structural | civil | transportation | environmental | geotechnical

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empd 2009
CONSULTANT OF THE YEAR 2009

Residential Development, New Lodge, Barnsley, South Yorkshire.

Flood Risk Assessment and Drainage Strategy For Keepmoat Homes Ltd.

11068: FRA/DS
Original: May 2011

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Flood Risk Assessment and Drainage Strategy

Land at New Lodge, Barnsley.

Prepared By:

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Checked By:

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Executive Summary

Introduction	BSP Consulting has been commissioned by Keepmoat Homes Ltd. to undertake a Flood Risk Assessment and Drainage Strategy for the proposed redevelopment of Land at Kirkstall Road and Langsett Road, New Lodge, Barnsley. This Flood Risk Assessment has been prepared in accordance with the Department for Communities and Local Government (DCLG) publication 'Planning Policy Statement 25 (PPS25) Development and Flood Risk' and in line with current guidance and best practice.
Site Location Description and Details	The site fronts onto Kirkstall Road and Langsett Road and was previously occupied by houses and associated car parking and hard standing. The site has been demolished and cleared recently and only some buildings remain. All buildings will be demolished and the site cleared prior to commencement of construction. The site is gently sloping and falls generally to the north east. Levels vary from 91.5m at the north eastern side to 95.5m AOD in the southern corner of the site.
Definition of the Flood Hazard and Probability	The site is noted to lie in the low risk flood zone 1 and therefore the risk of flooding from rivers is less than 1 in 1000 years. The River Dearne lies 800m to the south west of the site at about 40m below the lowest site level.
Predevelopment Surface Water Runoff	0.479ha of the site is covered with impermeable surfaces of tarmac, concrete or roofing. All of this area is drained by the extensive drainage network.
Proposed Developed Site Surface Water Strategy	The impermeable area of the proposed layout is about 0.598ha. The proposed impermeable area is 43% more than the original impermeable area and will either be drained to the existing outfall sewers or to private soakaways. Yorkshire Water has confirmed that they will accept surface water into the adopted public sewer system at restricted rates of discharge to offer a 30% reduction over the previous site discharge rates if infiltration drainage is not viable for the site
Climate Change	It is proposed that the detailed design of the piped surface water drainage systems should be checked with a factor of 1.3 to assess exceedance flows.
Pre Development Foul Water Regime	Foul flows generated by the existing site discharge to the adopted sewer network.
Proposed Developed Site Foul Water Strategy	The foul water flows to be generated by the proposed development should be accommodated within the adopted sewer network. Yorkshire Water has confirmed that an unrestricted gravity domestic foul flow from the proposed 84 units can be accommodated within the adopted foul/combined sewers currently crossing the site.
Recommendations	The following recommendations are made to reduce flood risk and promote a sustainable and practicable drainage strategy at the proposed development: • Where the permeable sandstone strata has been identified and is at a suitable depth below ground level soakaways will be used for the disposal of surface water generated by the proposed dwellings and associated hardstanding. Where the permeable sandstone has not been found or is too deep for traditional soakaways the proposed dwellings will discharge to the public surface water sewers crossing the site. The drainage from the public highways running through the site will discharge to the public sewers as it currently does. • Where soakaways are not suitable for the discharge of surface water generated from the development site, surface water should discharge to the local public surface water sewer network at a rate not exceeding 30% less than the existing rate. • The proposed drainage will discharge 3085m^2 to private soakaways and 2898m^2 to the public sewer network, compared to an existing discharge of 4176m^2 to the public sewers. This represents a 31% improvement over the existing situation. • Options such as permeable paving should be considered as primary treatment and attenuation features for private areas, where viable, considering other site constraints. • Permitted rates of surface water discharge will need to be confirmed with Yorkshire Water. • It is recommended that the final outfall for foul water from the site should be to the adopted foul/combined sewers crossing the site.

1.0 INTRODUCTION

1.1 Terms Of Reference

1.1.1 BSP Consulting has been commissioned by Keepmoat Homes Ltd. to undertake a Flood Risk Assessment and Drainage Strategy for the proposed redevelopment of land off Kirkstall Road and Langsett Road, New Lodge, Barnsley, South Yorkshire.

1.1.2 In the preparation of this report a Yorkshire Water Developer Enquiry has been undertaken and sewer records have been assessed to better understand the constraints affecting this site.

1.1.3 This Flood Risk Assessment and Drainage Strategy has been prepared in accordance with the Department for Communities and Local Government (DCLG) publication 'Planning Policy Statement 25 (PPS25) Development and Flood Risk' and in line with current guidance and best practice.

1.1.4 This report has been produced on behalf of the client, Keepmoat Homes Ltd., and no responsibility is accepted to any third party for all or any part. This report should not be relied upon or transferred to any other parties without the express written authorisation of BSP Consulting. If any unauthorised third party comes into possession of this report, they rely on it at their own risk and the authors owe them no duty of care or skill.

1.2 Planning Policy Statement 25 (PPS 25)

1.2.1 The final version of PPS 25 was released on the 7th December 2006 by DCLG and replaced the previous guidance on development and flood risk stated in PPG 25. PPG 25 has now been withdrawn.

1.2.2 PPS 25 can be downloaded free of charge from the internet at the following link:

http://www.communities.gov.uk/publications/planningandbuilding/pps25floodrisk

2.0 BACKGROUND INFORMATION

2.1 Site Location, Description and Details

2.1.1 Figure 2.1 below indicates the location of the site; a more detailed site location plan is located in Appendix A.

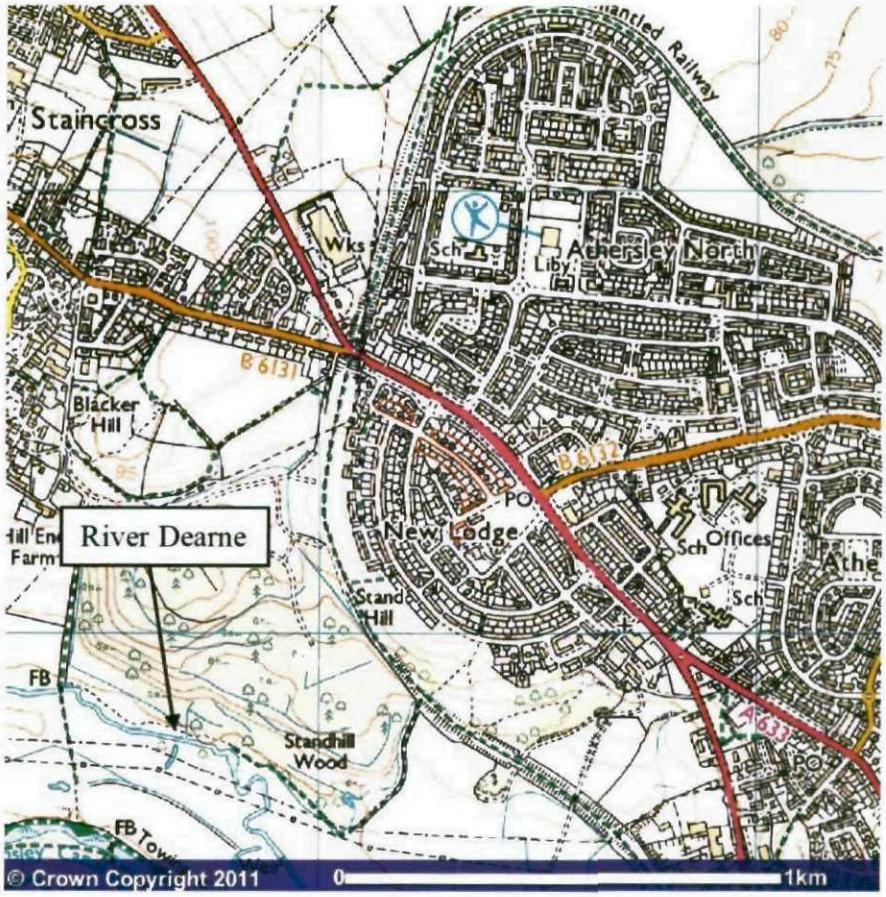


Fig 2.1 Land at New Lodge, Barnsley – Site Location Plan

2.1.2 The proposed development site has an area of approximately1.35 hectares and is located to the south of the A61 in the New Lodge area of Barnsley, South Yorkshire at grid reference SE 342 094.

2.1.3 The site fronts onto Kirkstall Road and Langsett Road and was previously occupied by various residential dwellings and associated drives and hardstanding. The site is bounded by existing residential development on all sides with an area of public open space to the south of Kirkstall Road.

2.1.4 No watercourses are noted on Ordnance Survey mapping to lie within the locality of the site. The River Dearne lies approximately 800m south west of the site.

2.1.5 A topographical survey of the site area has been carried out and a copy of this is included within Appendix B. Levels on the site vary from 95.5m to 91. 5m AOD.

2.1.6 The site slopes gently generally to the north east, with a low point in Kirkstall Road.

2.2 Main Drainage Catchment Context and Local Watercourse Classifications

Main Rivers

The River Dearne is a non tidal Main River that lies 800m to the south west of the site.

Watercourses

No ordinary watercourses are located within reasonable proximity of the site.

Adopted Main Sewers

Surface Water: Yorkshire Water's sewer records indicate surface water sewers crossing and within close proximity of the site. These sewers are identified on the site drainage plan in Appendix C. The pre development site discharged to these sewers at an unrestricted rate.

Foul Water: Yorkshire Water's sewer records indicate foul/combined sewers crossing and within close proximity of the site. These sewers are identified on the site drainage plan in Appendix C. The pre development site discharged to these sewers at an unrestricted rate.

The location of the River Dearne is indicated on Figure 2.1 above. The locations of the main sewers are indicated on the Yorkshire Water sewer records included in Appendix D.

2.3 Approach To The Assessment

2.3.1 This assessment seeks to consider the risks of flooding both to the site and to the wider area as a consequence of the development proposal. This also requires assessment of the development constraints of the site and the opportunities offered by the existing infrastructure and natural environment in order to propose a strategy by which the site can be developed both economically and sustainably. This assessment draws upon our investigations and experience within the local area.

3.0 FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY

3.1 Definition of the Flood Hazard and Probability

3.1.1 Fluvial Flood Risk

3.1.2 The site is noted to lie in the low risk Flood Zone 1 and therefore the risk of flooding from rivers is less than 1 in 1000 years. The River Dearne lies 800m to the south west of the site at about 40m below the lowest site level. Figure 3.1 below indicates the extent of the natural flood plain. This Main River is therefore not considered to present a flood risk to the proposed development. There are no other significant watercourses within influence distance of the site.

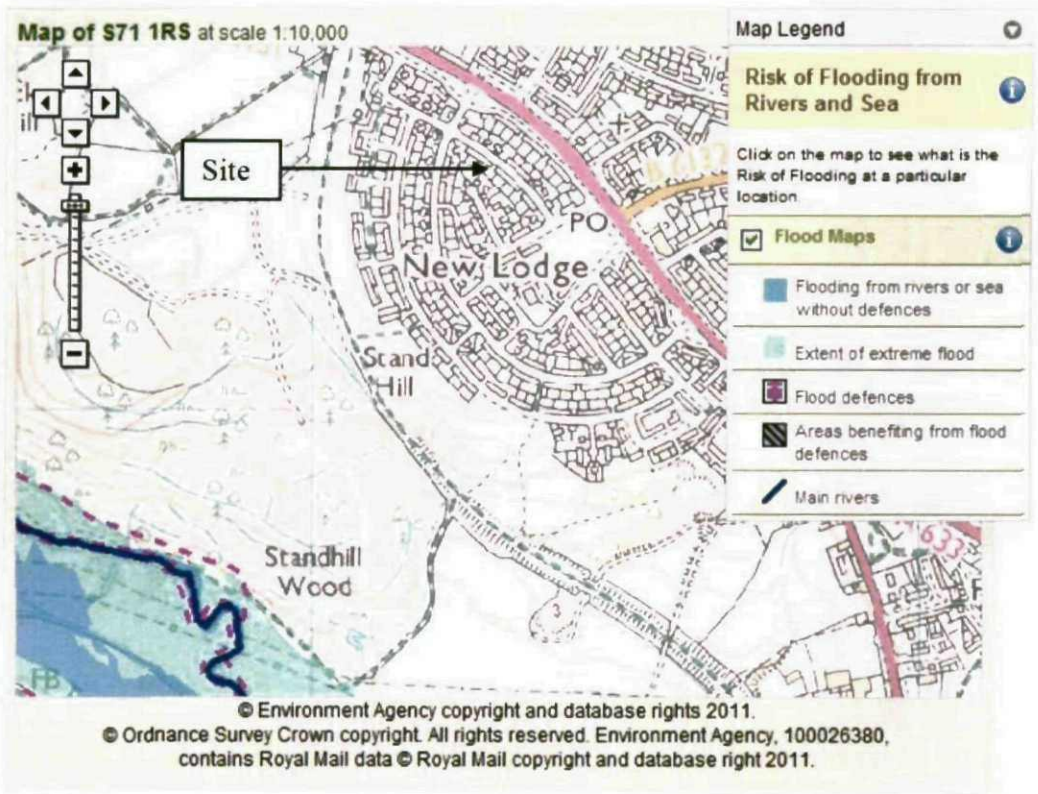


Fig 3.1 Land at New Lodge, Barnsley – Indicative Flood Map

3.1.3 Tidal Flood Risk

3.1.4 The site is at a lowest level of 91.65m above mean sea level. The site is therefore not at risk of flooding from tidal sources.

3.1.5 Surface Water Flood Risk

3.1.6 The site has a gradual fall towards the north east as noted in section 2.1 above with a low point approximately in the centre. In an extreme rainfall event any overland flows around the site would be intercepted by the road network and

discharge to the public sewers crossing the site. The site is therefore not at risk of flooding from sheet run-off from adjacent land.

3.1.7 The site is greater than 1 hectare in size and therefore there is an inherent risk of flooding to areas off site as a result of the development sewerage although in this instance the redevelopment will result in a reduction in the discharge rates from the site by 30% following the development. With regard to the issue of onsite flooding from site runoff, flood flow routes will be assessed as part of the detailed design.

3.1.8 The proposals for the management of surface water in section 3.4 of this report address this issue in more detail.

3.1.9 Flood Risk from Ground Water

3.1.10 The site occupies an elevated position above the surrounding areas. Inspection of the Site Investigation report confirms that the site is underlain by permeable rock at variable depth. Only very limited groundwater was encountered in one trial hole during the intrusive investigation. It can therefore be confirmed that the site is not at risk of flooding from ground water.

3.1.11 Flood Risk from Infrastructure

3.1.12 The site is not within close proximity of any reservoirs, canals or wet process industrial works. This site is not at risk of flooding from sewers or water mains based on the comments raised in paragraph 3.1.6.

3.2 Development Description and Planning Context

3.2.1 The current development proposals are for the demolition of the existing buildings and hardstandings and for the erection of a new residential development as outlined on the Proposed Site Layout included in Appendix C.

3.2.2 In accordance with PPS 25, the proposed residential end use falls under the **More Vulnerable** category in terms of flood risk. All forms of development are appropriate in flood zone 1.

3.3 Pre Development Surface Water Runoff

3.3.1 Inspection of the topographical survey indicates that 0.418ha of the site is covered with impermeable surfaces of tarmac, concrete or roofing. All of this area is drained by the existing drainage network. The road network serving the development is to be unchanged from the existing and has been excluded from these calculations.

3.3.2 Given that the site slopes gently with falls to gullies and that the drainage system is present across the entire site it can be seen that the entire area is positively drained. The flows appear to discharge to the existing public sewerage network crossing the site. In an extreme rainfall event accelerated runoff from the hardstandings and roof areas would tend to pond on site or discharge onto the

existing road network. The arrangement of the site areas are shown graphically on the Existing Impermeable Areas drawing included in Appendix E.

3.3.3 No evidence has been found to suggest that soakaways have been successfully used to drain surface water from any of the original buildings or hardstandings.

3.4 Proposed Developed Site Surface Water Strategy

3.4.1 The current development proposals are for the demolition of the existing buildings and hardstandings and for the erection of a new development of residential dwellings. The impermeable areas of the buildings and car parking are to be positively drained.

3.4.2 The impermeable area of the proposed layout is about 0.598ha. This area is noted on the Proposed Impermeable Areas plan included in Appendix E. The proposed impermeable area is 43% more than the original impermeable area.

3.4.3 A developer enquiry has been instructed with Yorkshire Water and they have confirmed that surface water may discharge to the adopted sewers at a rate not exceeding the current rate with a reduction of 30% if the use of infiltration drainage is not feasible. A drainage survey of the existing pipe runs has been carried out confirming discharge of the previous site to the public sewerage network. Copies of the Yorkshire Water response and sewer records are included in Appendix D.

3.4.4 A proposed drainage layout is included in Appendix C. Surface water generated by the proposed development discharging to the public sewers is to be reduced by 30% less than the existing flow rates and then discharged locally to the existing public sewer network. Where possible soakaways will be used to dispose of surface water generated by the development site.

3.4.5 A Phase 1 and Phase 2 Site Investigation has been carried out on this site. With regard to the feasibility of using infiltration drainage, to reduce the pass forward volume of surface water from the developed site, the Site Investigation reports that there exists a band of sandstone beneath the development site which offers the potential for infiltration drainage. Two percolation tests carried out in this band yielded percolation rates of 4.95×10^{-6}m/s and 5.13×10^{-6}m/s. These values are low but are workable. The sandstone was found at varying depths across most of the site, however it was not located in the far northern corner of the site or the far eastern side of the site and the drainage layout will need to reflect this by placing the required soakaways away from these areas. The near surface soils do not appear to be suitable for infiltration drainage and two percolation tests carried out in these soils failed to yield any positive results as water did not drain from the pits to any significant degree. Where the sandstone is close to the surface it is proposed that soakaways be used to drain surface water from the development site.

3.4.6 Options such as permeable paving should be considered as primary treatment features for private areas, where viable, considering other site constraints.

3.4.7 On the basis that there is a reduction of 30% in site discharge rates as a result of the development proposal it can be confirmed that the proposed development will be safe from flooding without increasing the risk of flooding to others. This proposal is therefore compliant with PPS 25 - Development and Flood Risk.

3.4.8 The final design proposals will need to be verified by building control, Yorkshire Water and the Environment Agency as necessary.

3.5 Design Considerations for Exceedance

3.5.1 The proposed surface water drainage system should be designed to accommodate the 1 in 30 year rainfall event without any surface water flooding and should be capable of retaining the 1 in 100 year plus 30% climate change storm event on site without flooding any buildings.

3.6 Climate Change

3.6.1 Climate change is recognised as a factor for consideration in terms of its effect on surface water runoff. This issue affects the likely future runoff from developed areas to the extent whereby it is proposed that the detailed surface water design calculations should be checked with a factor of 1.3 to assess exceedance flows.

3.7 Pre Development Foul Water Regime

3.7.1 Foul flows generated by the existing site discharge to the adopted sewer network.

3.8 Proposed Developed Site Foul Water Strategy

3.8.1 The foul water flows to be generated by the proposed development should be accommodated within the adopted sewer network.

3.8.2 Yorkshire Water has confirmed that an unrestricted gravity domestic foul flow from the proposed 84 units can be accommodated within the adopted foul/combined sewers crossing the site.

3.8.3 The final design proposals will need to be verified by building control and Yorkshire Water as necessary.

4.0 RECOMMENDATIONS

4.1 The following recommendations are made to reduce flood risk and promote a sustainable and practicable drainage strategy at the proposed development:

- Where the permeable sandstone strata has been identified and is at a suitable depth below ground level soakaways will be used for the disposal of surface water generated by the proposed dwellings and associated hardstanding. Where the permeable sandstone has not been found or is too deep for traditional soakaways the proposed dwellings will discharge to the public surface water sewers crossing the site. The drainage from the public

highways running through the site will discharge to the public sewers as it currently does.

- Where soakaways are not suitable for the discharge of surface water generated from the development site, surface water should discharge to the local public surface water sewer network at a rate not exceeding 30% less than the existing rate.
- The proposed drainage will discharge 3085m^2 to private soakaways and 2898m^2 to the public sewer network, compared to an existing discharge of 4176m^2 to the public sewers. This represents a 31% improvement over the existing situation.
- Options such as permeable paving should be considered as primary treatment and attenuation features for private areas, where viable, considering other site constraints.
- Permitted rates of surface water discharge will need to be confirmed with Yorkshire Water.
- It is recommended that the final outfall for foul water from the site should be to the adopted foul/combined sewers crossing the site.

Disclaimer

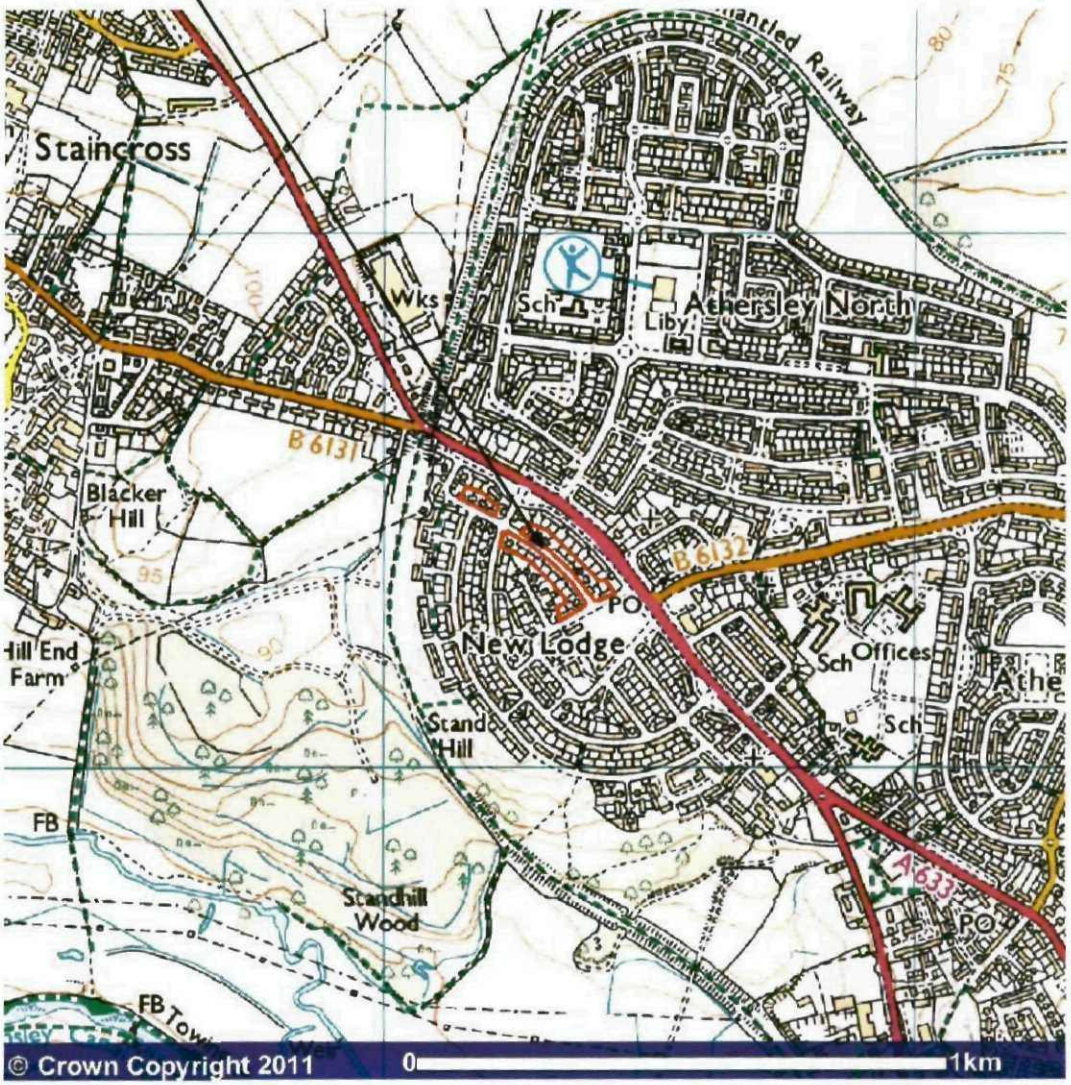
We would note that all comments made in this report are based on the sources stated in Section 1.1. This report and its recommendations are intended for the use of Keepmoat Homes Ltd. for the above site only.

Appendix A
Site Location Plan

SITE LOCATION PLAN

Site grid ref. E: 434290, N:409410

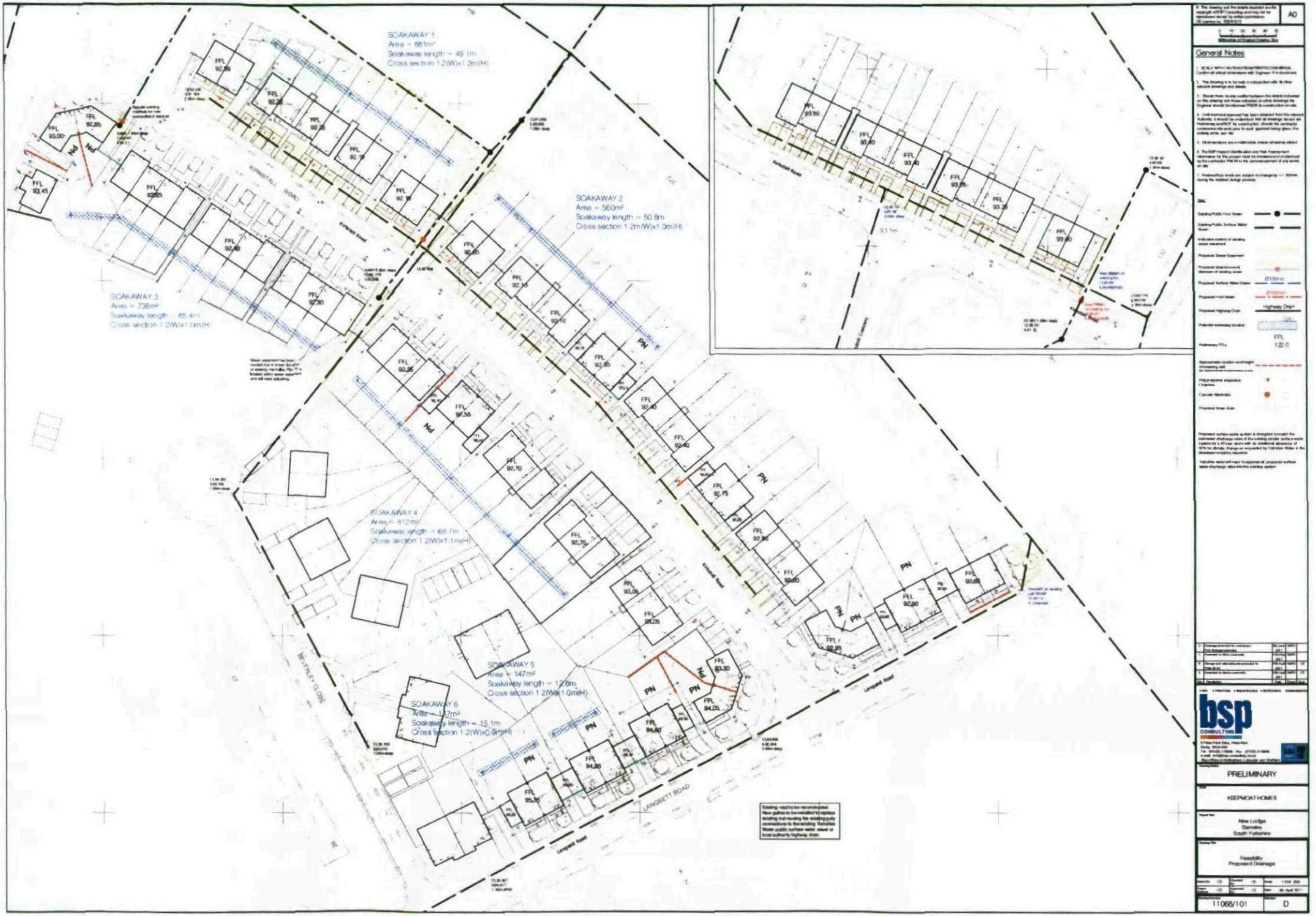
Kirkstall Road / Langsett Road
New Lodge
Barnsley
South Yorkshire



Appendix B
Topographical Survey

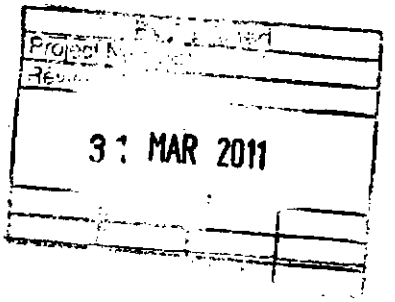


Appendix C
Proposed Site Drainage Layout


SOAKAWAY 1
Area = 681m²
Soakaway length = 49.1m
Cross section 1.2(W)x1.2m(H)
SOAKAWAY 2
Area = 560m²
Soakaway length = 50.8m
Cross section 1.2m(W)x1.0m(H)
SOAKAWAY 3
Area = 738m²
Soakaway length = 65.4m
Cross section 1.2(W)x1.0m(H)
SOAKAWAY 4
Area = 812m²
Soakaway length = 68.7m
Cross section 1.2(W)x1.1m(H)
SOAKAWAY 5
Area = 147m²
Soakaway length = 12.0m
Cross section 1.2(W)x1.0m(H)
SOAKAWAY 6
Area = 137m²
Soakaway length = 15.1m
Cross section 1.2(W)x0.6m(H)
Kirkstall Road
Langbett Road
Beverley Close
Existing road to be reconstructed. New gullies to be installed to replace existing and rerouted to existing gully connections to the existing Yorkshire Water public surface water sewer or local authority highway drain.
A0
General Notes
PRELIMINARY
KEEPMOAT HOMES
New Lodge
Barnsley
South Yorkshire
Feasibility
Proposed Drainage
11068/101
D

Appendix D
YW Developer Enquiry and Sewer Records

YorkshireWater



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

Tel: 0845 120 8482
Fax: (01274) 372 834

Email:
Planning.Sewerage@yorkshirewater.co.uk

For telephone enquiries ring:

Kashif Khan on (0845)120 8482

28th March 2011

BSP Consulting
5 Pride Point Drive
Pride Park
Derby
DE24 8BX

FAO Mr Chris Dodd

Your Ref:
Our Ref: M001388

Dear Sir,

New Lodge, Barnsley - Pre-Planning Sewerage Enquiry - Residential - J281245

Thank you for your letter received 3rd March 2011 and remittance. Our official VAT receipt has been sent to you under seperate cover. Please find enclosed a complimentary extract from the Statutory Sewer Map, this indicates the recorded position of the public sewers.

The following comments reflect our view, with regard to the public sewer network only, based on a 'desk top' study of the site:

There are 150/225/300 mm diameter public surface water sewers and 225 mm diameter public combined sewers recorded crossing the site. No buildings 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.

Development of the site should take place with separate systems for foul and surface water drainage. The separate system should extend to the public sewer.

GENERAL:

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.

Where appropriate, soakaways, swales and infiltration trenches (SUDS) may be adopted as part of the public sewer network. For general conditions for the adoption of SUDS please see the attached sheet. Further information may be seen in the DEFRA publication 'Interim Code of Practice for Sustainable Drainage Systems' (ISBN 0-86017-904-4). If the developer is considering adoption of SUDS they should contact our Developer Services Team on 0845 120 84 82.

NORTHERN SITE:

Foul water domestic waste should discharge to the 225 mm diameter public combined sewer recorded crossing/within the site. It is understood that private foul drainage currently serves the small section of land on Langsett Road. This should continue to be re-utilized.

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

In the first instance, please provide evidence to show soakaways are not a viable option (eg, a ground investigation report) and that there are no watercourses in the vicinity of the site.

As a last resort and the evidence submitted being satisfactory, 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. Discharges to the public sewer must also take into account a 30% reduction in existing discharge and climate change. To maintain the "status quo" in the public sewer network, any discharge of surface water from the site should take place with similar rates of flow and/or measured areas 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 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.

SOUTHERN SITE:

Foul water domestic waste should discharge to the 150 mm diameter public combined sewer recorded crossing Sherburn Road, at a point within/adjacent to the site.

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

In the first instance, please provide evidence to show soakaways are not a viable option (eg, a ground investigation report) and that there are no watercourses in the vicinity of the site.

As a last resort and the evidence submitted being satisfactory, 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. Discharges to the public sewer must also take into account a 30% reduction in existing discharge and climate change. To maintain the "status quo" in the public sewer network, any discharge of surface water from the site should take place with similar rates of flow and/or measured areas 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 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.

GENERAL:

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. Highway drainage, however, may be accepted under certain circumstances; for instance, if SUDS are not a viable option and there is no highway drain available and if capacity is available within the public sewer network. In this event, the developer will be required to enter into a formal agreement with Yorkshire Water Services under Section 115 Water Industry Act 1991 to discharge non-domestic flows into the public sewer network.

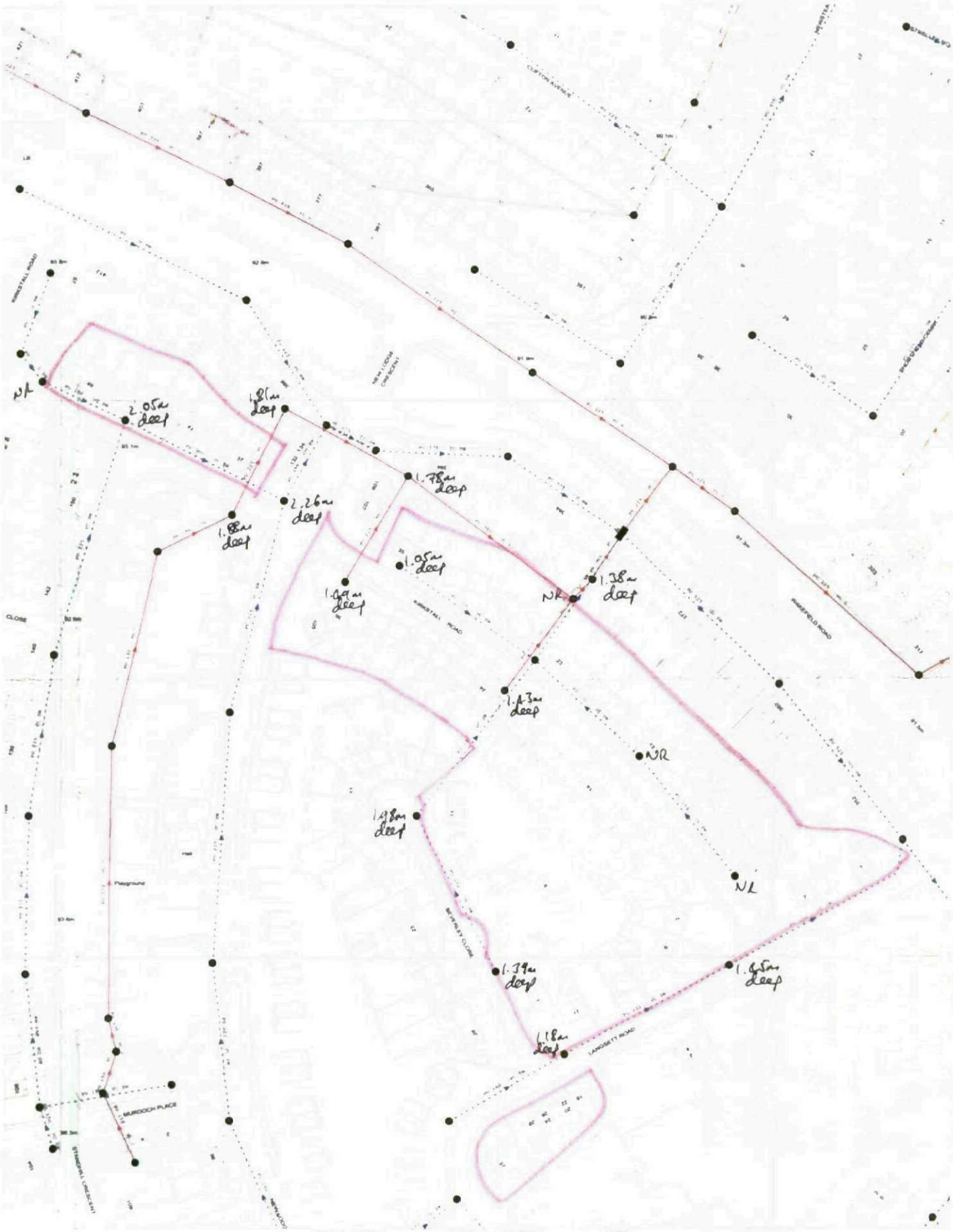
No land drainage to be connected/discharged to public sewer.

Any new connection to an existing public sewer will require the 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



434173 409269

Map Name SE3409SW

Yorkshire Water
PO Box 500
Halifax Road
Bradford BD6 2LZ
Contact Name
K KHAN
Contact Tel

YorkshireWater

Title

Notes
NR = No recorded depth

Partial Key
Foul Sewer = F
Combined Sewer = C
Surface Water Sewer = SW
Trade Sewer = TD
Partially Separate = PS

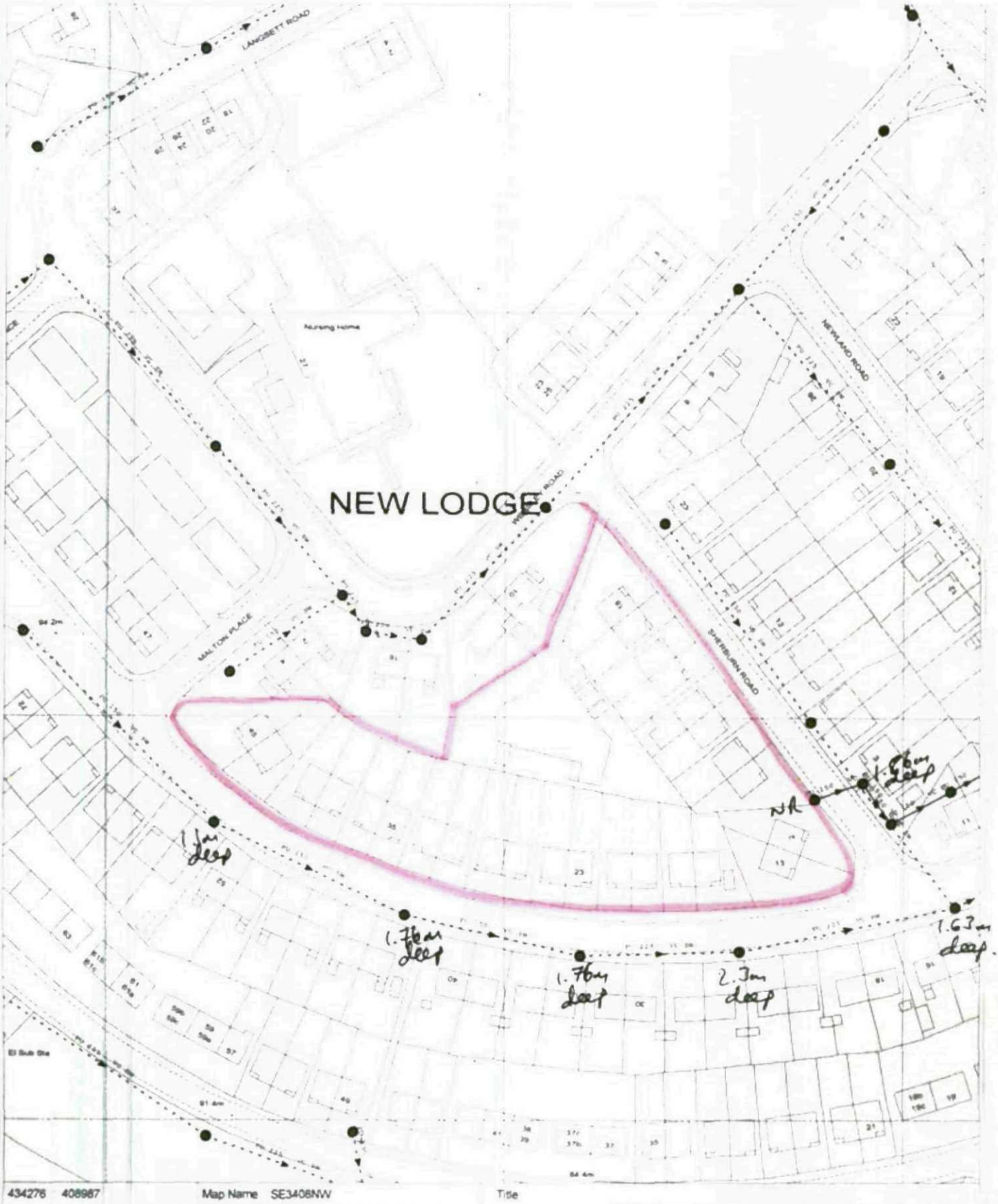
This plan is furnished as a general guide only and no warranty as to its correctness is given or implied. This plan must not be relied upon in the event of excavations or other works made in the vicinity of public sewers. No house or property connections are shown

Date Req 28/03/2011 14:53:58 Date Gen 28/03/2011 14:54:11

Source Sewer Network Enquiry

NORTHERN SITE.

UPN Undefined Originator K KHAN, New Development - Waste Water



434276 408987 Map Name SE3408NW

Title

Notes

NR = No Recorded Depth.

Yorkshire Water
PO Box 500
Halifax Road
Bradford BD6 2LZ
Contact Name
K KHAN
Contact Tel

YorkshireWater

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.

SOUTHERN SITE.

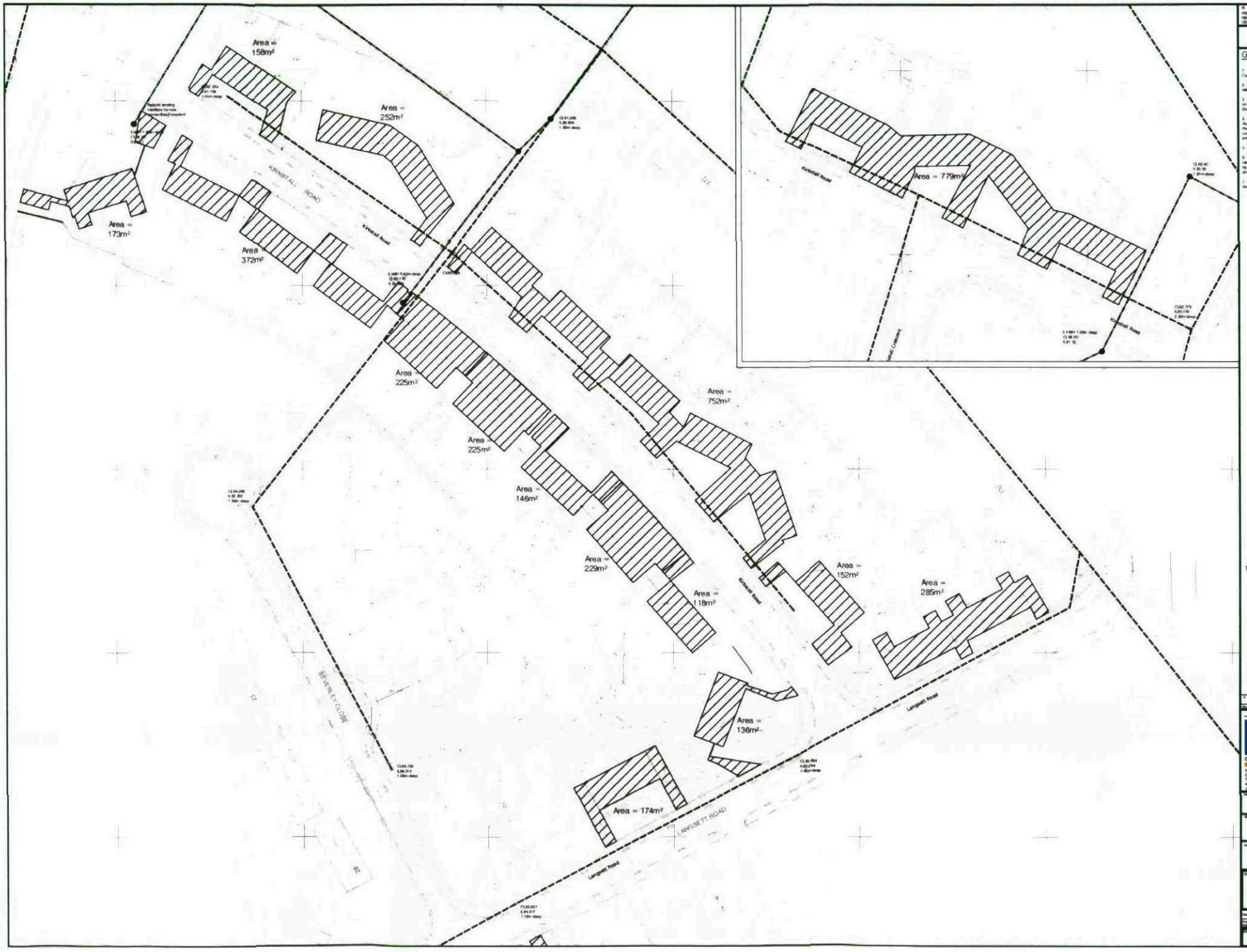
Date Req 28/03/2011, 14 52 48 Date Gen 28/03/2011, 14 53 17

Source Sewer Network Enquiry

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UPN Undefined Originator K KHAN. New Development - Waste Water

Appendix E
Existing and Proposed Drainage Areas



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A0

Millimetres Architectural Drawing Size

General Notes

1 SCALE WITH CAUTION FROM PRINTED DRAWINGS. Confirm all critical dimensions with Engineer if in doubt ask.

2 This drawing is to be read in conjunction with all other relevant drawings and details.

3 Should there be any conflict between the details indicated on this drawing and those indicated on other drawings the Engineer should be informed PRIOR to construction on site.

4 All technical approval has been obtained from the relevant Authority. It should be understood that all drawings issued are Preliminary and NOT for construction. Should the contractor commence site works prior to such approval being given, he entirely at his own risk.

5 All dimensions are in millimetres unless otherwise stated.

6 The RSP Hazard Identification and Risk Assessment information for this project must be reviewed and understood by the contractor PRIOR to the commencement of any works on site.

7 Finished floor levels are subject to changes +/- 300mm during the detailed design process.

Total Existing Impermeable Area = 4176m²

Rev	Description	Date	Drawn	Check
A	Amended to client comments	08.04.11	CE	

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Also offices in Nottingham, Leicester and Sheffield

PRELIMINARY

KEEPMOAT HOMES

New Lodge
Barnsley
South Yorkshire

Feasibility
Existing Impermeable Areas

Drawn By	CE	Checked By	CE	Scale	1:250 (A0)
Project Director	CE	Approved By	CE	Date	8th April 2011

Project No. 11068/102

Drawing No. A



A0

General Notes

1. SCALE WITH CAUTION DIMENSIONS TO COMMENCE
Confirm all critical dimensions with Engineer if in doubt are.

2. This drawing is to be read in conjunction with all other relevant drawings and details.

3. Should there be any conflict between the details indicated on this drawing and those indicated on other drawings the Engineer should be informed PRIOR to construction of site.

4. Until technical approval has been obtained from the relevant Authority, it should be understood that all drawings issued are Preliminary and NOT for construction. Should the contractor commence with work prior to such approval being given, it is entirely at his own risk.

5. All dimensions are in millimetres unless otherwise stated.

6. The BSP Hazard Identification and Risk Assessment information for this project must be reviewed and understood by the contractor PRIOR to the commencement of any works on site.

7. Finished floor levels are subject to change by +/- 300mm during the detailed design process.

Total Proposed Impermeable Area = 5963m²
Area draining to soakaways = 3395m²
Area draining to public sewers = 2568m²

3	Updated to reflect revised drawings	MB	20.11.12
2	Amended to reflect comments	MB	19.04.12
1	First Issue	MB	04.04.11
Rev	Description	Drn	Checked Date

bsp CONSULTING

PRELIMINARY

KEEPMOAT HOMES

New Lodge
Barnsley
South Yorkshire

Feasibility
Proposed Impermeable Areas

Drawn By	CB	Checked By	CT
Project No.	CB	Approved By	CT
Scale	1:250 @A0	Date	04 April 2011

Drawing No. 11068/103
Revision B