could migrate pollutants into the underlying groundwater or not suitable for draining polluted runoff. Possible reduced performance during long wet periods. Where property owner is responsible for operation and maintenance, performance difficult to guarantee.
Pervious Surfacing	Two types: 1. **Porous** surfacing is a surface that allows water to infiltrate across or percolate through the entire surface dressing. 2. **Permeable** surfacing is formed of material that is itself impervious to water, but by virtue of voids/joints formed within or between the surface material, allows surface water to percolate through to the underlying ground.	Attenuates flows and reduces the effects of pollution in runoff to receiving waterbodies. Can be used in high density developments with a range of surface finishes, providing a flexible and tailored solution that can suit the proposed usage and design life. Reduces the need for deep excavations for drainage, which can have significant cost benefits. Lined systems can be used where infiltration to ground is not desirable or where soil integrity could be compromised. Allows dual use of space and therefore no additional land take is required. Eliminates surface ponding and ice. Very resilient to lack of maintenance.	Cannot be applied where large sediment loads are anticipated to be washed onto the surface. Risk of long term clogging and weed growth if poorly maintained. Potential adoption issues by local highway authority.
Basins	Detention basins are surface water storage basins that provide flow control through attenuation of stormwater runoff. They also provide a level of settling out for particulate pollutants. These features are normally dry and in certain situations the land may also function as a recreational facility.	Can cater for a wide range of rainfall events. Can be used where groundwater is vulnerable (if lined). Simple and cost effective to design, construct and maintain. Potential for dual land use. Safe and visible capture of accidental spillages.	Little reduction in runoff volume (if lined) and detention depths may be constrained by system outlet levels, requiring a larger footprint/land take if only shallow depths can be achieved. Opportunity for biodiversity enhancement is reduced due to basins usually being seeded with grass, which is regularly mown to ensure storage capacity, providing a mono culture habitat.
Swales	Swale corridors can be proposed within public open space which will provide continuity and cohesion with the development proposed as part of Phase I. Swales comprise a vegetated channel used to convey and treat runoff (via filtration).	Good removal of urban pollutants. Can provide further attenuation reducing the rate of runoff. Low capital cost. Attractive for amenity spaces, provides biodiversity. Pollution and blockages are visible and easily dealt with.	Not suitable for steep areas or areas with road side parking. Limits opportunities to use trees for landscaping. Risks of blockages in connecting pipe work. Can be demanding on land take.
Trees	Bio retention trees could be considered along estate roads and car parking areas. Tree pits will be	Attractive for amenity spaces, contributes to overall requirement for planting. Very effective in	Maintenance of trees can be difficult in certain SuDS features. Susceptible to clogging other

SuDS Feature	Description	Pros	Cons
	designed to drain to the piped network which in turn will discharge to either a soakaway or attenuation feature. These can be planted within a range SuDS features which can add to their performance as root growth and decomposition increase soil infiltration capacities.	removing urban pollutants. Can reduce the rate and volume of runoff and resolve existing surface and ground water flooding issues.	drainage features/gullies if surrounding landscape is not managed.
Attenuation Tank	Attenuation tanks can be installed to receive and store runoff from the development. These systems will comprise lined below ground voids, used to temporarily store runoff before controlled release into the public sewer network. This will typically comprise geocellular modules.	Efficient way to store water in a concentrated area. Modular and flexible. High void ratio, lightweight and easy to install. Can be installed beneath trafficked and non-trafficked areas (providing structural performance is proven to be sufficient).	Large land take, must be located in open areas (amenity spaces or parking courts) if highway is to be adopted. No water or amenity provision. Can be difficult to maintain.

7.7 During the detailed design stage, the design team will consider which SuDS features to implement and determine in further detail how SuDS are incorporated into the layout, so that controlling surface water quantity (flood risk management), improving surface water quality (water quality management) and providing added development amenity (including biodiversity) benefits are incorporated into the design.

7.8 At this stage and based on recommendation from the LLFA, we have designed the surface water drainage not using any SuDS systems, the Adjacent Cockley Hill site is better suited to SuDS and uses a SuDS basin to provide attenuation.

Infiltration type SuDS are not considered appropriate for this site due to ground conditions and the generally steep topography.

Lined porous paving could be considered at the design stage as part of the drainage design but would be restricted to private driveways as the main roads are too steep to benefit from porous paving and are unlikely to be approved by the adopting authority.

Additional SuDS drainage is not required by the LLFA for road drainage, linear SuDS such as swales or filter trenches would not produce any benefit for attenuation design due to the steepness of the site.

8 FOUL WATER DRAINAGE

8.1 The current proposed site plan is presented in Appendix C and the proposed drainage plan is presented in Appendix D for reference purposes.

8.2 Yorkshire Water has indicated that they would accept discharge of foul water domestic waste into the 525mm diameter foul sewer located in Shop Lane. The sewer in Shop Lane is approximately 2.3m deep, therefore no pumping is required.

8.3 Further investigation will be required to ensure suitable condition, depth and outfall from this existing infrastructure. The proposed strategy is illustrated in ARP drawings 0906-05-SK04 Indicative Foul and Surface Water Drainage Strategy (refer Appendix D)

8.4 Foul water of a domestic quality generated by the proposed development will be collected from each unit and drained by gravity sewer to the Yorkshire Water public Sewer system. Any connection and rates will need to be formally approved by the regulatory authority.

9 CONCLUSIONS & RECOMMENDATIONS

9.1 Foul water of a domestic quality will discharge to the existing public sewer system. Yorkshire Water has confirmed that there is adequate capacity within the surrounding public foul sewers to receive the proposed foul flows.

9.2 Infiltration drainage is not considered to be a viable proposal for discharge of surface water for this site.

9.3 The proposed surface water system should be designed to accommodate a 1 in 30 year storm event without flooding and the 1 in 100 year storm plus climate change event should be retained within the site in an area which will not affect the new buildings or third party land from flooding. Attenuation could be achieved by several methods of below ground attenuation. The intention is for the Surface Water drainage system to be adopted.

9.4 The proposed attenuation tank provides attenuation for the sites surface water runoff, the location is shown indicatively on the proposed drainage strategy drawing 0906-09-SK05. The tank arrangement can be altered at detail design stage and to suit the requirement of Yorkshire Water and Kirklees Council. We anticipate the tank will be put forward for adoption by Yorkshire Water.

9.5 This report should be read in conjunction with the Flood Risk Assessment prepared for the site, and the foul and surface water drainage strategy drawing, reference 0906/09/SK05, prepared by ARP Associates.

9.6 Any connection will be subject to the prior agreement of the Regulatory Authorities.

9.7 Diverted watercourses on the site will be designed to have improved access and sufficient manhole access to enable future maintenance.

9.8 Periodic inspection and maintenance of the drainage systems shall be undertaken to maintain performance over the lifetime of the development, in

accordance with a maintenance schedule to be developed at the detail design stage.

9.9 Based on implementation of the strategy set out above, it is concluded that the proposed development can satisfy the requirements of the National Planning Policy Framework and the Planning Practice Guidance in relation to foul and surface water drainage.

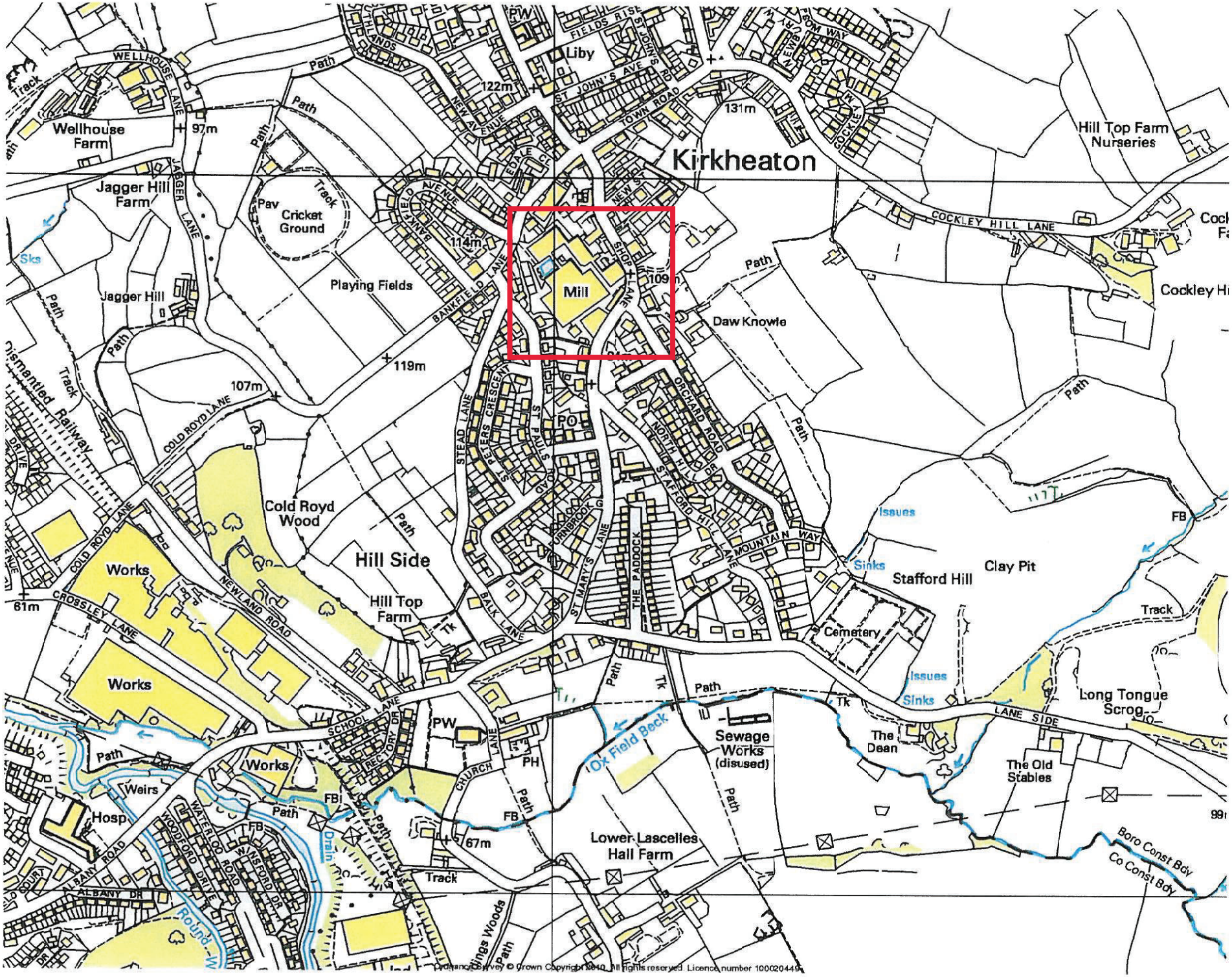
RECOMMENDATIONS

9.10 The following proposals and mitigation measures are recommended to inform the design of the drainage strategy further and ensure that development remains safe during an exceedance event:

- Further investigation is undertaken to inform design of the culvert diversion.
- Finished floor levels are set at a minimum 150mm above the surrounding ground level to prevent water ingress through doorways;
- Positioning of dwellings in natural depressions should be avoided;
- Ground level setting and landscaping within the Site should ensure that any surface water runoff flood routes or exceedance flows are directed away from the buildings and towards the flood exceedance conveyance routes through the site (generally the main site road). Ultimately any overland flows should be directed to the existing Gullies and Watercourses in Shop Lane.

9.11 Provided these design proposals and mitigation measures are implemented and adhered to it is considered the development should remain safe for its lifetime and will not cause or increase flood risk elsewhere.

Appendix A
Site Location Plan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Jagger Hill Farm
Jagger Hill
Cricket Ground
Playing Fields
Cold Royd Wood
Hill Side
Hill Top Farm
Works
Works
Works
Hill Top Farm Nurseries
Daw Knowle
Cockley Hi
Stafford Hill
Clay Pit
Cemetery
Sewage Works (disused)
Ox Field Beck
Lower Lascelles Hall Farm
Long Tongue Scrog
The Dean
The Old Stables
Boro Const Bdy
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Dismantled Railway
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119m
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109m
67m
61m
WELLHOUSE LANE
JAGGER LANE
COCKLEY HILL LANE
BANKFIELD LANE
STEAD LANE
ST PETERS CRESCENT
ST PAUL'S ROAD
ORCHARD ROAD
NORTH HILL
STAFFORD HILL
MOUNTAIN WAY
ST MARY'S LANE
THE PADDOCK
BALK LANE
COLD ROYD LANE
NEWLAND ROAD
CROSSLEY LANE
SCHOOL LANE
RECTORY DR
CHURCH LANE
LANE SIDE
ST JOHN'S AVE
TOWN ROAD
NEW AVENUE
FIELDS RISE
THE LANDS
SHOP LANE
BAIN ROAD
ALBANY DR
WOODFORD DRIVE
WINSFORD DR
Rings Woods
Round-W
Drain
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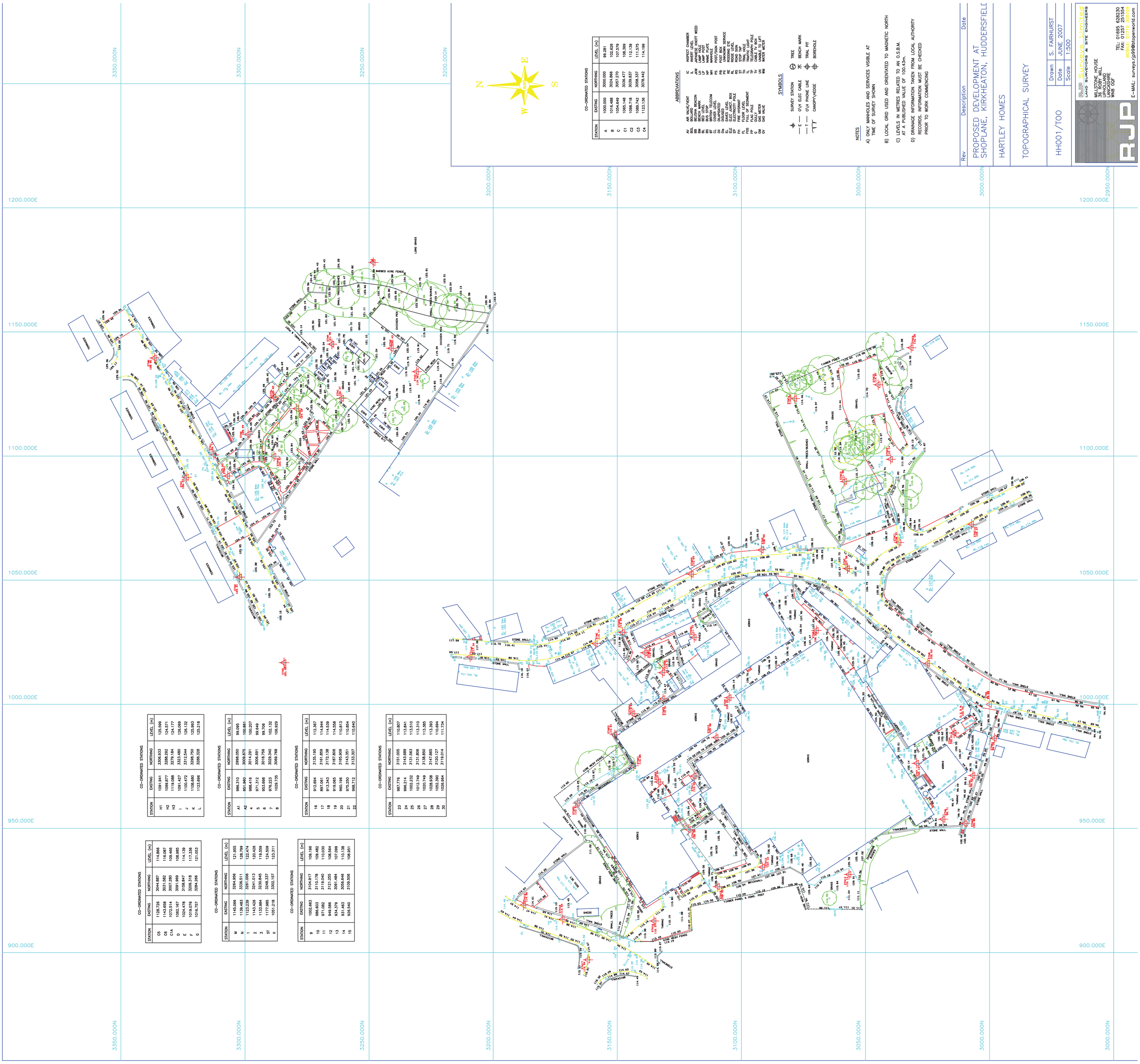
Appendix B
Topographical Survey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3000.000N
1200.000E
1150.000E
1100.000E
1050.000E
1000.000E
950.000E
900.000E
N
E
S
W
SHEDS
STONEWALL
STONE WALL
TIMBER FENCE
WIRE MESH FENCE
BARBED WIRE FENCE
CHICKEN PEN
GRASS
LONG GRASS
GRAVEL
PAVED
WORKS
SMALL TREES/BUSHES
TARMAC
CONCRETE
WATER
BRICKWALL
TIMBER PANEL & CONC POST
CO-ORDINATED STATIONS
STATION | EASTING | NORTHING | LEVEL (m)
A | 1000.000 | 3000.000 | 99.281
B | 1016.488 | 3024.866 | 102.626
C | 1054.649 | 3057.270 | 107.579
C1 | 1065.148 | 3036.477 | 108.369
C2 | 1098.718 | 3039.837 | 112.139
C3 | 1089.742 | 3058.337 | 111.575
C4 | 1123.136 | 3078.442 | 114.199
ABBREVIATIONS
AV AIR VALVE/VENT
BOL BOLLARD
BB BELGIAN BEACON
BM BENCH MARK
BL BED LEVEL
BS BUS STOP
BT BRITISH TELECOM
CL COVER LEVEL
DO DRAWOFFED
Da DISUSED
EL EAVES LEVEL
ELC ELECTRIC BOX
EP ELECTRICITY POLE
FH FIRE HYDRANT
FL FLOOR LEVEL
FOS FULL OF SEDIMENT
FP FLAG POLE
G GULLY
GM GAS METER
GV GAS VALVE
IC INSPECT CHAMBER
IL INVERT LEVEL
JKW JAPANESE KNOT WEED
LP LAMP POST
MH MANHOLE
PS POST/SIGN POST
PB POST BOX
PSK PARKING BAY
RE RODDING EYE
RL ROOF LEVEL
RS ROAD SIGN
ST STOP TAP
TL TRAFFIC LIGHT
TP TELEGRAPH POLE
TR TRIAL HOLE
UN UNABLE TO LIFT
WM WATER METER
SYMBOLS
SURVEY STATION
O/H ELEC CABLE
O/H PHONE LINE
CANOPY/HEDGE
TREE
BENCH MARK
TRIAL PIT
BOREHOLE
NOTES
A) ONLY MANHOLES AND SERVICES VISIBLE AT TIME OF SURVEY SHOWN
B) LOCAL GRID USED AND ORIENTATED TO MAGNETIC NORTH
C) LEVELS IN METRES RELATED TO AN O.S.B.M. AT A PUBLISHED VALUE OF 100.43m.
D) DRAINAGE INFORMATION TAKEN FROM LOCAL AUTHORITY RECORDS. INFORMATION MUST BE CHECKED PRIOR TO WORK COMMENCING
CO-ORDINATED STATIONS
STATION | EASTING | NORTHING | LEVEL (m)
H1 | 1091.941 | 3306.933 | 125.599
H2 | 1099.877 | 3288.292 | 124.571
H3 | 1119.088 | 3279.184 | 124.177
I | 1091.427 | 3323.480 | 126.069
J | 1100.472 | 3312.544 | 126.132
K | 1108.680 | 3298.750 | 125.993
L | 1123.696 | 3288.328 | 125.218
CO-ORDINATED STATIONS
STATION | EASTING | NORTHING | LEVEL (m)
A1 | 986.310 | 2998.050 | 99.095
A2 | 951.980 | 3009.875 | 100.881
4 | 988.416 | 3014.291 | 100.207
4 | 971.312 | 3006.691 | 99.649
5 | 953.698 | 3018.756 | 99.706
6 | 978.223 | 3029.340 | 102.132
7 | 1029.735 | 3069.768 | 106.929
CO-ORDINATED STATIONS
STATION | EASTING | NORTHING | LEVEL (m)
16 | 912.694 | 3135.195 | 112.367
17 | 897.061 | 3161.859 | 114.944
18 | 913.343 | 3172.138 | 114.539
19 | 919.065 | 3187.806 | 114.558
20 | 960.196 | 3165.909 | 110.813
21 | 975.250 | 3143.351 | 110.854
22 | 988.712 | 3133.307 | 110.640
CO-ORDINATED STATIONS
STATION | EASTING | NORTHING | LEVEL (m)
23 | 987.776 | 3151.005 | 110.807
24 | 996.214 | 3143.689 | 113.841
25 | 1002.232 | 3131.563 | 113.510
26 | 1012.749 | 3131.806 | 113.310
27 | 1020.749 | 3138.850 | 113.385
28 | 1028.938 | 3147.865 | 113.393
29 | 1052.390 | 3120.127 | 110.694
30 | 1026.964 | 3119.014 | 111.734
CO-ORDINATED STATIONS
STATION | EASTING | NORTHING | LEVEL (m)
C5 | 1128.726 | 3044.887 | 114.866
C6 | 1143.658 | 3031.582 | 116.087
C1A | 1072.514 | 3007.280 | 109.466
D | 1062.107 | 3091.969 | 108.985
E | 1024.478 | 3158.847 | 114.139
F | 1019.076 | 3209.318 | 117.336
G | 1016.757 | 3284.286 | 121.053
CO-ORDINATED STATIONS
STATION | EASTING | NORTHING | LEVEL (m)
M | 1145.086 | 3284.956 | 121.955
N | 1139.483 | 3336.511 | 128.799
1 | 1123.239 | 3261.006 | 122.474
2 | 1143.426 | 3241.013 | 120.426
3 | 1133.984 | 3230.845 | 119.559
ST | 1177.985 | 3248.337 | 124.509
X | 1051.218 | 3302.157 | 123.311
CO-ORDINATED STATIONS
STATION | EASTING | NORTHING | LEVEL (m)
9 | 1002.663 | 3104.917 | 109.196
10 | 986.603 | 3110.178 | 109.482
11 | 971.082 | 3119.040 | 110.030
12 | 949.586 | 3121.255 | 108.564
13 | 934.379 | 3091.484 | 107.099
14 | 931.463 | 3056.646 | 110.138
15 | 926.540 | 3109.506 | 108.951
Rev | Description | Date
PROPOSED DEVELOPMENT AT SHOPLANE, KIRKHEATON, HUDDERSFIELD
HARTLEY HOMES
TOPOGRAPHICAL SURVEY
HH001/TOO
Drawn | S. FAIRHURST
Date | JUNE 2007
Scale | 1:500
RJP Surveys Limited
LAND SURVEYORS & SITE ENGINEERS
MILLSTONE HOUSE
35 HOPE MILL
UPHOLLAND
LANCASHIRE
WN8 0QF
TEL: 01695 628230
FAX: 01257 251554
MOBILE: 07710 308709
E-MAIL: surveys.rjp99@btopenworld.com

Appendix C
Proposed Site Plan

PLANNING LAYOUT LAYERS KEY:

- BRICK WALL
- TIMBER FENCE
- ELECTRIC VEHICLE CHARGING POINT
- PUBLIC RIGHT OF WAY
- REAR ACCESS GATE

SCHEDULE OF ACCOMMODATION:

HOUSETYPE	AMOUNT
TYPE A2 3 Storey FOG 2 Bed	4 No.
TYPE C2 2 Storey Semi/Ter 2 Bed	18No.
TYPE R 2 Storey Semi/Ter 3 Bed	7 No.
TYPE S 2 Storey Semi/Ter/Det 3 Bed	5 No.
TYPE F 2 Storey Semi 3 Bed	8 No.
TYPE P 2 Storey Det 4 Bed	4 No.
TYPE G 2 Storey Det 4 Bed	2 No.
TOTAL	48 No.

REV	DATE	DESCRIPTION	BY	CHECK
REV F	05.02.21	ADDITIONAL PLOTS ADDED TO SITE AREA OPPOSITE SHOP LANE. KEY AND SCHEDULE UPDATED.	SD	LM
REV E	28.01.21	HOUSETYPE R & S BLOCKS UPDATED. PLOT 4 CHANGED TO A C2 HOUSETYPE. PLOT 18 PARKING MOVED TO THE FRONT. ELECTRIC VEHICLE CHARGING POINTS ADDED. KEY ADDED.	SD	LM
REV E	28.01.21	HOUSETYPE R & S BLOCKS UPDATED. PLOT 4 CHANGED TO A C2 HOUSETYPE. PLOT 18 PARKING MOVED TO THE FRONT. ELECTRIC VEHICLE CHARGING POINTS ADDED. KEY ADDED.	SD	LM
REV D	19.11.20	SITE LAYOUT UPDATED TO INCORPORATE ENGINEERS COMMENTS. HOUSETYPES R, S AND A2 ADDED.	RB	LM
REV C	12.08.15	PUBLIC RIGHT OF WAY 255 AND VISIBILITY SPLAYS ADDED TO LAYOUT.	RB	LM
REV B	01.06.15	PUBLIC RIGHT OF WAY ADDED TO LAYOUT	RB	LM
REV A	17.09.14	PLOT 49 REMOVED FROM SOUTH EASTERN PARCEL TO INCORPORATE ACCESS TO EXISTING UNIT	RAN	JRP

jrp ARCHITECTURE | PLANNING | LANDSCAPE

CLIENT:
HARTLEY PROPERTIES

PROJECT:
PROPOSED RESIDENTIAL DEVELOPMENT @ SHOP LANE, KIRKHEATON

DRAWING:
PROPOSED SITE LAYOUT

DRAWING NUMBER:
P09:4266:01 F

SCALE @ A1:
1:500

DRAWN: RAN **DATE:** MAR 14

CHECKED: LM **DATE:** MAR 14

WIP

NORTH

1:500 SCALE

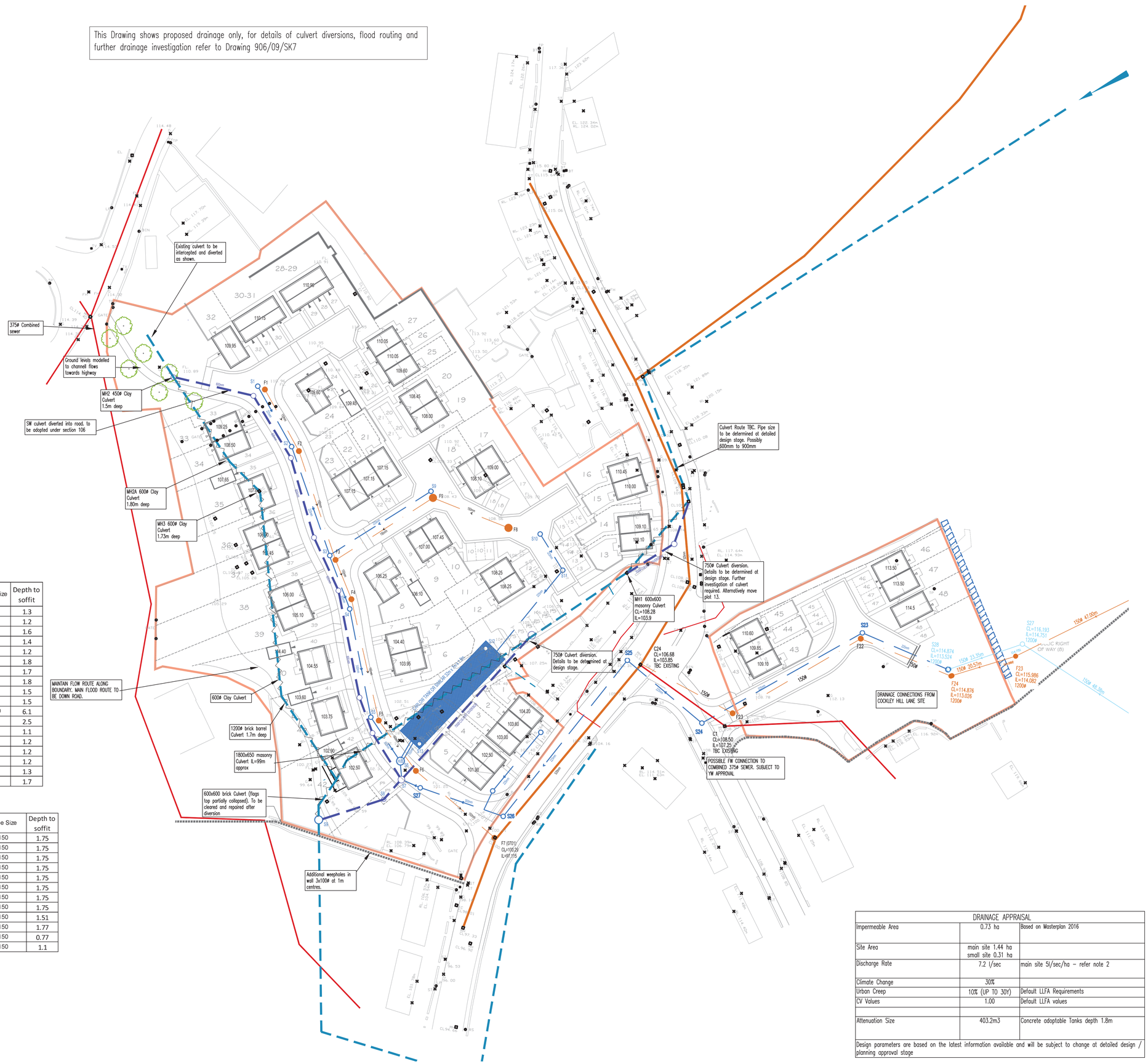
10m 50m

14 MARINER COURT / CALDER PARK / WAKEFIELD / WF4 3FL
01924 383322 / www.jrpassoc.co.uk / info@jrpassoc.co.uk
jrpassociates is a trading style of John R Paley Associates Limited

01 / PROPOSED SITE LAYOUT

Appendix D
Drainage Strategy Drawings

This Drawing shows proposed drainage only, for details of culvert diversions, flood routing and further drainage investigation refer to Drawing 906/09/SK7



Surface Water Network

US/MH Name	US/CL (m)	US/IL (m)	Pipe Size	Depth to soffit
1	109.1	107.6	225	1.3
2	107.9	106.5	225	1.2
3	105.8	103.9	300	1.6
4	104.8	103.2	300	1.4
5	102.9	101.3	300	1.2
6	101.8	99.2	750	1.8
7	101.1	99.2	225	1.7
9	107.3	105.2	225	1.8
10	108.2	106.5	225	1.5
11	108.1	106.4	225	1.5
12	107.2	99.3	1800	6.1
13	102.5	99.3	750	2.5
22	114.3	113.0	225	1.1
23	112.0	110.6	225	1.2
24	108.3	106.8	225	1.2
25	106.5	105.1	225	1.2
26	101.0	99.5	225	1.3
27	101.4	99.4	300	1.7

Foul Network

US/MH Name	US/CL (m)	US/IL (m)	Pipe Size	Depth to soffit
1	109.035	107.135	150	1.75
2	107.781	105.881	150	1.75
3	105.739	103.839	150	1.75
4	105.002	103.102	150	1.75
5	102.788	100.888	150	1.75
6	101.667	99.767	150	1.75
8	108.159	106.259	150	1.75
9	107.076	105.176	150	1.75
21	114.520	112.860	150	1.51
22	112.050	110.125	150	1.77
23	108.224	107.300	150	0.77
24	108.500	107.250	150	1.1

SUBJECT TO THE APPROVAL OF ALL RELEVANT AUTHORITIES

DRAINAGE APPRAISAL		
Impermeable Area	0.73 ha	Based on Masterplan 2016
Site Area	main site 1.44 ha small site 0.31 ha	
Discharge Rate	7.2 l/sec	main site 5l/sec/ha – refer note 2
Climate Change	30%	
Urban Creep	10% (UP TO 30Y)	Default LLFA Requirements
CV Values	1.00	Default LLFA values
Attenuation Size	403.2m3	Concrete adoptable Tanks depth 1.8m
Design parameters are based on the latest information available and will be subject to change at detailed design / planning approval stage		

N O T E S

ATTENTION IS DRAWN TO THE REQUIREMENTS OF THE CONSTRUCTION DESIGN AND MANAGEMENT REGULATIONS 2015 AND THE DUTIES AND RESPONSIBILITIES CONTAINED THEREIN

K E Y

- Storm water manhole
- Foul water manhole
- Storm water sewer
- Foul water sewer
- Existing Combined sewer
- Diverted Culverted Watercourse
- Existing Culverted Watercourse
- Existing Foul water sewer
- Easement
- Site Boundary

DRAINAGE STRATEGY NOTES

1. All proposals are subject to detailed investigation to prove the route, size, depth and structural condition of any culverted watercourse
2. All proposals are subject to the approval of all regulatory bodies
3. Survey is based on a 2016 topo survey before demolition. Contours within the site are approximate only and need to be resurveyed.

APPRAISAL NOTES

SURFACE WATER DRAINAGE

1. This appraisal assumes that infiltration drainage has been discounted as a viable option.
2. Allowable discharge rate for the main site has been calculated as 7.2 l/sec based on the Kirklees MDC consultation that a restricted rate of 5 l/s/ha should be applied. Discharge from the small site has been assumed unrestricted to balance the greenfield rate applied to the Main site. The connection from the Cockley Hill site is limited at greenfield and is shown in details on separate 0906-05 drawings.
3. Surface water attenuation is up to and including all storms for 1 in 100 year return period + 30% allowance for climate change. An urban creep factor of 10% has been added for storms up to 30 years.
4. Storage requirements are met by a tank structure with a plan area 224m2 and a height of 1.8m. Exact details are subject to detailed design and outcome of drainage surveys. The storage tank has been shown will require an easement of 2m around the tank.
5. Due to the topography of the site, it is thought that an underground tank to accommodate the 1 in 100 year + 30% storm events would be a preferred option in lieu of a pond or detention basin. (THIS IS SUBJECT TO THE APPROVAL OF ALL PARTIES)
6. The Outfall from the Cockley Hill Lane Site is proposed to connect into the drainage system and thence discharge into the culvert watercourses.
7. Level and exact location of outfall to watercourse within the Shop Lane site is unknown but assumed to be 1000mm deep. The exact route, level and structural condition upstream and downstream will need to be determined before detailed design can be carried out.

FOUL DRAINAGE

1. The foul flows from the Cockley Hill Lane site will discharge to the new drainage system and thence into the Combined sewer in Shop Lane.
2. The connection to the existing combined sewer may be outside of the site boundary. If so then the adjacent landowner will have to be part to the Section 104 Agreement or Grant a Deed of Easement. Alternatively the off site element of the works can be requisitioned under Section 98 of the Water Industry Act 1991.
6. Unless shown otherwise all foul sewers are 150mmø
7. The Outfall is proposed to connect into the culvert watercourses in the Shop Lane Site.
8. The exact route, level and structural condition upstream and downstream of sewers and culverts will need to be determined before detailed design can be carried out.

EXISTING SEWERS

1. There are existing 150mmø and 225mmø combined sewers within the site boundary. These may require diverting to suit the proposed retaining wall layout for which a sewer diversion agreement under Section 185 of the Water Industry Act 1991 will be required.
2. A CCTV survey of the existing drainage will be required to prove connections to the sewer which will have to be accommodated into the diversion works.

GENERAL NOTES

1. Easements will be required to all sewers outside of adoptable highways. Easement to be 3m either side of pipes or 2m from the edge of the storage tank. (SUBJECT TO YORKSHIRE WATER APPROVAL)

Rev	By	Date	Revision	Chk	Apvd
C	AT	23.03.21	existing culvert info added.		
B	AT	02.03.21	Levels updated, culvert moved		
A	AT	04.02.21	Levels updated, existing culvert		
/	AT	22.01.21	Issued for information	MI	

ARP ASSOCIATES
Chartered Consulting Engineers
Northwest House ● 5 & 6 Northwest Business Park ● Servia Hill, Leeds ● LS6 2QH
☎ 0113 245 8498 ✉ 0113 244 3864 ● leeds@arpassociates.co.uk ● www.arpassociates.co.uk
ARP Associates is a trading division of ARP Geotechnical Ltd, a company registered in England and Wales with company number 3771811, whose registered office is at 5/6 Northwest Business Park, Servia Hill, Leeds LS6 2QH

TITLE
DRAINAGE FEASIBILITY

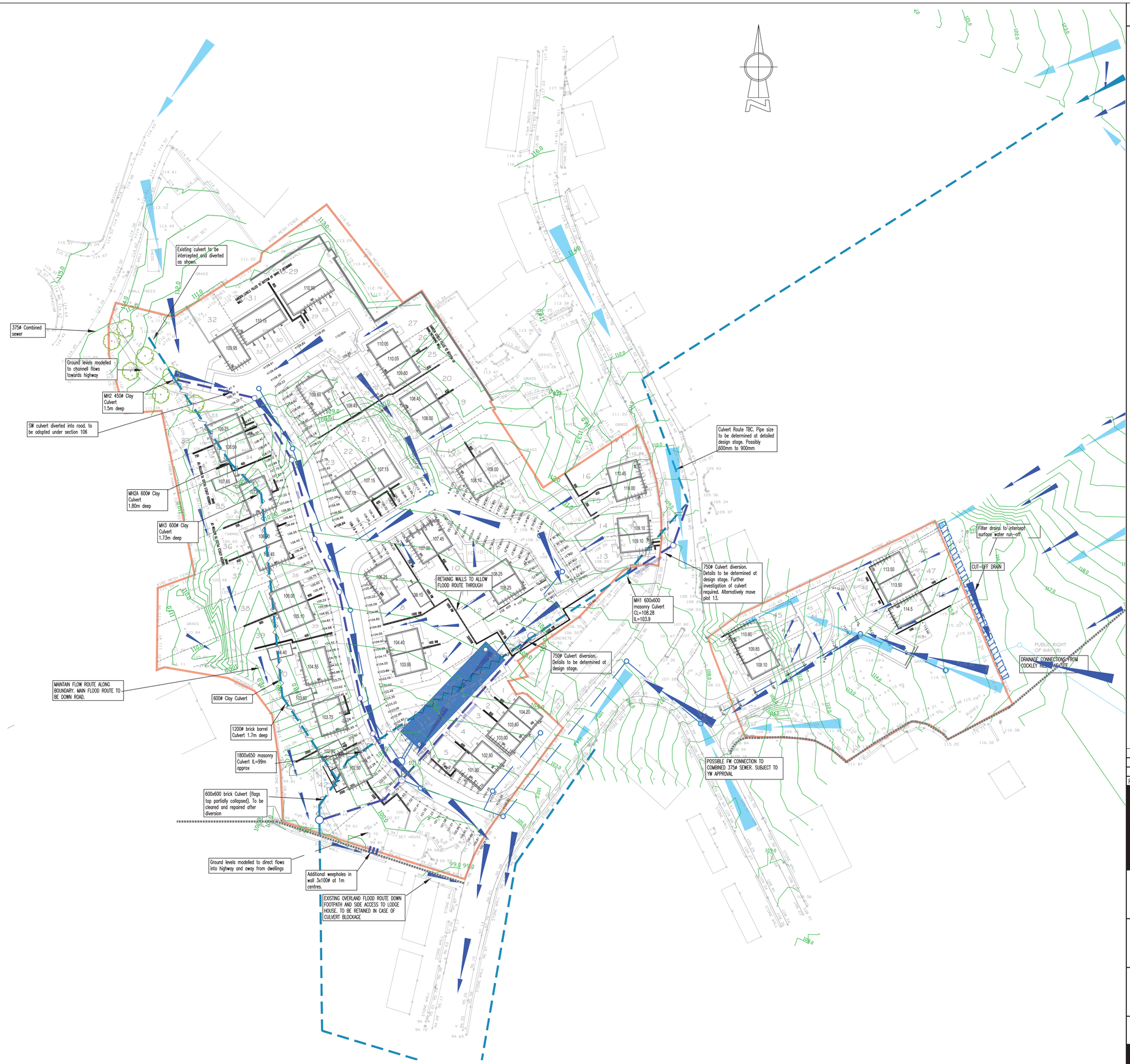
PROJECT
SHOP LANE, KIRKHEATON

CLIENT
HARTLEY PROPERTIES

DRAWING STATUS
PRELIMINARY

Scale 1:500 @ A1 | Date JAN 21 | Drawn AT | Chk. MI

Drg. No. 0906/09/SK5 | Rev C



N O T E S

K E Y

- Storm water manhole
- Storm water sewer
- Diverted Culverted Watercourse
- Existing Culverted Watercourse
- Site Boundary
- 400 — Retaining wall (Max height shown)
- HWRW — Highway Retaining Wall
- Extra facing brickwork – underbuild

SUBJECT TO THE APPROVAL OF ALL RELEVANT AUTHORITIES

Rev	By	Date	Revision	Chk
B	AT	29.03.21	Existing Culverts amended	
A	AT	15.02.21	Revised Layout F	
/	AT	27.01.21	Issued for approval	

ARP ASSOCIATES
CHARTERED CONSULTING ENGINEERS

Northwest House • 5/6 Northwest Business Park • Servia Hill • Leeds LS6 2QH
Telephone: 0113 2458498 • Fax: 0113 2443864 • E-Mail: leeds@arpassociates.co.uk
ARP Associates is a trading division of ARP Geotechnical Ltd, a company registered in England and Wales with company number 3771811, whose registered office is at 5/6 Northwest Business Park, Servia Hill, Leeds LS6 2QH

TITLE
FLOOD ROUTING

PROJECT
SHOP LANE
KIRKHEATON

CLIENT
HARTLEY DEVELOPMENTS

Scale	Date	Drawn	Chk.
1:500 @ A1	JAN 21	AT	MI

Drg. No. 906/09/SK7 Rev B

Appendix E
Yorkshire Water

Yorkshire Water Services
Developer Services
Pre-Development Team
PO BOX 52
Bradford
BD3 7AY

Tel: 0345 120 8482
Fax:

Email:
technical.sewerage@yorkshirewater.co.uk

For telephone enquiries ring:
Chris Roberts on 0345 120 8482

Your Ref:
Our Ref: X000555

25th January 2021

Dear Mr Tills,

Land at Shop Lane, Kirkheaton, Huddersfield, HD5 0DB – Pre-Planning Sewerage Enquiry U099974

Thank you for your recent enquiry. Our charge of £157.00 will be added to your account with us, reference ARP013. 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

There is an abandoned 300 mm diameter surface water overflow recorded crossing the site. Investigation will be required by the developer to determine if this is in situe and contact YW with their findings.

There are small diameter sewers recorded on the site. In this instance, building-over may take place under the control of Part H4 Building Regulations 2000. No trees planted within 5 (five) metres of this public sewer. It may not be acceptable to raise or lower ground levels over the sewer, nor to restrict access to the manholes on the sewer. If you wish to have this sewer diverted under Section 185 of the Water Industry Act 1991 an application should be made in writing. To discuss this matter, please telephone 0345 120 84 82.

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.

Foul Water

Foul water domestic waste can discharge to the 525 mm diameter public foul sewer recorded in Shop Lane, at a point to the south east of the site.

YorkshireWater

Surface Water

It is understood that a 610 x 610 culverted watercourse is located to the south east of the site in the junction of St Marys Lane and Stafford Hill Lane. It is also believed there may be existing culverts on your site. This appears to be the obvious place for surface water disposal (if SuDS are not viable). Please note Yorkshire Water cannot provide plans of culverted watercourses or highway drains. To obtain plans please contact the Lead Local Flood Authority for more details.

If other methods of surface water disposal are not viable and subject to providing satisfactory evidence as to why they have been discounted, curtilage surface water discharges to the public sewer will be restricted to the level of run-off - i.e. same rate of discharge - to that from the existing use of the site less a 30% reduction in the existing discharge. Any discharge of surface water from the site should discharge to similar points of connection to that of the existing use of the site. You will need to demonstrate positive drainage, based on a 1 in 1 year storm, to the public sewer to Yorkshire Water by means of investigation and calculation carried out at your expense.

To do this, Yorkshire Water requires to see existing and proposed drainage layouts with pipe sizes, gradients, gullies, downpipes and connection points, measured impermeable areas of the present and proposed use of the site, along with the calculations that show the existing and proposed discharge rate from the site to the public sewer.

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 apply on line or 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.

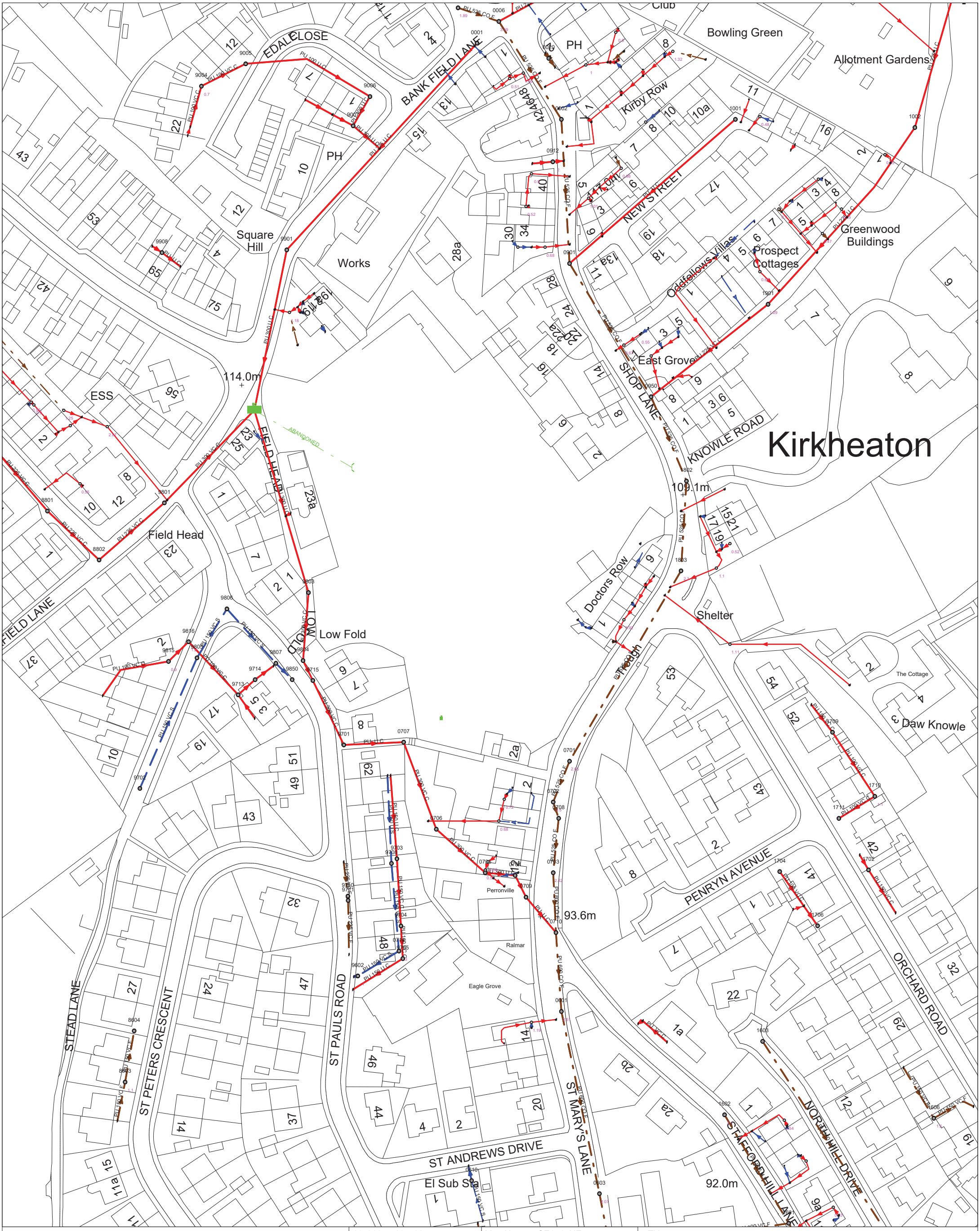
Prospectively adoptable sewers and pumping stations must be designed and constructed in accordance with the WRc publication "Sewers for Adoption - a design and construction guide for developers" 6th Edition as supplemented by Yorkshire Water's requirements, pursuant to an agreement under Section 104 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.

All the above comments are based upon the information and records available at the present time and is subject to formal planning approval agreement. 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. 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
Development Services Technician

YorkshireWater



417963 : 417738	Map Name : SE1717NE	Title
Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ Contact Name : YorMap Advisor C ROBERTS Contact Tel : 87 2582		Notes
Partial Key Foul Sewer = F Combined Sewer = C Surface Water Sewer = SW Trade Sewer = TD Partially Separate = PS		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 Req : 25/01/2021, 09:54:33		Date Gen : 25/01/2021, 09:58:15
Source : Sewer Network Enquiry		

UPN: Undefined Originator: C ROBERTS, YorMap, 87 2582

Appendix F
Environment Agency

Planning advice for developers – FAQs

Introduction

Local planning authorities (LPAs) across Yorkshire are required to consult us on certain planning applications which affect flood risk, groundwater, waste, or water quality.

If your development falls into one of these categories, we'll be invited to comment on your planning application. Your LPA, when considering your application, will take our comments into account.

We've produced this guidance to summarise the environmental issues we're responsible for. The guidance forms part of our free advice service; if you require site-specific or face-to-face advice, we'll need to recover our costs through our charged advice service. Engaging with us early can help you identify the big issues, reduce the chances of subsequent delays and help you design a more sustainable and attractive development.

Development and flood risk

Is my development proposal at risk of flooding?

The flood map for planning shows where flooding from rivers and the sea may occur. Whilst this map isn't suitable for a detailed flood risk assessment, it'll show which flood zone your development is located within and therefore will indicate whether further assessment is needed. You should also refer to your LPA's strategic flood risk assessment which will provide additional local information on flood risk, including the location of functional floodplain and areas which are susceptible to other sources of flooding such as from surface water or reservoirs.

Will my application need to pass the sequential and exception tests?

Local planning authorities apply the sequential test to steer development towards areas at the lowest risk of flooding. If your proposal is located within flood zones 2 or 3, you should contact your LPA to discuss the sequential test **before** submitting your application. The LPA may require you to submit information with your application in support of the sequential test.

If the LPA confirm that the sequential test has ruled out steering the development to lower risk sites, the development may also need to pass the exception test by demonstrating that its sustainability benefits outweigh flood risk and that it can be made safe for its lifetime, through the production of a site-specific flood risk assessment. Planning practice guidance advises when an exception test will be required, which will depend on the vulnerability of the development and the flood zone it lies within.

Do I need to submit a flood risk assessment with my planning application?

You'll need to submit a flood risk assessment if your application lies within flood zones 2 or 3 or is over 1 hectare within flood zone 1. You'll also need to submit an assessment if your proposal could be affected by sources of flooding other than from rivers or the sea. For certain lower risk applications, we've provided 'flood risk standing advice' which enables local planning authorities to assess flood risk assessments without the need to consult us.

What information should I include in my flood risk assessment?

We recommend that you refer to the checklist for a site-specific flood risk assessment for detailed advice on what to include in your flood risk assessment. Alongside referring to your LPA's strategic flood risk assessment, you should contact your LPA to find out whether there are any development guidelines which are specific to your locality.

Can I undertake my own flood risk assessment?

Your FRA must be appropriate to the scale, nature and location of the development whilst being credible and fit-for-purpose. Whilst it's possible to undertake your own assessment, most applicants employ suitably experienced professionals. We're not able to recommend specific consultants, but a simple web search should help you source a competent individual or company.

Do I need to consider how climate change will affect my proposal's flood risk?

Yes, you should demonstrate how flood risk will be managed now and over the development's lifetime, taking climate change into account. Please refer to the following guidance when undertaking your flood risk assessment. In some cases we'll hold the climate change flood data you need. In others you'll need to undertake your own analysis to understand the impacts.

Where can I get modelled or historic flood levels from?

Email our Customers and Engagement team (neyorkshire@environment-agency.gov.uk) to find out whether we have any modelled or historic flood levels available for your development site. A list of the packages of information we're able to provide can be found under the 'get information to complete an assessment' section of the planning practice guidance. They'll aim to provide this information within 20 days. We no longer charge for providing this information.

The risk portrayed by your flood map doesn't seem to reflect the site's actual risk. How do I 'challenge' your flood map?

If you have evidence suggesting that our flood map is inaccurate, please contact our Customers and Engagement team (neyorkshire@environment-agency.gov.uk) who will provide you with any existing data we hold. To formally contest our flood zones, you'll need to submit supporting evidence, such as digital copies of a topographic survey or modelling for quality assurance purposes. Digital files of the proposed new flood zones in ArcMap or MapInfo format should also be supplied. Any new outline data you submit must conform to our flood zones policy, copies of which are available on request.

Whilst we'll usually be happy to review any topographical survey or model prior to the application being submitted, we would have to recover our costs for this work. In some cases where work to review and update our existing models is already underway, we may decline to consider a challenge.

As we have to be certain that the data which informs our flood map is fit-for-purpose, any revisions will need to meet stringent quality checks.

SURFACE WATER AND DRAINAGE

Who's responsible for managing surface water?

Lead local flood authorities are responsible for providing advice on the management of surface water resulting from new major development. Internal drainage boards, where established, have permissive powers to manage water levels within their drainage districts, so also play a key role in managing surface water.

Will I need to provide surface water storage and limit the discharge rate?

You should contact your lead local flood authority to discuss surface water discharge rates and storage requirements. Typically, they'll ask that your development does not increase run-off and limits the discharge to the existing greenfield run-off rate (usually 1.4l/s/ha if not calculated).

Do I need to install sustainable drainage systems?

Sustainable Drainage Systems (SuDS) should always be carefully considered in discussion with your lead local flood authority. A SuDS scheme can reduce flood risk, improve water quality, create better habitats for wildlife, and produce pleasant, more amenable places for people.

Infiltration drainage must not, however, pose a risk to groundwater quality. All infiltration SuDS must:

- Meet the groundwater protection criteria set out on GOV.UK
- Not be constructed in ground affected by contamination

Who should I contact about connecting my development to the mains sewer?

Talk to your water company about connecting to their sewerage system. Here are some contact details for water companies operating in the Yorkshire Environment Agency area:

Yorkshire Water	planningconsultation@yorkshirewater.co.uk
Northumbrian Water	developmentenquiries@nwl.co.uk
Severn Trent Water	new.connections@severntrent.co.uk

My development is a long way from the mains sewer. Can I install a 'non-mains' drainage system, such as a package treatment plant?

New development should connect to the public mains sewer wherever possible. Individual treatment plants can deteriorate local water quality and are more challenging to monitor and regulate. If you can't connect to the mains sewer, your planning submission should outline how you will deal with foul drainage discharge. You should include evidence as to why it is not possible to connect to the mains system, including details of any prohibitive costs. Please note that some 'non-mains' foul water drainage systems will require an environmental permit, irrespective of any planning approval.

OTHER ENVIRONMENTAL CONSIDERATIONS

What other environmental issues will you consider with my planning application?

Your planning application will need to demonstrate that any environmental risks can be managed, through design and construction, for the development's lifetime. Alongside flood risk, the key environmental risks we'll consider are:

- **Land Contamination**
  We're mainly interested in those sites where there is a risk of pollution to controlled waters. You should investigate any contamination to see whether the environmental risk or cost of clean-up (remediation) would hinder your proposal. If contamination is known or suspected, a desktop study, investigation, remediation and other works may be required to enable safe development. Our model procedures for the management of land contamination provide further information.

- **Pollution prevention**
  Your application should demonstrate how you'll minimise the risk of pollution from all aspects of your development, including construction and

operation phases. Groundwater can be vulnerable to pollution, as well as rivers and streams. Some areas (source protection zones and aquifers) are especially sensitive to pollutants as they typically supply public drinking water. To find out whether your development is located in an area sensitive to groundwater pollution, visit our interactive maps. Advice on groundwater protection can be found on GOV.UK

- **Fisheries, biodiversity, geomorphology and protected species**
  If your proposal is likely to affect the ecology of a main river, you'll need to carry out a risk assessment. This assessment should show that your development can proceed without demonstrable harm, and should propose mitigation, compensation or enhancements where required. A survey should be carried out if any protected species are thought to be nearby. If this survey confirms the presence of protected species or their habitat, measures should be taken to manage the development's risks. Natural England are the statutory consultee for other biodiversity-related matters. Further information on their remit can be found on GOV.UK

- **Water framework directive**
  If your proposal affects ground or surface waterbodies, you'll need to consider the Water Framework Directive (WFD) and the actions set out in the Humber River Basin Management Plan. You'll also need to submit a WFD Assessment demonstrating how the development will prevent deterioration and improve the waterbody's ecological status.

- **River buffer zone**
  Your development should ensure that an 8m strip of land (planted with locally appropriate, native species) is left undisturbed next to the bank of any main river. This 'river corridor' will improve habitat connectivity and will ensure we're able to access the bank for any future flood defence construction and maintenance.

- **Culverting**
  We're opposed to culverting. Culverts degrade watercourses' ecology and prevent the movement of wildlife and fish. As culverts can easily become blocked, they increase flood risk. They're also difficult to inspect and maintain. We may object to any planning applications involving culverting on a main river and may refuse to grant an environmental permit. Existing culverts should be removed and the river channel and bankside habitat reinstated to restore the ecological continuity of the river channel and its corridor.

Will I need any other Environment Agency permits for my development?

You might need an environmental permit if your development manages or produces waste or emissions that pollute the air, water or land or is work that affects a main river or a sea defence. The lead local flood authority is responsible for any consents relating to ordinary watercourses.

The Environmental Permitting Regulations (England and Wales) 2015 cover water discharges, groundwater activities, flood risk activities, radioactive substances, waste, mining waste and installations. They also include provision for a number of directives including batteries. Further information, including contact details for further permitting related enquiries, can be found here.

As planning and permitting decisions are often closely linked, we have issued detailed guidance for developments requiring planning permission and environmental permits. This guidance explains how, when responding to planning consultations that require environmental permits, we will advise of three possible positions:

- No major permitting concerns
- More detailed consideration is required and parallel tracking is recommended
- Don't proceed – unlikely to grant a permit.

PRE-APPLICATION ADVICE

Can you provide site-specific advice, review a submission document, or attend a site meeting before I submit my planning application?

We encourage you to seek pre-application advice as it can help you solve key environmental issues early, reduce the chance of an objection and help you design a more sustainable development. If you'd like to take advantage of this service, please email our Sustainable Places team so that we can provide further details and estimated costs.

Please note that any pre-application guidance we provide doesn't represent our final view in relation to any future planning application. We recommend that you seek your own expert advice prior to submitting your application.

Who should I contact for further information?

Yorkshire planning enquiries: sp-yorkshire@environment-agency.gov.uk

General enquiries: 03708 506 506

Environment Agency, Lateral, 8 City Walk, Leeds LS11 9AT
https://www.gov.uk/government/organisations/environment-agency

The Flood Map for Planning

The Flood Map for Planning (Rivers and Sea) can be viewed and downloaded as a PDF file on GOV.UK by following this link: https://flood-map-for-planning.service.gov.uk **or downloaded in GIS format under an open data licence from the following address**: https://data.gov.uk/publisher/environment-agency
Please type Flood Map for Planning in the search box.

What is the Flood Map for Planning?

The Flood Map for Planning provides information on flooding from rivers and the sea for England and Wales. The Flood Map also has information on flood defences and the areas benefiting from those flood defences.

The Flood Map for Planning shows the following:

1. Flood Zone 3 (dark blue area on the enclosed map): natural flood plain area that could be affected by flooding from rivers and/or the sea – not taking into account the presence of any flood defences
    - For flooding from rivers the map indicates the extent of a flood with a 1% (1 in 100) chance of happening each year;
    - For flooding from the sea the map shows the extent of a flood with a 0.5% (1 in 200) chance of happening each year.

2. Flood Zone 2 (light blue area): natural flood plain area that could be affected by flooding from rivers and/or the sea – not taking into account the presence of any flood defences. Flood Zone 2:
    - indicates the extent of a flood with a 0.1% (1 in 1000) chance of happening each year.
    - and/or indicates the greatest recorded historic flood, whichever is greater.

3. Flood defences built in the last five years to protect against river floods with a 1% (1 in 100) chance of happening each year, together with some natural or constructed entities which retain, store or channel water and which may protect against smaller floods.

4. Areas benefiting from flood defences - areas that benefit from the flood defences shown, in the event of a river flood with a 1% (1 in 100) chance of happening each year, or a flood from the sea with a 0.5% (1 in 200) chance of happening each year. If the defences were not there, these areas would flood.

Flood History

To the best of our knowledge there is no known flood history for this site. However, in close proximity to this location we do have some flood history available (see enclosed map). The extent of flooding, and/or flood level information is only shown for those watercourses surveyed after the flood. Other flooding may have occurred which is not shown. This is the best information currently available.

Please refer to the following table detailing the causes of those past floods.

Name	Start Date	End Date	Flood Source	Flood Cause	Flood Map Status	Historical Flood Map Status	Source of data
123 April1970	13/04/1970	13/04/1970	main river	channel capacity exceeded (no raised defences)	considered and rejected	considered and rejected	Survey

Water causing flooding can come from different places, for example from rivers or the sea; surface water (i.e. rainwater flowing over or accumulating on the ground before it is able to enter rivers or the drainage system); overflowing or backing up of sewers or drainage systems which have been overwhelmed or from groundwater rising up from underground aquifers.

Please note that this record doesn't include all of the flooding that may have occurred including and since 31st December 2020.
Given the process of recording, verifying and updating our record from major floods is extensive and may take a considerable amount of time.

Assets

Asset Location Map

Please find attached asset map(s) showing location of all (Agency and non Agency maintained) flood defences and channels.

Description of Works

See attached table with description of the defences and structures shown on the above drawing, including condition ratings, upstream and downstream crest levels, where available.

Risk of Flooding – Environment Agency Defences
The risk of flooding in this area is now reduced by the presence of flood defences that we maintain, but there still is a residual risk of flooding if these were to breach or be overtopped by a flood greater than that for which they were designed.

Risk of Flooding – Privately Maintained Defences
You will see that the Environment Agency does not maintain any of those defences. However we undertake regular risk based visual inspections. We do not hold design levels and have no height information on these defences or structures.

Asset Condition Ratings
The performance of a flood defence asset is recorded as the condition of the asset. Our asset inspectors subjectively assess the conditions of assets (during visual inspection site visits) with reference to a national standard template. Each asset is given a rating between one and five with one being very good condition and five being very poor. A condition rating of 3, or 'fair' is the minimal acceptable standard for a critical asset, such as a defence wall that protects properties. We are striving to improve all assets below 'fair' to an acceptable standard.

Asset inspections are done on average every six months, although some critical assets are assessed on a more regular basis. It is possible that adjacent assets are inspected on different dates, which may result in two assets of a similar state of repair having different condition ratings.

Condition ratings of assets may also be affected by the time of year the surveys are conducted, as vegetation may obscure the asset in the summer months, or accessibility may be an issue during winter months. These factors would not usually affect the recorded condition rating of an asset unless the asset is on a borderline between two ratings.

Asset Standard of Protection
Please note that the provided Design Standard of Protection is an estimate and should not be relied on. Please note that where available the defended flood extents provide more reliable information relating to the protection offered by the defence (i.e. at which return period the water levels are likely to overtop the defence). If available and required the defended flood extents can be provided on request.

Modelling

Fenay Beck 2007 Flood Risk Mapping study

See enclosed extracts from the Fenay Beck Flood Risk Mapping study produced by Jeremy Benn Associates in August 2007. Extracts include

- results for peak water levels for the 0.1% (1 in 1000), 1% (1 in 100), 1% (1 in 100) + 20% Climate Change ,1.3% (1 in 75), 2% (1 in 50), 4% (1 in 25) and 10% (1 in 10) Annual Exceedance Probabilities (AEP).

Please see below a paragraph extracted from the report which explains the effect of reservoirs to this study.

"In a hydrodynamic model, there is additional functionality available to represent different floodplain characteristics. Where the water is predicted to convey directly along the floodplain the extended cross section approach outlined above has been adopted. However, where storage is more likely, the extended cross sections have been truncated and instead replaced with reservoir units with geometry derived from LiDAR data. The spills to and from these reservoir units may be attached to model either as lateral spills or as parallel structures. The crest levels of such spills are estimated either from LiDAR or survey data".

Please note there are no depth grids available with this study.

A copy of the report (Product 5) is available on request

Climate Change

Updated guidance on how climate change could affect flood risk to new development - 'Flood risk assessments: climate change allowances' was published on gov.uk on 19 February 2016. You should confirm the flood risk vulnerability classification and lifetime of your proposed development in line with NPPF and apply the appropriate climate change allowances.

Bespoke Flood Risk Assessment (FRA) advice:

If the pre-application advice is required with regards the preparation of a site-specific Flood Risk Assessment, this can be requested via the Yorkshire Sustainable Places team (email: sp-yorkshire@environment-agency.gov.uk). Charges may apply for any advice that is provided, this currently stands at £100 per hour per person. The .gov.uk pages provide a good starting point on what to include within a site-specific Flood Risk Assessment and can be accessed via https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications. A site-specific Flood Risk Assessment will need to consider flood risks from all sources, including those associated with defence failure (e.g. breach) and accounting for the predicted impacts as a result of climate change. Please contact the Sustainable Places team if you require advice on how to include these within a Flood Risk Assessment.

Other

Surface Water Map

Lead Local Flood Authorities (LLFA) are responsible for managing local flood risk from surface water flooding and groundwater flooding. You should check with the LLFA as they may have more up to date information regarding this type of flooding.

The Risk of Flooding from Surface Water Flood Map can be viewed and downloaded as a PDF file on GOV.UK by following this link: https://flood-warning-information.service.gov.uk/long-term-flood-risk

Surface Water Drainage

The Lead Local Flood Authority is the statutory consultee for planning matters relating to surface water drainage, therefore it is recommended they should be consulted separately regarding this.

Surface water discharge from new development should ideally 'mimic' the pre-development situation using a sustainable drainage system so that the flow and volume of water in watercourses is not increased.

A permit may be required, under the Environmental Permitting Regulations 2016 from the Environment Agency for any proposed works or structures in, under, over or within eight metres of a 'main river' (e.g. a new outfall). A permit is separate to and in addition to any planning permission granted. Further details and guidance are available on the GOV.UK website: https://www.gov.uk/guidance/flood-risk-activities-environmental-permits

Risk of Flooding from Reservoirs Map

Outlines and simplified depth and velocity maps can be viewed on our website:

https://flood-warning-information.service.gov.uk/long-term-flood-risk/#x=438988&y=406600&scale=2

Please, zoom into the location of interest, and then click on the inundated location for details. As a result a list of reservoirs will be provided with supporting information and a links to other data, such as estimated depths and speed of flooding, at the bottom of the result page.

A map showing the outlines can also be provided on request.

Flood Warning

The site is not covered by a Flood Warning.

LIDAR Data

Please note that our LiDAR data is now available free of charge (Open Data) from http://environment.data.gov.uk/ds/survey/index.jsp#/survey (once zoomed to the relevant location the available LiDAR products will be listed below the map).

Two LIDAR products are available:

1. Tiled LIDAR data - The full tiled dataset consists of historic LIDAR data which has been gathered since 1998. For some areas we have carried out repeat surveys and data is available in a range of resolutions.
2. Composite LIDAR data - The composite dataset is derived from a combination of our full tiled dataset which has been merged and re-sampled to give the best possible spatial coverage.

Light Detection and Ranging (LIDAR) is an airborne mapping technique, which uses a laser to measure the distance between the aircraft and the ground. This technique results in the production of an accurate, cost-effective terrain model suitable for assessing flood risk and other environmental applications.

The Environment Agency owns two LIDAR systems, which are installed in a survey aircraft along with its other operational remote sensing instruments.

The aircraft is positioned and navigated using Global Positioning System (GPS) corrected to known ground reference points. The aircraft typically flies at a height of about 800 metres above ground level and a scanning mirror allows a swath width of about 600 metres to be surveyed during a flight.

The Rights & Responsibilities of a Riverside Owner

The owner of property adjacent to a watercourse is usually deemed to be the riparian owner and, as such, has both riparian rights and responsibilities with regard to the watercourse within their ownership.

For more information on Rights and Responsibilities of a riverside owner, you can visit our website at:

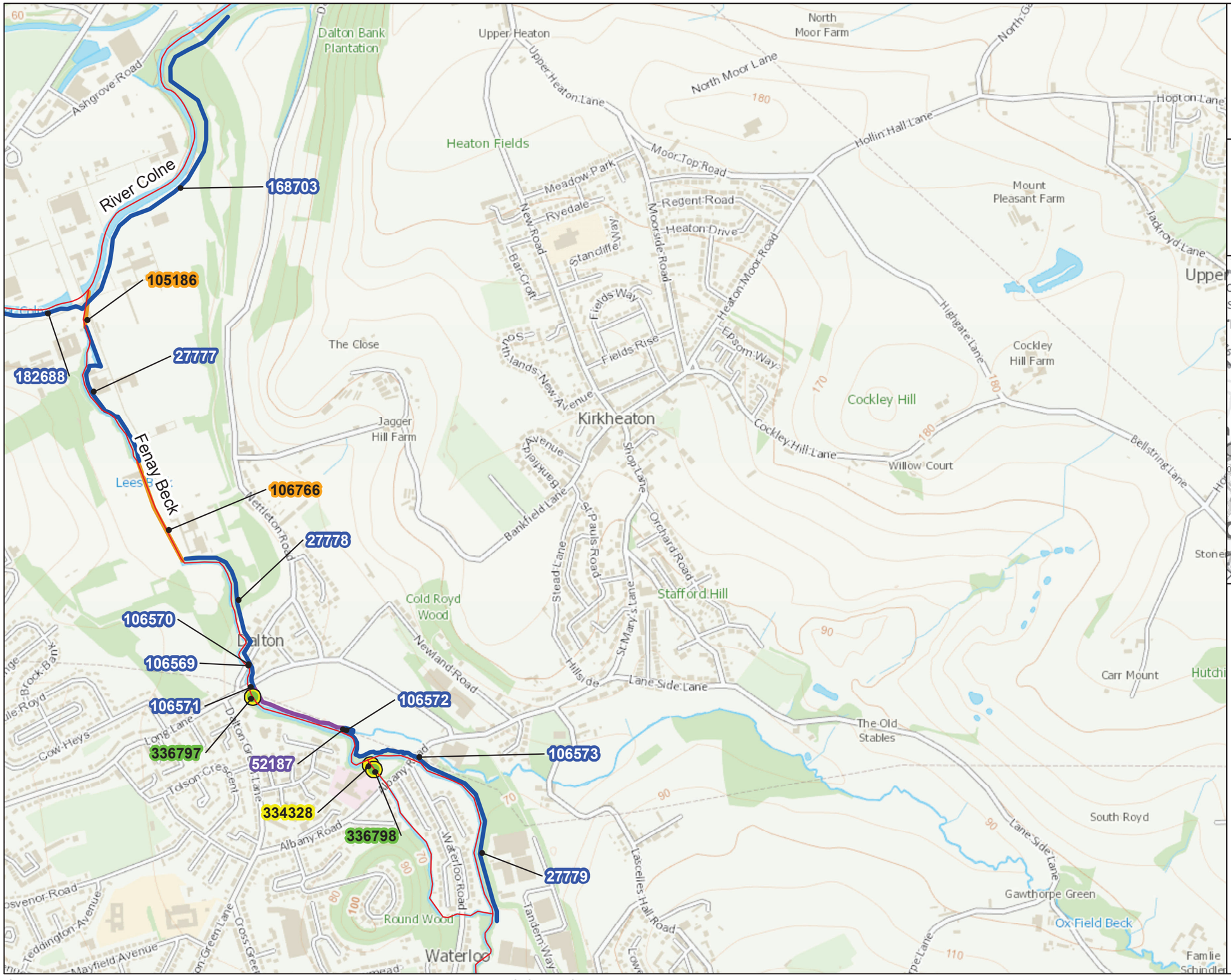
https://www.gov.uk/guidance/owning-a-watercourse

Ordnance Survey Data

Under the terms of our licence agreement with the Ordnance Survey, we are unable to supply the OS data. Under this agreement we can only supply OS data to consultants/contractors carrying out work on our behalf.

RFI/2020/200693 Assets Map centred your site at Shop Lane, Kirkheaton, HD5 0DB

Date created: 15/03/2021



Environment Agency

www.environment-agency.gov.uk

Scale: 1:10,000

when reproduced @ A3

N W E S

LEGEND

- Main River
- Structures (3rd party maintained)
- Structures (EA maintained)

Defences (3rd party maintained)

SUB_TYPE

- high_ground

Defences (EA maintained)

SUB_TYPE

- embankment

Channels (3rd party maintained)

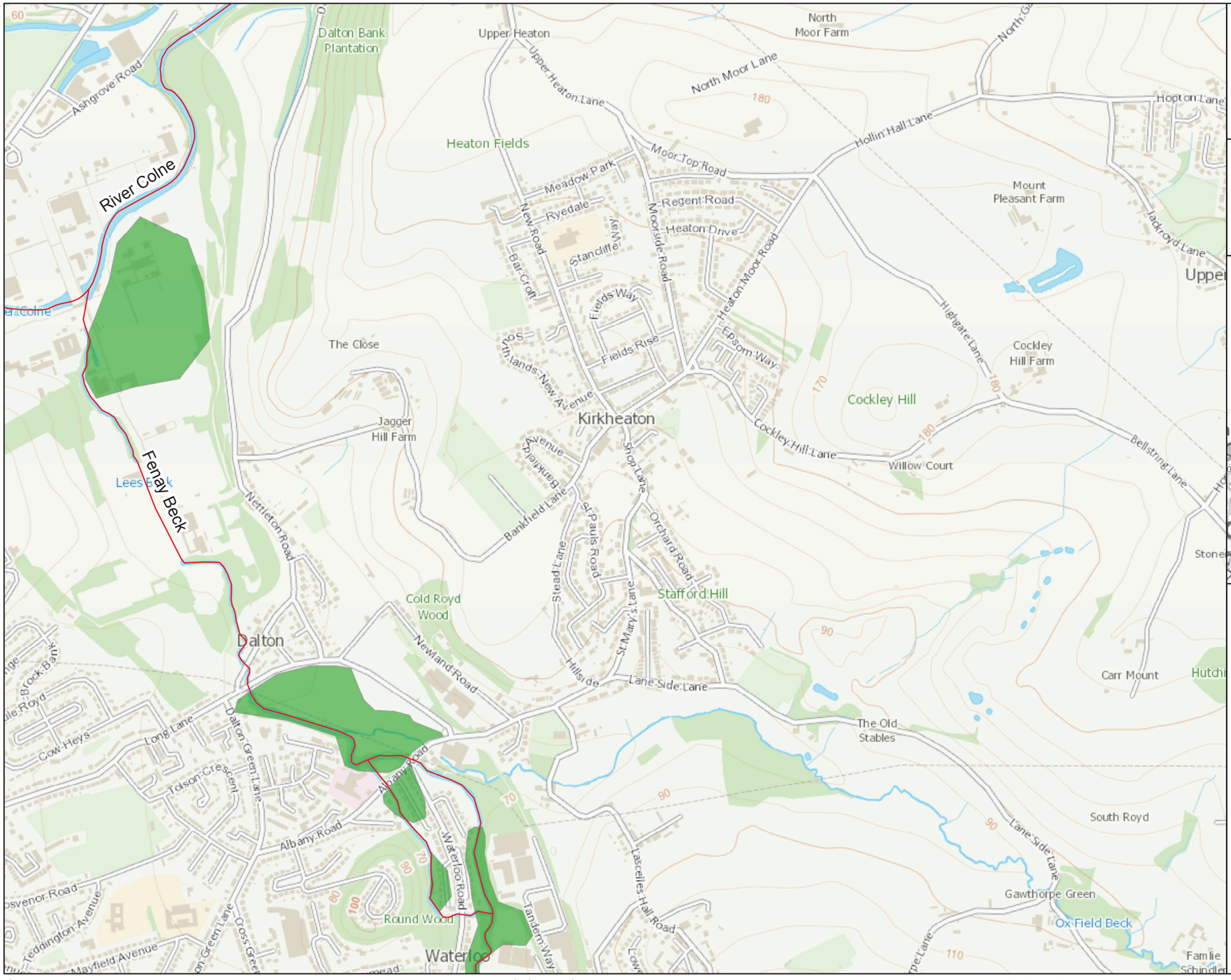
SUB_TYPE

- simple_culvert

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506(Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

RFI/2020/200693 Flood History Map centred your site at Shop Lane, Kirkheaton, HD5 0DB

Date created: 15/03/2021



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N
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LEGEND

Main River

Recorded Flood Outlines

123 April1970

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506(Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

RFI/2020/200693 Node Point Map centred your site at Shop Lane, Kirkheaton, HD5 0DB

Date created: 15/03/2021

Environment Agency

www.environment-agency.gov.uk

Scale: 1:10,000

when reproduced @ A3

N W E S

LEGEND

- Main River
- 2007 Fenay Beck Node Points

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506(Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Appendix G
Lead Local Flood Authority