

Harron Homes Limited

Littleworth Lane

Lundwood

Barnsley

Flood Risk Assessment

Ref-10957-5001

Revision No 01

July 2014

**Professional, Innovative,
Practical Solutions**

Revision Record

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Rev	Description	Date	Originator	Checked	Approved
00	Final Report	9 th July 2014	ATK	RJS	BJS
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1.0 Introduction

1.1 Background

- i. We have been requested by Harron Homes Limited to undertake a Flood Risk run-off Assessment for redevelopment site at Littleworth Lane, Lundwood, Barnsley.
- ii. The proposal involves the redevelopment of the former Priory School, which historically contained a range of buildings and hard standing areas that have now been demolished and removed from site. Since this time the site has been vacant and laid out to rough grass land.



- iii. The site is irregular in shape and extends to approximately 7.9Ha, 2.6 kilometer's East of Barnsley Town Centre at Grid reference 436981 407101 and is outlined on the enclosed location plan (Appendix 1)
- iv. The nearest watercourse to the site is the River Dearne positioned approximately 500m to the South of the site flowing from West to East.

- v. The site is currently laid out to rough grassland, but historically contained the school buildings car park and Playground areas of the former Priory School. The site falls generally in an East to West direction by around 7.5m giving average gradients of 1 in 48 across the site. (Topographic Survey attached in Appendix 6)
- vi. Yorkshire Water drainage records shows existing Foul and Surface Water sewers within and around the site. A 375/ 450mm diameter Combined sewer skirts the western boundary before crossing the site in an easterly direction, 225 and 300mm sewers link to this sewer at various points across the site, and it is clear that these fed the School that was previously on the site. These sewers also serve the Littleworth Grange Primary Learning Centre adjacent the North West boundary and residential properties to Jaques Place South West of the site boundary. 600mm and 225mm diameter surface water sewers are present adjacent to the South East Corner of the site. A copy of the record map is included in Appendix 5 attached.
- vii. In accordance with current sustainable policies on the disposal of surface water drainage, Yorkshire Water and Barnsley MDC Land Drainage Engineers will seek to follow a hierarchical approach where developers must firstly consider the use of filtration to recharge ground water, if the site does not possess adequate infiltration characteristics, then the nearest watercourse must be considered. Only if these options are demonstrated to be inadequate or impractical will Yorkshire Water consider draining Surface Water into their sewer network and it will need to be demonstrated that flow rates are reduced by 30% against the pre development scenario.
- viii. The proposal is to redevelop the site with approximately 198 No Residential Dwellings together with access, car parking and garden areas. An initial appraisal of the existing catchment and contributing flows has already been agreed with Yorkshire Water, and their acknowledgement is attached in Appendix 5
- ix. The objective of a Flood Risk Assessment is to demonstrate that a proposed development is sustainable in flood risk terms. This means that the development should not itself be at a significant risk of flooding or result in an increased flood risk elsewhere. The guidance given in The National Planning Policy Framework states that Local Authorities should adopt Proactive strategies at a local level through Strategic Flood Risk Assessments. Many of these follow the guidance set out in

Planning Policy Statement 25: "Development and Flood Risk" (PPS25) and this has been followed in preparing this assessment.

- xi. As a consequence of PPS25, issued in December 2006, which refers to Flooding and Flood Risk, it is necessary to provide an assessment of the potential problems which are associated with:
 - a. Permitting the Development.
 - b. Potential risk of flooding from the watercourse.
 - c. Safety of occupants of the dwellings.
 - d. Impact upon the local hydrological network.
- x. In order to provide a Flood Risk Assessment, use has been made of the information contained at the offices of the Environment Agency and also the Indicative Flood Plain Maps for the 1in100 Year Storm Event, which have been produced by the Institute of Hydrology.
- xi. The Environment Agency and Yorkshire Water have been consulted and their information and comments have been used in this report.

1.2 Information Sources:

- i. The principal information sources which have been used for this Flood Risk Assessment are:
 - a. Geological Maps
 - b. Yorkshire Water – Main Drainage
 - c. Environment Agency – Flood Defence.
 - d. Barnsley MBC Preliminary Flood Risk Assessment

- ii. These have been reviewed in conjunction with an inspection of the current:
 - a. Geological Maps,
 - b. Drainage records,
 - c. Flood maps,
 - d. Visual inspection of land, existing watercourses and the surrounding area.

1.3 Geology:

From an examination of the published geological map, Applied Geology of the Barnsley Area: Bedrock Geology (1:25,000) the solid geology is shown to be Lower Westphalian which are mainly productive coal measures.

From an examination of the published geological map, Applied Geology of the Barnsley Area: Superficial Geology (1:25,000) the site is shown to be positioned on minimal made Ground with no significant superficial deposits.

1.4 Hydrogeology & Hydrology

The published Groundwater Vulnerability Map for the area indicates that the site is not located within a Ground water source protection zone. There are no water abstractions within 250m of the site.

The nearest watercourse to the site is the River Dearne located some 600m to the South.

1.5 Current Environment

- i. The site is currently laid out to rough grassland but historically contained the School buildings, play grounds and parking areas of the former Junior School. The site falls generally from West to East by around 7.5m giving average ground slopes of around 1 in 48.
 - ii. Yorkshire Water drainage records shows existing Foul and Surface Water sewers within and around the site. A 375/ 450mm diameter Combined sewer skirts the western boundary before crossing the site in an easterly direction, 225 and 300mm sewers link to this sewer at various points across the site, and it is clear that these
-

fed the School that was previously on the site. These sewers also serve the Littleworth Grange Primary Learning Centre adjacent the North West boundary and residential properties to Jaques Place South West of the site boundary. 600mm and 225mm diameter surface water sewers are present adjacent to the South East Corner of the site.

- iv. Much of the Barnsley MBC area is located within the River Dearne Catchment, a tributary of the River Don. Western parts of the Council area drain directly to the Upper Don. The Upper Don drains from the Uplands of the Peak District National Park to Sheffield. The area is characterised by steep sided valleys and developed River channels with limited natural floodplain. The risk of flooding through this catchment is managed through a combination of manmade defences and a number of storage reservoirs that help slow the flow. The Environment Agency and Stakeholders need to improve the function and condition of the upland storage areas to improve run off rates and the high frequency of flood events.

1.6. Development Proposals

- i. The Development proposal indicates a scheme of approximately 198 residential dwellings together with associated Estate Roads gardens and drive accesses. A copy of the outline proposal is attached in Appendix 2.

1.7. Historical Notes

- i. Anecdotal evidence suggests that the previous school on the site and Littleworth Lane has suffered surface water flooding as noted on the maps attached within the Preliminary Flood Risk assessment produced by Barnsley MDC. (attached in Appendix 3) It is not thought that surface water entered the school buildings, but was held on the surface and on Littleworth Lane for some time.
- ii. The Environment Agencies indicative flood plain map for this area (Appendix. 3) shows the site to be within Flood Zone 1, ie having less than a 0.1% annual probability of River Flooding in any year and there is no record of flooding at this site.
- iii. Yorkshire Waters records database (DG5 Register) shows no attendance's in the area and there are no problems reported on the main sewer network.

2.0 Flood Risks and Mitigation

This section describes the potential sources of flooding and their impact on the proposed development and where required, the proposed mitigation measures.

- i. An established framework for environmental risk assessment that can be effectively applied to Flood Risk Assessment is the Source Pathway Receptor Model
 - a. Sources: The weather and other elements that can trigger flooding
 - b. Pathways: The mechanism's by which water generated by sources becomes flooding.
 - c. Receptors: The people, properties and natural environment that are affected by flooding.
- ii. Three main source's of flooding have been identified within the Barnsley catchment:
 - Main River Flooding.
 - Non Main River Flooding. .
 - Surface Water Drainage related flooding
- iii. The Pathways are in general the Rivers, drains, sewers and aquifers. High flows in the rivers drains and sewers can exceed drainage networks and high subterranean ground water levels can cause flooding from artesian pressure.
- iv. The receptors to Flooding in the Barnsley catchment are people, the built environment, agricultural land, infrastructure and environmental assets. Major floods can have significant impact on these receptors.

All these flood risks are described in the sections following.

2.1 Main River Flooding

Risk

- i. Flooding from rivers and other natural water courses is usually caused by prolonged and intense rainfall generating high rates of run-off which overwhelm the capacity of the river to convey the water downstream. Although unlikely, high flows can also be the result of unplanned, but sudden discharges from reservoirs.
- ii. The River Dearne is the closest Watercourse to the site located approximately 600m to the South of the site. Contours on the Ordnance Survey map of the area show the River to be below 35m AOD.

Mitigation

- iii. The 100 year climate change Flood Map for this area shows the area immediately adjacent to the River Dearne in Flood however, due to the topography of the area, this is very linear and restricted to the immediate environment of the watercourse. Spot levels and contours on the Ordnance Survey map indicate this area to be at a level below 35m AOD. The site sits at an elevation of 50m+ AOD and is therefore unlikely to be affected by Flood Waters from this Watercourse.
- v. The drainage system will be designed to a recognised Industry Standard in a manner that will not increase contributing flows into the surrounding network. PPS25 requires that surface water from a development site should as far as possible, be managed in a sustainable manner to mimic surface water flows arising from the site prior to the proposed development, whilst reducing the flood risk to the site itself and elsewhere, taking climate change into account.

2.2 Non Main River Flooding

Risks

- i. Ordinary Watercourses are those Rivers and Streams that are not designated Main River and are therefore the responsibility for maintenance and mitigation falls with the Local Authority. A number of the ordinary watercourses within the Upper Don Catchment are designated Critical Ordinary Watercourses. This designation reflects a known issue with respect to flooding, and is generally associated with limited channel capacity, channel constrictions and a poor maintenance regime.
- ii. Many constructed drainage systems such as pipes, sewers, land drainages and drainage channels exist to manage run off from developments. During prolonged periods of heavy rainfall, flooding may occur if the rainfall event exceeds the capacity of the drainage system or the system becomes blocked or inefficient through lack of maintenance. Flooding will also occur if the system surcharges due to a high water level within the receiving watercourse.
- iii. Sewer network flooding is the principal concern in the Barnsley District and as much of the network is combined these become overburdened during peak storm events and discharge to watercourses. Due to the steep topography of this part of Barnsley, surface water surcharging from sewers creates the greatest issue of flooding in the district.

Mitigation

- iv. There are no Critical Ordinary Watercourses in the vicinity of the site
- v. The drainage system will be designed to a recognised industry standard in a manner that will not increase contributing flows into the adjacent network. PPS25 requires that surface water from a development site should as far as practicable be managed in a sustainable manner to mimic surface water flows arising from the site prior to

the proposed development, whilst reducing the flood risk to the site itself and elsewhere taking climate change into account.

- vi Current guidance indicates that in order to take full account of the climate change event, a 30% increase in rainfall should be accommodated.
- vii The Environment Agency and Yorkshire Water will require a 30% reduction in Surface Water run-off from redevelopment of this site. They will require robust evidence to support the existing and proposed run-off rates before approving this at Planning stage. Discussions have already been held with Yorkshire Water and agreement reached on a satisfactory restricted outfall rate for this site and their formal response is attached in Appendix 5)
- viii Benefits may also be achieved through the use of rainwater collection butts to properties for use on garden areas and this should be considered by the end user.

2.3 Surface Water Drainage related flooding

Risk

- i. Where infrastructure exists that retains, transmits or controls the flow of water, flooding may occur if there is a structural, hydraulic, geotechnical mechanical or operational failure. Because of the nature of these structures, sudden onset of flooding from these can be catastrophic.
- ii. There are many reports of Sewer Flooding following the problems encountered in Barnsley during the 2007 Floods, and this is represented on the Flood Plans attached in Appendix 3. It is not thought that Surface Water entered the school buildings but the plans attached in Appendix 3 shows fairly extensive Surface water Flooding on Littleworth Lane and areas around the school buildings on the site

Mitigation

- iii. The Environment Agency's indicative flood plain map for this area shows the site to be within Zone 1. This zone comprises of land assessed as having a less the 1 in 1000 annual probability of river or sea flooding in any year (< 0.1%).
- iv. All uses of land are appropriate in this zone.
- v. The single largest source of flooding in the Barnsley District is sewer flooding from the combined sewer network and this is exacerbated by the steep topography. Redevelopment of this site will not contribute increased flows to the drainage network but will seek to control and reduce flows during peak storm events through surface water balancing. This will remove the instances of Surface Water flooding on the site through robust design of the drainage network.

2.4 Overland Flows

Risks

- i. Flooding from overland flows is caused when the intensity of rainfall exceeds the infiltration capacity of the surface onto which it falls, or when, during prolonged periods of wet weather, the soil becomes so saturated that it cannot accept any more water. Developments that include significant impermeable surfaces, such as roads, car parks and roofs, may increase the occurrence of overland flow.
- ii. Overland flow will tend to occur for a similar period of time as the rainfall event that causes it, however, the flood water may remain for some time after accumulating at the surface in low areas with no significant outlet.
- iii. Developments can enhance the risk of flooding from overland flows due to the increased volume of surface water run-off. In the case of the Littleworth Lane Site the impermeable areas will be increased over that of the existing, however surface

water will be attenuated to a level agreed with Yorkshire Water with associated surface water attenuation provided to ensure that the post development catchment areas do not generate greater rates and volumes of run-off than the current situation.

Mitigation

- iv. Redevelopment of this site will minimise the potential of flooding through overland flows with the introduction of positive drainage systems and maintenance regime's serving the properties.

- v. As the impermeable areas of the site will be considerably increased, surface water attenuation has been agreed with Yorkshire Water for the whole site with a maximum restriction of 98Litres per second permitted from the former school site. Surface water attenuation will be provided to cater for the 100 year climate Change event providing less of a flood risk to the site and its surroundings.

- vi In the event of a blockage or partial failure of the drainage network on the site, careful consideration of flood routing by shaping the land will need to be undertaken to ensure that surface water run off from this site does not flood adjacent property.

2.5 Groundwater Flooding

Risks

- i. High ground water levels can cause flooding if the water table level exceeds the natural ground level. Any significant rainfall, particularly where this occurs for a sustained period can increase ground water levels and may result in flooding. The risk of ground water flooding is considered to be greatest where areas are underlain by permeable rocks that form major aquifers.

Mitigation

- ii. The nature of the catchment geology means that ground water is unlikely to be a significant issue in this catchment. Furthermore no instances of flooding from groundwater in the Barnsley area have been identified.
- iii. From an examination of the published geological map, Applied Geology of the Barnsley Area: Bedrock Geology (1:25,000) the solid geology is shown to be Lower Westphalian which are mainly productive coal measures.

From an examination of the published geological map, Applied Geology of the Barnsley Area: Superficial Geology (1:25,000) the site is shown to be positioned on minimal made Ground with no significant superficial deposits.

- iv. A visual inspection of the site did not reveal any sources of groundwater from the site.

2.6 Tidal Flooding

Risks

- i. Flooding to low lying land from the sea and tidal estuaries is caused by storm surges and high tides. The onset of flooding from the sea can be extremely rapid, deep fast flowing water can create extreme hazards.

Mitigation

- ii. As much of the site and its surroundings are at an elevation of 50+ m AOD the risk of tidal flooding is highly unlikely.

3.0 Run-off Assessment

3.1 Existing Site

- i. The site under consideration totals an area of approximately 7.9Ha and was formerly Priory Junior School containing a range of buildings, hard standings and playing fields. All the buildings and hard standing areas have been demolished and removed from site leaving rough grassland.
- ii. Historically, there is anecdotal evidence that Littleworth Lane and the school grounds have suffered surface water flooding during extreme rainfall events, as noted in 2007, It is not thought that this reached levels to breach the threshold of any of the buildings on the site.
- iii. An assessment of the previous catchment has been carried out by Harron Homes and they have entered into dialogue with Yorkshire Water to agree acceptable discharge rates into the public sewer network. Surface Water contributing flows from the original buildings across the site has been assessed at 128Litres per second, applying a 30% reduction gives an allowable discharge rate for the site of 98 Litres

per second. Confirmation of this figure is provided in Yorkshire Waters response attached in Appendix 5.

- iv. The redevelopment of this site will need to fully comply with the requirements of PPS25, Yorkshire Water, Environment Agency and the Planning Authority.

3.2 Development Proposal

- i. The Development proposal indicates a scheme of approximately 198 residential dwellings together with associated Estate Roads gardens and drive accesses. a copy of the outline proposal is attached in Appendix 2.
- ii. Redevelopment of the site in the manner outlined in the initial proposal attached in Appendix 2 will increase contributing flows when compared against that of the existing however the by incorporating surface water attenuation through storage pipes and a Dry pond, this will ensure that the site does not generate flows that will cause any flooding on the site or its surroundings.
- iii. In relation to the requirements of PPS25, the land must not generate an increase in flows as a consequence of redevelopment and therefore it will be necessary to ensure that the reuse of the site does not create flows which exceed that which exist at present.
- iii. Yorkshire Water require attenuation to cater for the 30yr event with a check carried out on the 100 year event to determine how much floodwater is lost from the tank and where will this flow to. Considering the slope of the site and the existing properties below the eastern boundary, it will be necessary to cater for the 100 year storage within the tank and Dry pond to ensure flood water does not place the properties below the site at risk.
- v. Current guidance indicates that an allowance of 30% should be made for the Climate Change event.
- vi. Detailed Surface Water sewer modelling for the whole proposal has been carried out to ensure that the attenuation and storage pond volumes are adequate to serve the

development and provide a 100 year + Climate change level of protection to the site and its immediate environment.

3.3 Proposed Measures

- i. It is recognised that in constructing the new development, a modern drainage system will be more efficient than the existing and could increase the impact on the local drainage network.
- ii. As a consequence, it is intended that the surface water discharge will be attenuated by whatever means are practical and economical and sustainable.
- iii. In determining the arrangements, the use of SUDS has been considered.
- iv. Soakaways

From an examination of the published geological map, Applied Geology of the Barnsley Area: Bedrock Geology (1:25,000) the solid geology is shown to be Lower Westphalian which are mainly productive coal measures.

From an examination of the published geological map, Applied Geology of the Barnsley Area: Superficial Geology (1:25,000) the site is shown to be positioned on minimal made Ground with no significant superficial deposits.

There is currently no Intrusive Ground Investigation report for the site, but it is expected that the site is overlain with Mudstones, siltstones and sandstone with clay laminations. Whilst the sandstone layers may be receptive to porosity testing the topography of the area produces its own risks with soakaways. The risk of water finding its way back to surface causing flooding elsewhere is potentially high and needs to be considered further. Any subsequent Ground Investigation must undertake percolation testing to establish if soak ways could be an option as this is a precondition to Yorkshire Water accepting flows into their Surface Water Sewer network.

v. Recycling

Recycling rainwater from roof areas is not considered to be practical on residential developments of this nature. There are many instances where cross contamination occurs from subsequent alterations to properties, where householders or tradesmen do not have an understanding or knowledge of the system installed. Rain water recycling butts to rear gardens should be considered.

Foul Water

Foul water from the proposed development on the site may drain into the existing Combined sewer running through the site as agreed with Yorkshire Water, considering this system is shown to be 2.4m deep and falling with the lie of the land, connections at the points shown on the drainage plan attached in Appendix 4 should be achievable by gravity.

4.0 Conclusions & Recommendations

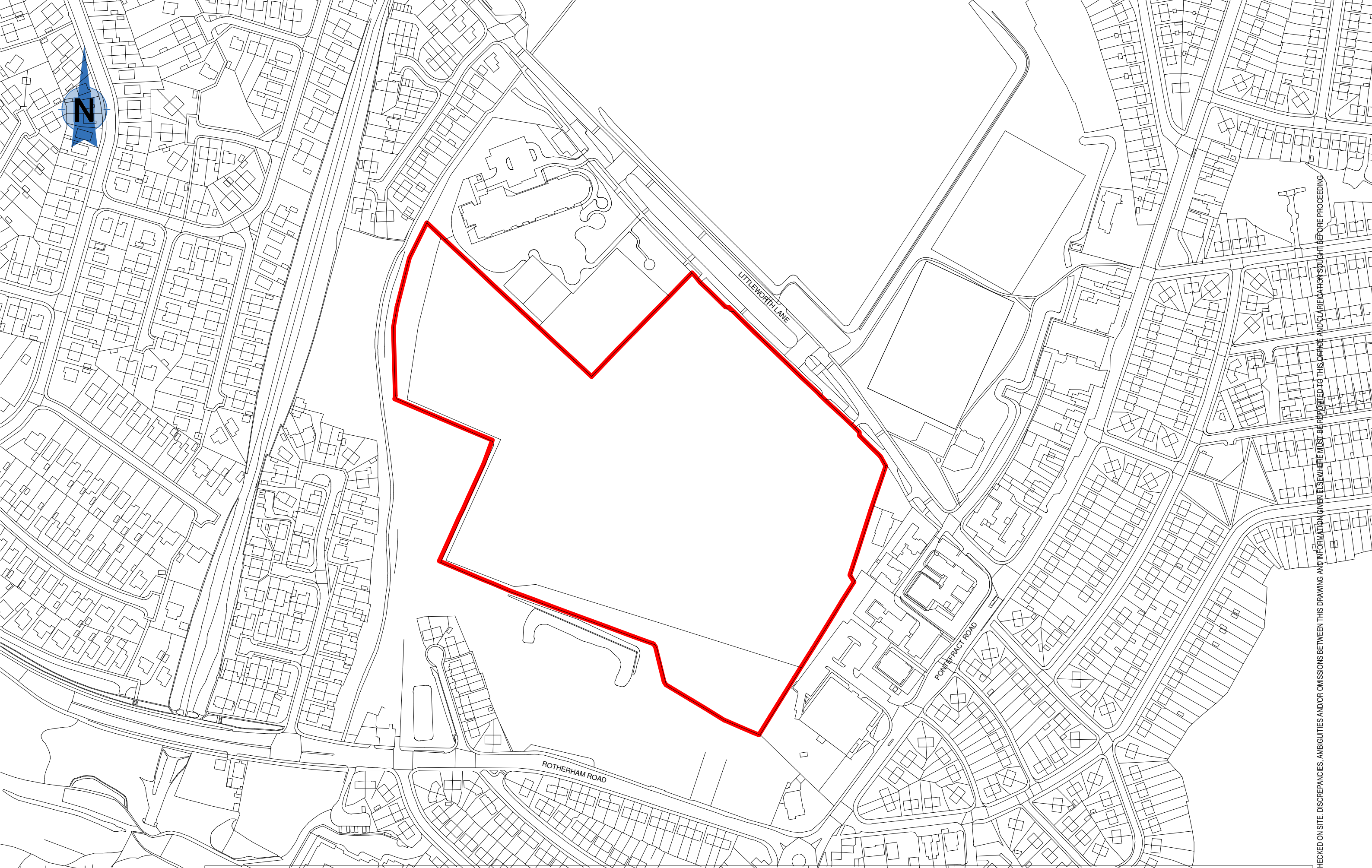
- i. Harron Homes propose to redevelop a Brownfield site South of Littleworth Lane for residential use.
- ii. The site lies within Zone 1 of the Environment Agencies Indicative flood plain but it is believed that the site has suffered some surface water flooding during the 2007 extreme event. Considerable improvements to the drainage network within the site will remove this risk placing the site at a very low risk of flooding from all sources.
- iii. Redevelopment of the site will create increased impermeable areas when compared to its historic status and this has been agreed with Yorkshire Water on the basis that an overall 30% reduction in Surface Water flows, with attenuation, are achieved from the whole site.
- iv. Historically the site drained both foul and surface water drainage from the buildings through a combined sewer, and surface water sewers into the sewer network running through the site to the East. Yorkshire Water will not permit this situation to re-occur without first considering alternate arrangements, these being, soak-away, watercourse, Surface Water sewer, in this order of preference.
- v. Soak-away testing has not yet been undertaken on the site and it is unlikely that adequate porosity will be achieved from the sub strata below the site, but more importantly, the risk of surface water emerging further down the slope and causing problems to third parties should be considered.
- vi. There are no available watercourses in the vicinity of the site.
- vii. Maximum discharge rates into the adjacent Surface water are agreed at 98 Litres per second from the whole site. The previous school site contributed a maximum 128 Litres per second from roof areas only, but in real terms, the playground and parking areas will have contributed significant flows. Overall a maximum discharge rate of 98 Litres per second will equate to a considerable reduction against the previous use of the site.

- viii. Foul water may drain into the public Combined Sewer network in a similar manner to the current buildings on the site, it is thought that this is achievable by gravity.

- ix. Development of the site in the manner outlined in this report will reduce the risk of flooding to the site and it's surrounding catchment, upstream and downstream.

Appendix 1

Site Location Plan



REV	DATE	AMENDMENT

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fax 01845 524278
e diparchitects@btconnect.com
w www.diparchitects.co.uk

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Thirsk, North Yorkshire Y07 1EY



Harron Homes Limited
Colton House
Temple Point
Bullerthorpe Lane
Leeds
LS15 9JL
Tel: 0113 2044670



PROJECT :
Development at Littleworth Lane, Lundwood
DRAWING TITLE :
Location Plan

SCALE:		DATE:	
1 : 2500 @ A3		JULY 2014	
DRAWN:	CHECKED:	DWG NO.	REV.
JW	-	3623/11	-

ALL DIMENSIONS TO BE CHECKED ON SITE. DISCREPANCIES, AMBIGUITIES AND/OR OMISSIONS BETWEEN THIS DRAWING AND INFORMATION GIVEN ELSEWHERE MUST BE REPORTED TO THIS OFFICE AND CLARIFICATION SOUGHT BEFORE PROCEEDING

Appendix 2

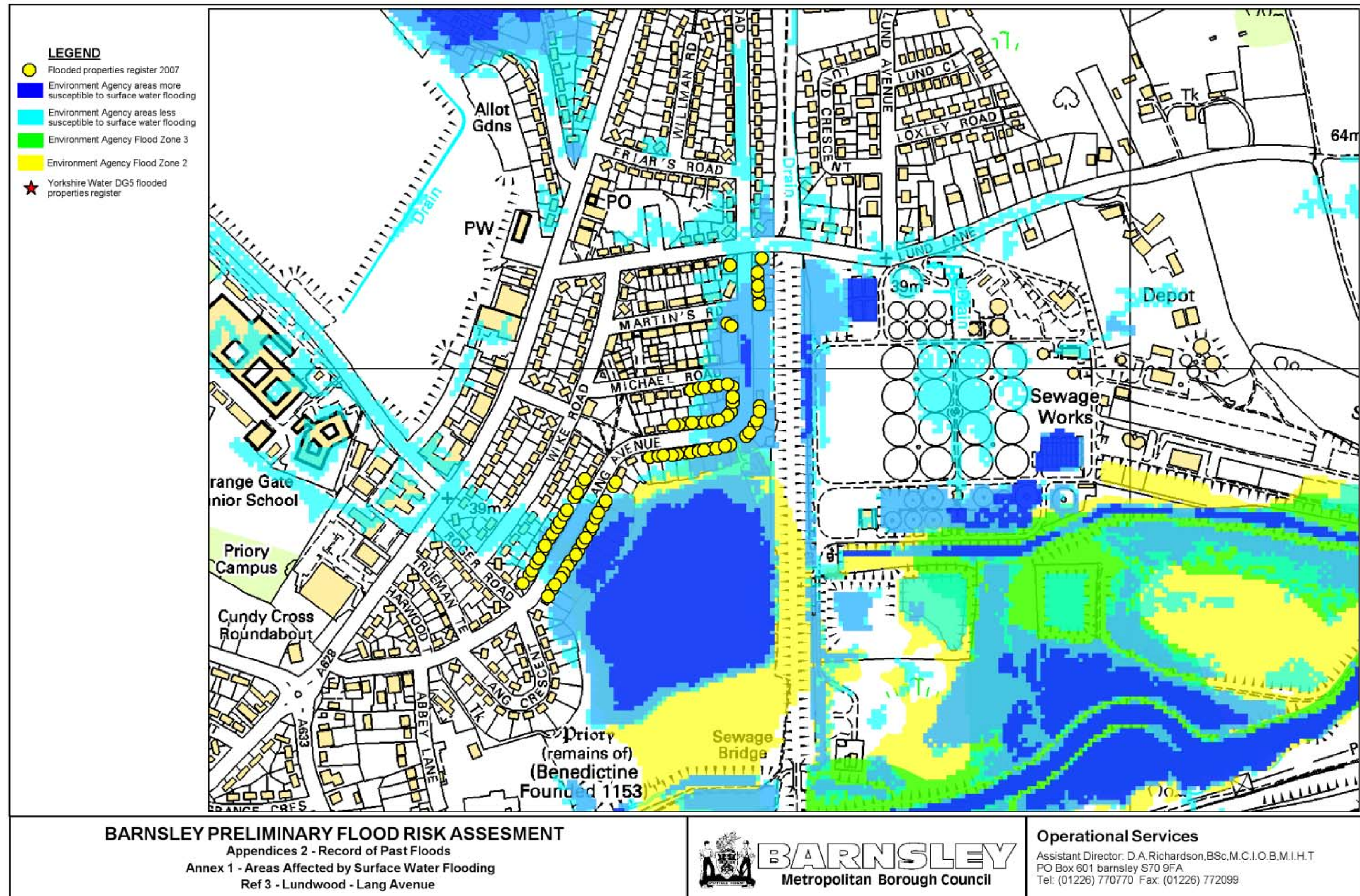
Proposed Site Layout

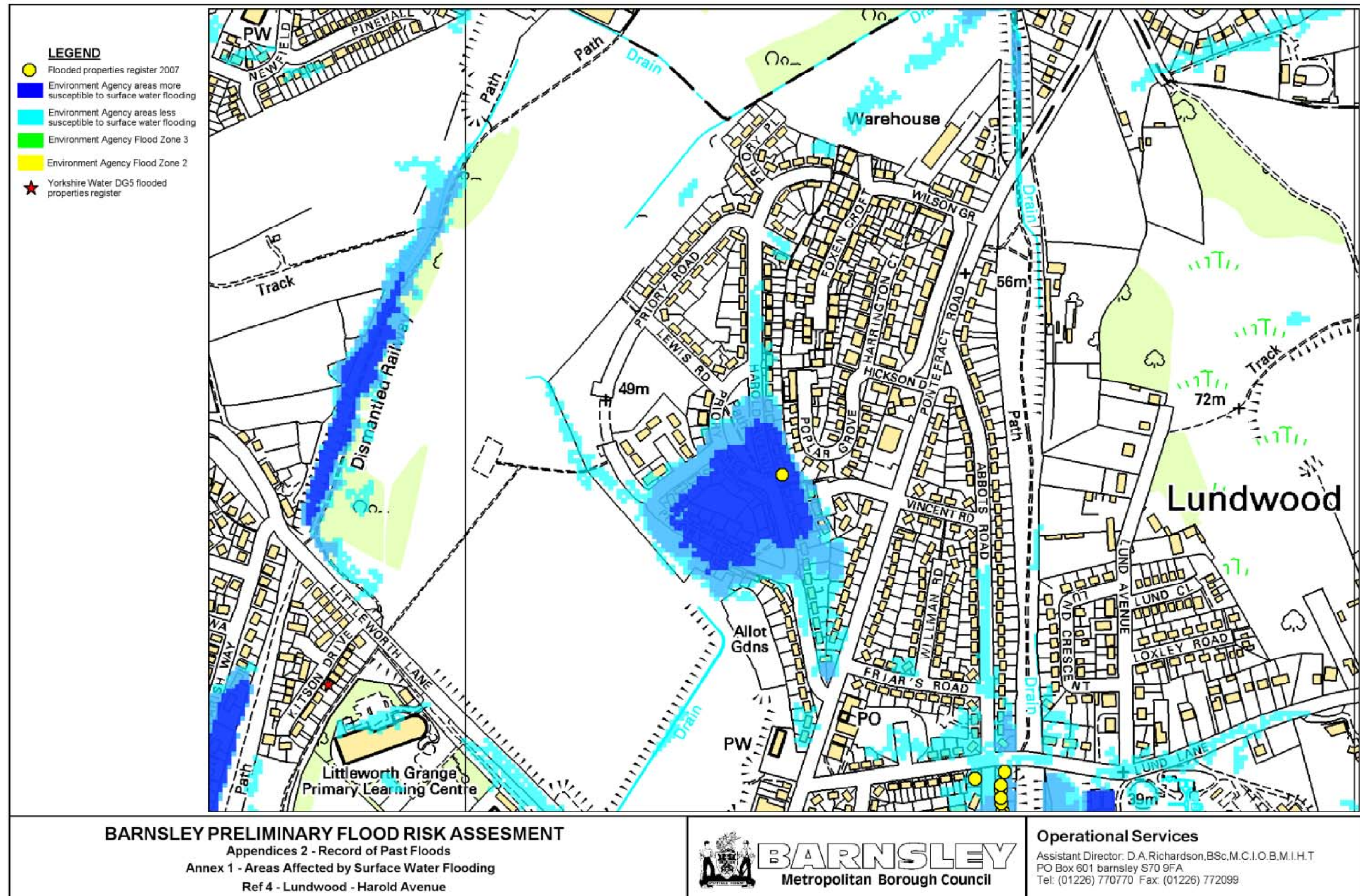
Appendix 3

Environment Agencies Indicative Flood Plain Map

Barnsley MBC Preliminary Flood Risk Maps







Appendix 4

Indicative Drainage Layout

Appendix 5

Yorkshire Water Sewer Records and correspondence



YorkshireWater



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

Harron Homes
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Technical.Sewerage@yorkshirewater.co.uk

Your Ref:
Our Ref: Q008284

For telephone enquiries ring:

Kashif Khan on (0845)120 8482

11th June 2014

Dear Sir,

Priory School, Littleworth, Lundwood, Barnsley - Pre-Planning Sewerage Enquiry on P431563

Thank you for your recent enquiry and remittance. Our official VAT receipt has been sent to you under separate cover. 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:

There are 375 mm and 450 mm diameter public combined sewers recorded crossing the site. No buildings, or other obstructions, are to be erected within 3 (three) metres, nor trees planted within 5 (five) metres of these public sewers. It may not be acceptable to raise or lower ground levels over the sewers, nor to restrict access to the manholes on the sewers. If you wish to have these sewers diverted under Section 185 of the Water Industry Act 1991 an application should be made in writing. To discuss this matter, please telephone 0845 120 84 82.

There is also a 225 mm diameter public surface water sewer recorded crossing the site. In this instance, building-over may take place under the control of Part H4 Building Regulations 2000.

The local Waste Water Treatment Works (WWTW) is Lundwood. It is understood that this WWTW may only have limited spare capacity, if any, available. We have contacted the respective treatment team for more information regarding the impact of proposed development and will contact you when an assessment has been made.

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 domestic waste should discharge to the 375/450 mm diameter public combined sewer recorded crossing/within the site.

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 9 (nine) litres per second.

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.

The local public sewer network does not have capacity to accept any additional discharge of surface water from the proposal 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.

Subject to providing evidence as to why the other methods of surface water disposal have been discounted, curtilage surface water may discharge to the 600 mm diameter public surface water sewer. Any discharge of surface water from the site should discharge to similar points of connection to that of the existing use of the site.

Based on the information submitted to date, the surface water discharge from the site to be restricted to not greater than 98 (ninety eight) litres/second.

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, with regard to surface water disposal from the site.

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 0845 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.

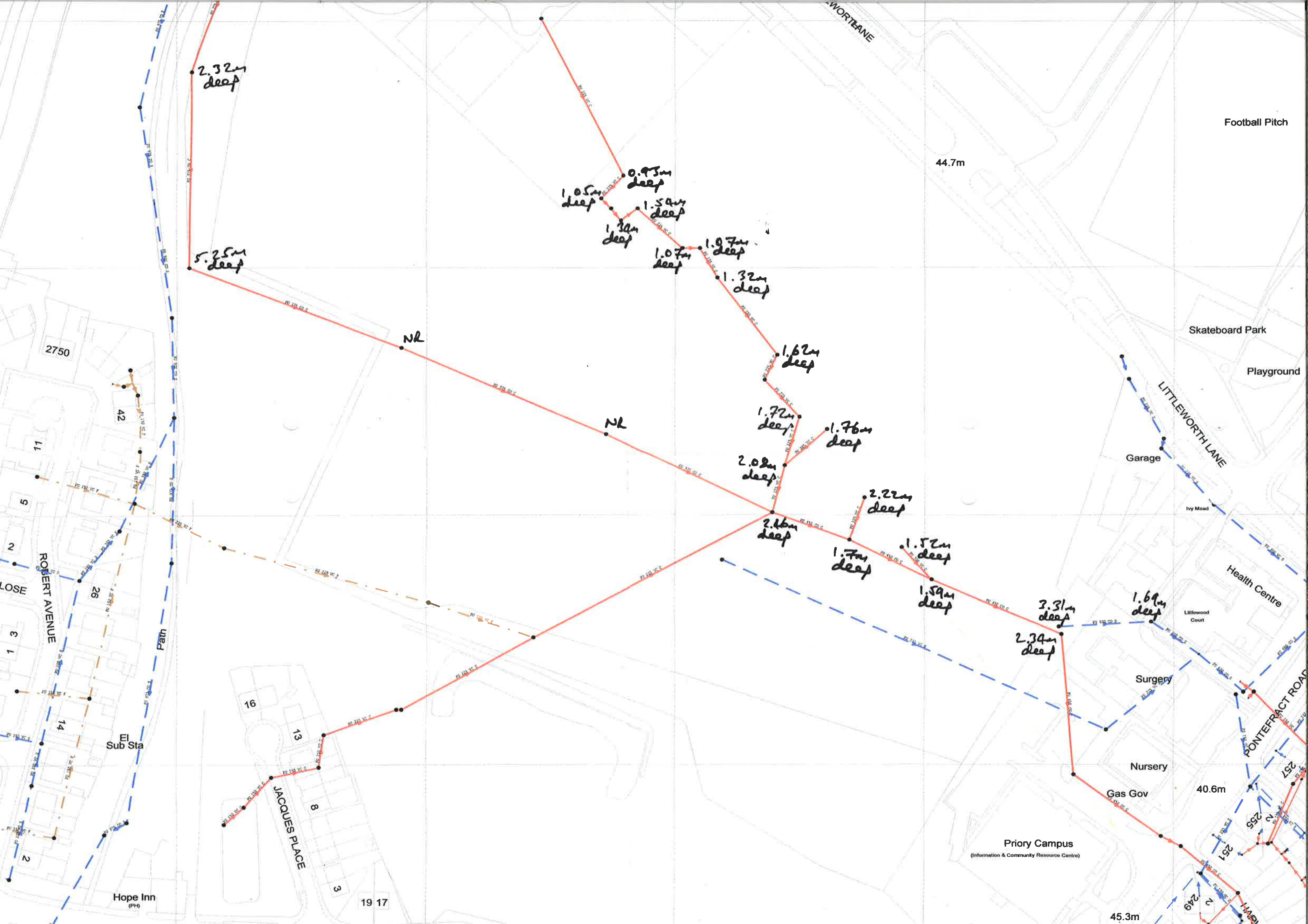
Any new connection to an existing public sewer will require the prior approval of Yorkshire Water. You may obtain an application form from our website (www.yorkshirewater.com) or by telephoning 0845 120 84 82.

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. 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 faithfully

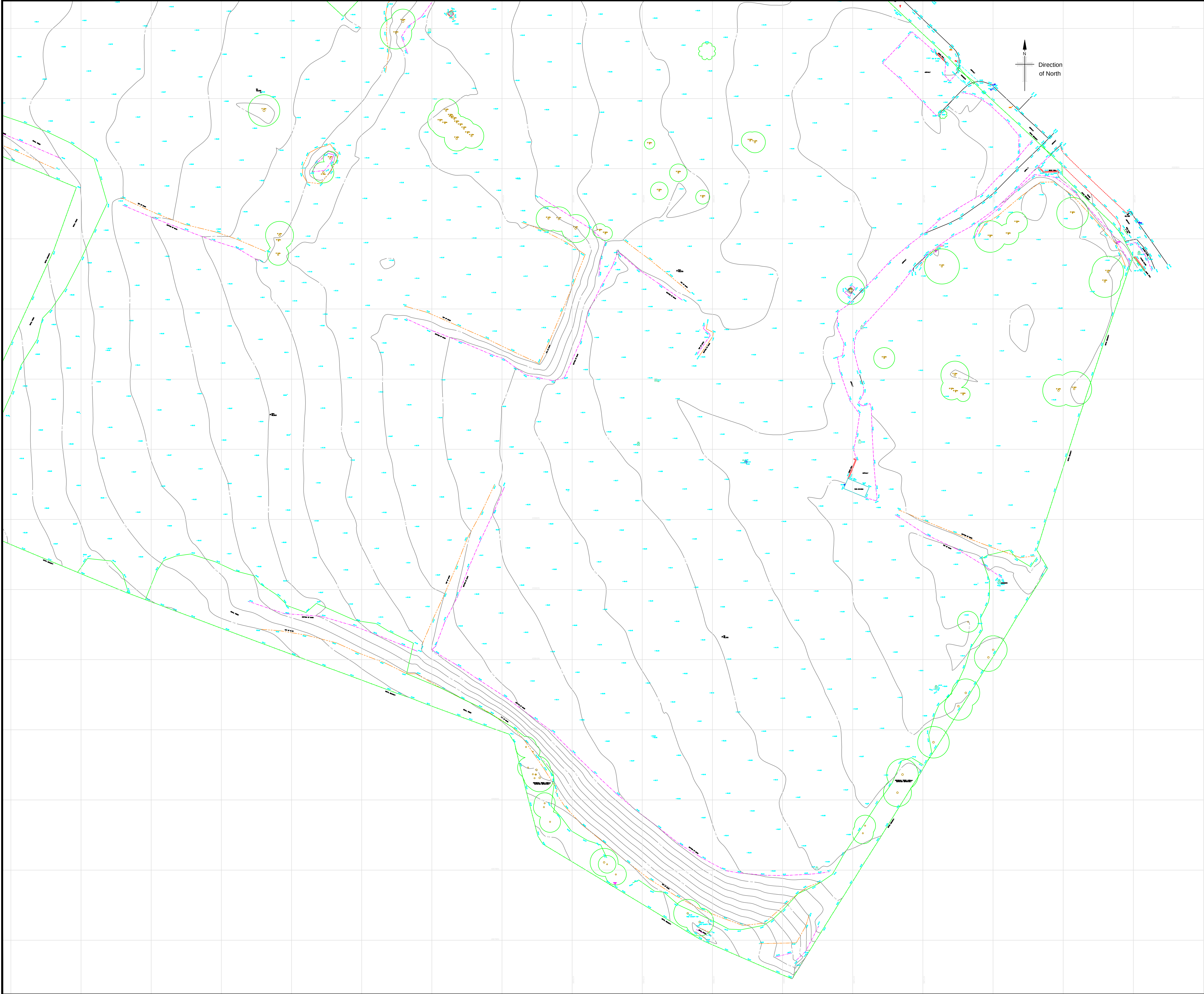


Developer Services Team



Appendix 6

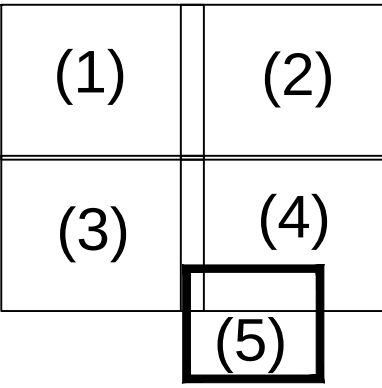
Topographic Survey



Notes

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Layout Key



Grid : OS National Grid.
Using the OS GPS Network and applying OSTN02 transformation and then removing the scale factor for true distances with a one-step transformation centred on G1

Datum : OS Level Datum.
Using the OS GPS Network and applying OSGM02 National Geoid Model to obtain local area corrections.

Station Listing			
Station	Easting	Northing	Level
DB3	436884.694	407042.394	49.951
DB4	436933.984	406909.893	48.563
G1	437107.123	407034.289	44.662
G2	437037.168	407103.430	45.608
S2	437178.757	406967.303	42.783
S3A	437049.909	406950.902	45.579
S4	436931.209	407001.740	49.032
S5	437062.819	406846.535	45.218

KEY			
AIR VALVE	AV	KERB OUTLET	KO
BENCH MARK	BM	LAMP POST	LP
BN	BN	MANHOLE (CIRCULAR)	MH
BOLLARD	BOL	MANHOLE (RECTANGULAR)	MHR
BORE HOLE	BH	MANHOLE (TRIANGULAR)	MHT
BRITISH TELECOM COVER	BT	MARKER POST	MCR
BUS STOP	BUS	GULLY	GU
CABLE TV COVER	CA TV	RODDING EYE	RE
CABLE TV SUPPLY	CA	SIGN POST	SIGN
COLUMN	COL	TELECOM COVER	TEL
EARTHING POINT	EP	TELEGRAPH POLE	TP
ELECTRICITY COVER	ELEC	THRESHOLD LEVEL	THL
ELECTRICITY POLE	EP	TRAFFIC LIGHT	TL
FIRE HYDRANT	FH	TRIAL PIT	TPIT
GAS VALVE	GAS	WASH OUT	WO
GATE	G	WATER METER	WM
INSPECTION COVER (CIRCULAR)	IC	WATER STOP COOK	SC
INSPECTION COVER (RECTANGULAR)	IC	WATER STOP VALVE	SV
COVER LEVEL	CL	CHAMBER BASE LEVEL	Ch.L
INVERT LEVEL	IL	WATER SURFACE LEVEL	WL
UNABLE TO RAISE	UTR	UNABLE TO MEASURE	UTM
GIRTH OF TREE TRUNK	G	DIAMETER OF TREE TRUNK	D
HEIGHT TO TOP OF TREE CANOPY	H	MULTI BOLE TREE	MB

-	--/--/----	--	--	--
Rev	Date	Drawn	Description	Check



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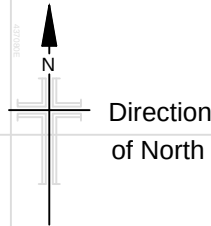
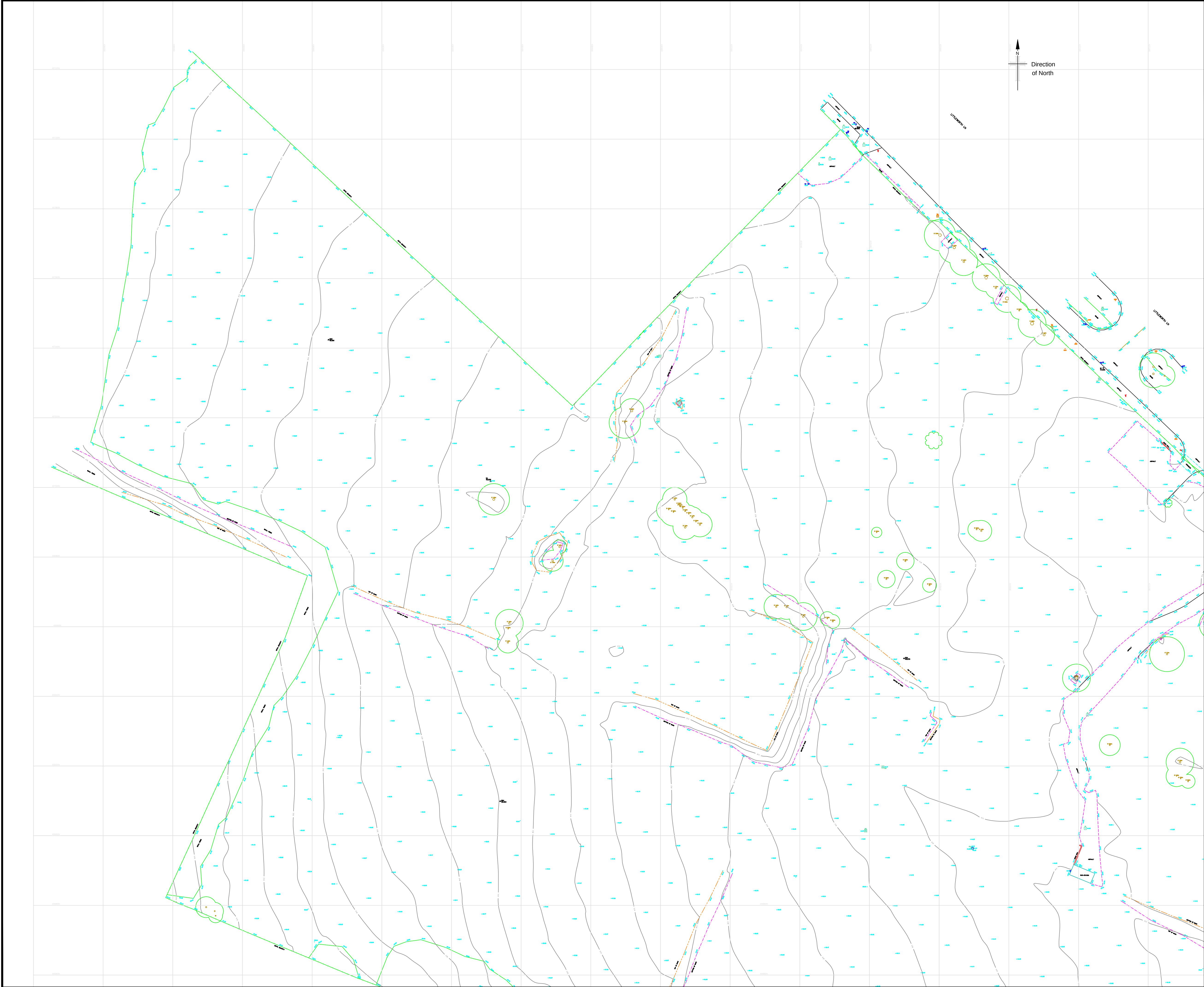
Site

LUND WOOD, BARNSELEY
SOUTH YORKSHIRE, S715RB

Title

TOPOGRAPHICAL SURVEY
3D

Surveyed	DP, DB, KZ	Drawn	DP
Chk.	DA	Date	11/03/2014
Scale	[A1 Sheet] 1/500	DWG Ref (Layout No) 10957-109_3DT (6)	Status FINAL
Job No	10957-109	Rev	I



Notes

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Layout Key

(1)	(2)
(3)	(4)
(5)	

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Site

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SOUTH YORKSHIRE, S715RB

Title

TOPOGRAPHICAL SURVEY
3D

Surveyed	DP, DB, KZ	Drawn	DP
Chk.	DA	Date	11/03/2014
Scale	[A1 Sheet] 1/500	DWG Ref (Layout No) 10957-109_3DT (7)	Status FINAL
Job No	10957-109		Rev I