







Flood Risk Assessment

Rhodes Asset Management Ltd

**Proposed Development, Former Kirklees
College, Huddersfield**

July 2018

Client	Rhodes Asset Management Ltd
Project	Proposed Development, Former Kirklees College, Huddersfield
Report Title	Flood Risk Assessment
Report Ref.	0391/3/FRA

Rev	Status	Date	Details	Prepared		Checked & Approved	
0	Final	24-10-17	First Issue	JT		TAM	
1	Final	13-7-18	Drainage details amended.	JT		TAM	

Egorum Limited
West Field House
Bray Gate
Bishop Wilton
York YO42 1SA

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Yorkshire Water

1 Introduction

1.1 Appointment

Egorum Limited was appointed by Rhodes Asset management Limited in July 2017 to undertake a Flood Risk Assessment (FRA) study for a proposed development at the former Kirklees College site, Huddersfield.

1.2 Scope

The scope of the study was to collate and review information from searches and consultation with the key flood risk and drainage bodies, identify flood risk and drainage constraints and potential mitigation measures.

Design of the proposed mitigation measures did not form part of the scope and has not been undertaken at this stage.

Drainage design has been undertaken by WML Consulting and reference should be made to the drainage design drawings and documentation, submitted separately to this FRA report.

1.3 Methodology

The study consisted of data collection and review, desk based research and consultation with regulatory bodies and third parties in relation to flood risk and drainage.

The study provides a risk based assessment of potential flooding to the site and as a result of development from all sources, including fluvial, tidal, surface water / pluvial, groundwater, surcharged sewers and other man made sources. Mitigation measures are identified to address the flood risk to the site and any potential increase in flood risk to other land.

The impact of climate change on flood risk and drainage requirements is also assessed.

1.4 Limitations

The report is based on the interpretation and assessment of data provided by third parties. Egorum Limited cannot guarantee the reliability of the third party information obtained. The conclusions and findings of the report may change if the third party data is subsequently amended or updated.

The report and findings have been prepared for the client and purpose stated in paragraph 1.1. The report should not be relied upon or transferred to any third parties without the written authorisation of Egorum Limited.

2 Existing Site

2.1 Location

The site is in the centre of Huddersfield. The OS grid reference for the site is SE 14053 16882.

A site location plan is in **Appendix A**.

2.2 Description

Site Area		Approximately 2.46ha
Topography		<p>The site falls from the north west to the south east. Levels typically range from 116m in the north west corner to 104m in the south east.</p> <p>The site is currently occupied by the former college buildings and there are various step changes in level across the site.</p>
Land use		Former college
Boundaries	north	Fitzwilliam Street, residential and commercial areas
	south	Trinity Street, town centre
	east	New Road, church and commercial uses
	west	Portland Street, residential and commercial

2.3 Waterbodies

Records do not indicate any watercourses crossing or in the vicinity of the site.

Kirklees Council Flood Risk Management has confirmed that they have no records of a watercourse crossing the site.

2.4 Drainage

Public Sewers

Yorkshire Water sewer records show:-

- Combined sewers within the highways and footway areas surrounding the site.
- A 150mm dia. combined sewer within the southern part of the site

The law regarding responsibility for drains and sewers changed on the 1st October 2011. From this date, the Government transferred the majority of drainage pipes that are either outside a property's boundary or are shared with other buildings to the sewage/water companies. The sewer records may not show all the transferred sewers.

Refer to **Appendix A** for public sewer record drawings.

Private Drainage

A drainage record drawing has been made available for this study. The record drawing shows various private drainage runs, the majority of which drain in an easterly direction before connecting to the public combined sewer system.

The public combined sewer in the south of the site is recorded on the private drainage drawing.

It should be noted that the drainage record drawing shows the public combined sewer in New North Road within the footway (not the carriageway as per the public sewer records). The route of the public combined sewer is also shown to slightly encroach onto the site.

2.5 Flood Mapping and Reports

Flood Mapping

The site is in Flood Zone 1 - low risk.

The Environment Agency flood risk from surface water mapping shows some localised surface water flooding on the site, where water is trapped against existing buildings with the topographic slope and some overland flood flow routes and surface water flooding in the south of the site.

The site is not in an area at risk from flooding from failure of a major reservoir.

Refer to **Appendix B** for flood mapping.

2.6 Ground Conditions

The WML Consulting Phase 1 Desk Study and Preliminary Phase 2 Geo-Environmental Assessment states that “the ground conditions comprise Made Ground locally underlain by Head Deposits and elsewhere or beneath the Made Ground by Pennine Lower Coal Measures strata (PLCM) which include worked coal seams”.

In terms of infiltration drainage viability, the report states “in consideration of the thickness of Made Ground and cohesive nature of the natural soils beneath the site, soakaways are not considered a feasible drainage option for the site”.

The site is not in a groundwater source protection zone.

3 Proposed Development

3.1 Sequential and Exceptions Test

The proposed development is for residential and commercial use.

The site is within Flood Zone 1 therefore a Sequential Test is not required.

3.2 Consultation

Consultation with Kirklees Council Flood Risk Management Team, as Lead Local Flood Authority, and Yorkshire Water has been undertaken.

Copies of responses are included in **Appendix D** and are summarised below.

Summary of Consultation Responses	
Kirklees Council FRM Team	<p>Formal pre-planning response –</p> <ul style="list-style-type: none"> • Low to high risk areas of surface water flooding at the site – mitigation and assessment required. • No recorded waterbodies in the immediate vicinity of the site. • Surface water – restriction to 30% of existing rate of run-off. • Use of above ground SuDS to be investigated. <p>Further consultation with Kirklees FRM has been undertaken regarding:-</p> <ul style="list-style-type: none"> • Some highway flooding locally due to blocked gullies • Geo-env desk top study required to confirm soakaway viability • Urban creep allowance not required for this type of development • Requirement for soil permeability tests at this stage • Drainage strategy agreed in principle.
Yorkshire Water	<p>There are restrictions on building adjacent to or over the existing surface water and foul sewers (refer to Appendix D).</p> <p>Subject to confirmation that soakaways are not viable, surface water run-off can discharge to the public surface water system at the equivalent 1 in 1 year rate less 30%. YW will require details of existing connectivity and the proposed drainage.</p> <p>Foul flows can connect to the public combined sewer system around the site.</p>

4 Flood Risk Sources and Extent

4.1 Summary

Refer to **Appendix B** for flood risk mapping.

Summary of the Sources and Extent of Flood Risk	
Source	Risk Level
Fluvial	low
Tidal	negligible
Surface Water / Pluvial	Low – locally high for the existing site
Groundwater	low
Surcharged Sewers	low
Other Man Made Sources	low

4.2 Fluvial and Tidal

The site is in Flood Zone 1 – low risk.

Kirklees Council Flood Risk Management have no records of watercourses in the area of the site and review of available records confirms the same.

4.3 Surface Water / Pluvial

The Environment Agency flood risk from surface water mapping shows some localised surface water flooding on the site, where water is trapped against existing buildings with the topographic slope and some overland flood flow routes and low and high surface water flooding in the south of the site.

The surface water flood risk mapping shows areas of risk for the existing – where water can be potentially trapped against retaining walls and changes in level against existing buildings.

The mapping highlights areas where careful design of external features and levels will be required for the proposed development site – refer to Section 5 Flood Risk Mitigation.

4.4 Groundwater Flooding

The Groundsure report within the WML Consulting Phase 1 Desk Study and Preliminary Phase 2 Geo-Environmental Assessment states that there are groundwater flooding Susceptibility areas within 50m of the site with the potential to flood at ground surface. The WML report states that no significant groundwater inflow is anticipated into excavations although shallow perched groundwater conditions may occur locally. Conventional 'sump and pump' dewatering measures are however considered adequate to keep excavations dry.

Groundwater flooding has not been highlighted as an issue through consultation undertaken for this report and there are no records of groundwater flooding at the site.

Based on available information the risk of groundwater flooding at the surface is considered to be low.

4.5 Surcharged Sewers

Kirklees Council Flood Risk Management flooding records show that the slip road to New North Road off the inner ring road has flooded, causing difficulties for cars passing through on a few occasions, however the flooding was due to blocked gullies.

Consultation has not highlighted flooding from surcharged sewers to be risk and there are no records of flooding at the site.

Flood risk to the development site from surcharged sewers is low.

4.6 Other Man Made Sources

The site is not in an area at risk from flooding from a failure of a major reservoir and there are no other known artificial sources of flood risk that could affect the site.

4.7 Climate Change

Climate change allowances have been included in the drainage calculations, refer to WML Consulting drainage details in separate documentation.

5 Flood Risk Mitigation

5.1 Flood Risk Mitigation Measures

Flood risk from all sources, with the exception of surface water, is considered to be low.

5.2 Flood Risk Mitigation - Surface Water

Proposed external levels and falls have been set to ensure that exceedance overland flows are directed away from proposed buildings as far as reasonably practicable.

An overland flow route and channel drainage is to be provided in the area off Portland Street, to the rear of the existing listed building.

Emergency overflow channels / openings within retaining walls and kerb lines can be provided for those areas where proposed gradients and falls create low spots where potential surface water flooding could occur during exceedance events.

Refer to the preliminary overland flow assessment in **Appendix C** and to the WML Consulting drainage design documentation for more detail.

5.3 Surface Water Drainage Strategy

Discharge by Infiltration

The WML Consulting Phase 1 Desk Study and Preliminary Phase 2 Geo-Environmental Assessment states that “the ground conditions comprise Made Ground locally underlain by Head Deposits and elsewhere or beneath the Made Ground by Pennine Lower Coal Measures strata (PLCM) which include worked coal seams.

In terms of infiltration drainage viability, the report states “in consideration of the thickness of Made Ground and cohesive nature of the natural soils beneath the site, soakaways are not considered a feasible drainage option for the site”.

Soakaways are not considered to be provide a reasonably practicable solution for disposal of surface water run-off.

Discharge to Watercourse

There is no watercourse in the vicinity of the site available for disposal of surface water runoff.

Discharge to Public Sewer

The existing site drains to the public combined sewer system and Yorkshire Water has confirmed that the proposed development can discharge to the public sewer system at the 1 in 1 year rate less 30% subject to provision of detailed calculations and drainage connectivity survey.

Refer to WML Consulting drainage design documentation for more detail.

5.4 Foul Drainage

Yorkshire Water has confirmed that foul flows can connect to the existing combined sewer around the site. Refer to WML Consulting drainage design documentation for more detail.

6 Residual Risks and Management

6.1 Residual Risks

To mitigate against surface water / overland flow flood risk from extreme events and blockages, external levels and floor levels have been set as far as reasonably practicable to ensure that exceedance overland flows are directed away from proposed buildings and a surface water drainage system and storage, designed to current standards, will be provided.

Emergency overflow channels / openings within retaining walls and kerb lines can be provided for those areas where proposed gradients and falls create low spots where potential surface water flooding could occur during exceedance events.

A detailed exceedance assessment will be undertaken at the detailed design stage based on final levels design / detailing and detailed drainage network modelling.

7 Conclusions

7.1 Existing Site

The site is in Flood Zone 1 and flood risk to the proposed development from all sources is low, with the exception of localised surface water overland flows.

Drainage records show that the site connects to the public combined sewers around the site in several locations.

Ground conditions comprise Made Ground locally underlain by Head Deposits and elsewhere or beneath the Made Ground by Pennine Lower Coal Measures strata and worked coal seams. Soakaways are not considered to be a feasible drainage option for the site.

7.2 Flood Risk Mitigation

External levels, falls and floor levels have been set as far as reasonably practicable to ensure that exceedance overland flows are directed away from proposed buildings and a surface water drainage system and storage, designed to current standards, will be provided.

Surface water run-off is proposed to discharge at restricted rates to the public sewer system, equivalent to the existing 1 in 1 year run-off rate less 30%.

Yorkshire Water has confirmed that foul flows can discharge to the public combined sewer system around the site.

Appendices

Appendix A Existing Site

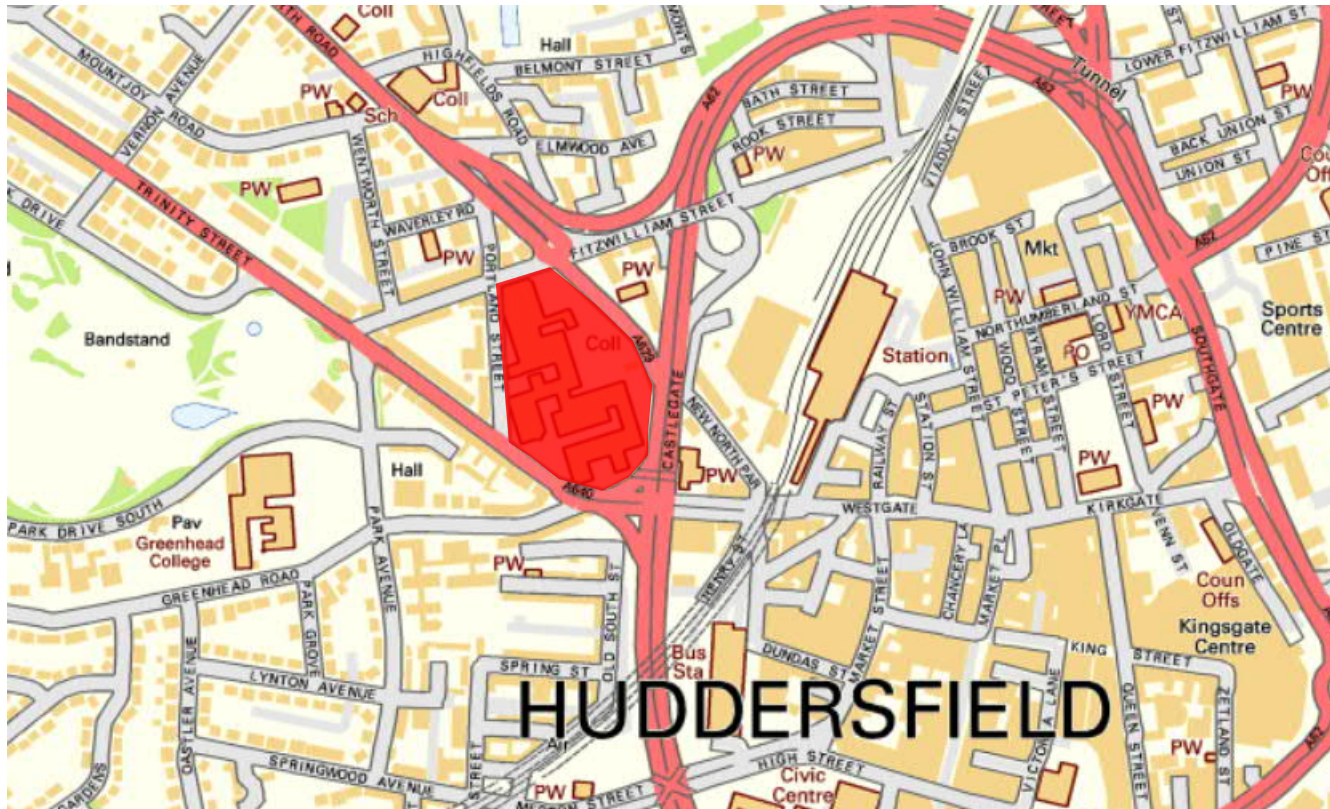
Location Plan

Topographical Survey

Yorkshire Water Records

Drainage Record drawing

Extract from Geo-Environmental Assessment



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PROPOSED DEVELOPMENT FORMER KIRKLEES COLLEGE, HUDDERSFIELD LOCATION PLAN

NOT TO SCALE



[illegible]

Survey Station Coordinates

Stn	Easting	Northing	Level
0001	443636.27	417002.55	111.91
0002	443979.37	416956.99	115.16
0006	441291.53	416909.67	105.81
0011	441438.70	416910.00	105.81
0004	444090.50	416734.96	105.44
0005	439886.24	416939.29	114.43
0008	439882.28	416935.29	114.33
0064	440037.80	416944.11	115.41
0068	43974.69	416930.59	114.16
CJ1J	43980.75	416944.11	115.41
CJ1B	44033.60	416963.19	112.07
CJ1C	44053.14	416963.19	112.07
CJ1J	44073.99	416944.01	109.26
CJ1B	44076.99	416944.01	109.26
CJ1J	44083.18	416893.30	108.33
C2	44077.49	416930.59	114.61
C2E1	44044.81	416932.80	110.53
C2E2	44075.44	416860.26	109.33
C3B1	44076.99	416944.01	109.26
C3B1	43988.51	416890.12	112.07
S3B1A	43986.35	416896.33	111.02
S3B1	44025.45	416899.53	111.02
S3B1	44036.57	416899.37	110.70
S3B1	44035.57	416899.37	110.70
S3B1	44043.31	416898.37	111.82
S3B1	44029.65	416880.27	110.12
DS5A	44024.08	416899.37	110.70
DS42	44061.07	416872.13	108.06
DS43	44102.78	416872.13	108.06
DS45	44049.13	416960.42	105.26
DS46	44083.03	416967.34	105.65
DS41	440334.89	416846.41	109.54
DS44	44089.41	416760.12	106.08
CJ3A	44113.59	416854.53	104.44
J402	44077.07	416876.24	106.54
J402	44066.97	416876.24	106.08
CJ2G	44075.70	416860.97	107.02
CJ2G	44038.25	416860.97	107.02
CJ3B	44116.33	416778.81	103.54
CJ3B	44044.66	416778.81	103.54
CJ3B	44134.15	416817.57	109.37
CJ3B	44093.68	416857.39	109.37
CJ5E	44063.46	416814.69	109.05
CJ5F	44077.97	416814.69	109.05
CJ5E	44063.46	416893.64	110.61
CJ5F	44029.38	416894.68	110.61
CJ6A	439973.38	416928.66	114.61
CJ6B	439986.61	416928.66	114.61
CJ4A	44016.66	416953.02	112.79
CJ4B	44011.36	416953.02	112.79
BM06	44095.48	416866.50	109.55

DSBM 44095.48 416866.50 109.55

Levels are related to **OSDB**
 Value **108.3m**
 Shaded on wall inside St. Patrick's Church,
 as shown on Dwg SSL:9905-2001:14
 Coordinates are related to National Grid (Graphical)

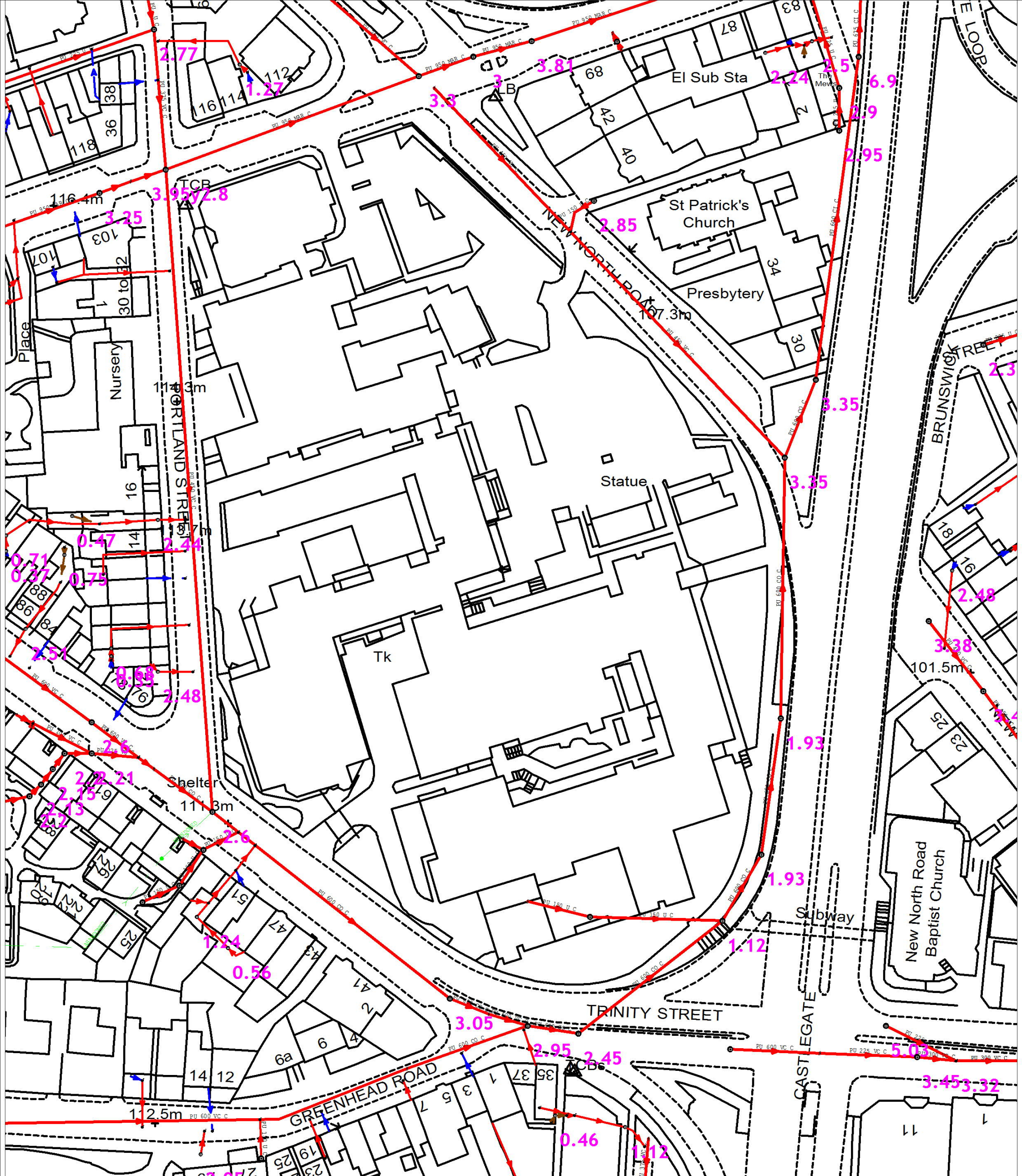
Client	Brookway Malayan
Title	
Topographical Survey	
Huddersfield Technical College	
Surveyor	CJ
Drawn	JDS:ADG
Date	Jan 2006
Checked	AG
CAD file name	9905-TOPO
Revision	Rev A
Order's No.	SSL:9905-2001:1:2


www.sams.co.uk | mail@sams.co.uk

Head and Registered Office
Survey House
55-57 Wiltshire Road
Handforth • Wiltshire
Cheshire SK9 3EN
Tel. 01625 533444
Fax 01625 526815

Southern Office
Abbey House
18-24 Stoke Road
Slough
Berkshire SL2 5AG
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413910 : 416684		Map Name : SE1316NE		Title	
 YorkshireWater		Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ Contact Name : YorMap Advisor C ROBERTS Contact Tel : 87 2582		Notes	
				<div>Partial Key</div> <div>Foul Sewer = F</div> <div>Combined Sewer = C</div> <div>Surface Water Sewer = SW</div> <div>Trade Sewer = TD</div> <div>Partially Separate = PS</div>	
(Ody) COPYRIGHT STATEMENTS: Reproduced by permission of Ordnance Survey on behalf of HMSO © Crown copyright and database 2014. All rights reserved Ordnance Survey Licence number 100022432				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 : 11/09/2017, 12:01:10		Date Gen : 11/09/2017, 12:01:38			
Source : Sewer Network Enquiry					

GENERAL NOTES

- DO NOT SCALE FROM THIS DRAWING WORK TO FIGURED DIMENSIONS ONLY.
- NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING IS ALLOWED WITHOUT PRIOR PERMISSION IN WRITING.
- ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.

Rev.	Amendment	Date	By	Chkd
Project HUDDERSFIELD TECHNICAL COLLEGE DRAINAGE & EXTERNAL WORKS				
Client HUDDERSFIELD TECHNICAL COLLEGE				
Title				
Drawn G3	Checked CB	Date JUL'06	Scale 1:250 @ A0	
WRIGHT MOTTERSHAW Consulting Civil & Structural Engineers Enwood House, 212 Moss Lane, Brighall, Stockport, Cheshire, SK7 1BD Tel: 0161-440 7766 Fax: No. 0161-440 8835 email: wrightm@wmpgroup.com				
Job No. 3333		Drawing No. E1000 P1		

Phase 1 Desk Study and
Preliminary Phase 2 Geo-Environmental
Assessment

For a site at

Trinity Street, Huddersfield

Undertaken for

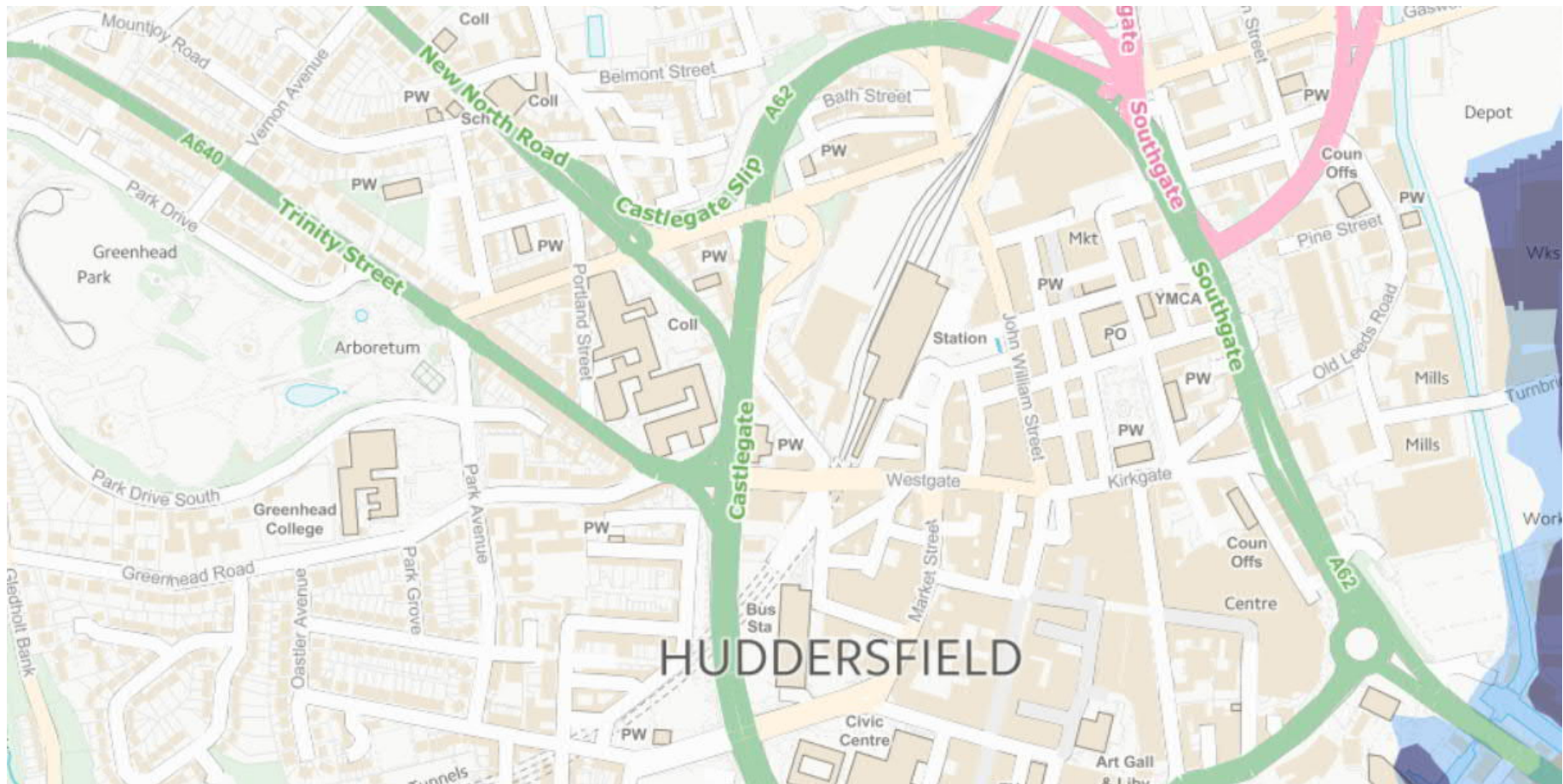
Rhodes Asset Management Limited

	<p>wholly discounted at this stage.</p> <p>Therefore, a thorough inspection should be undertaken following the site strip and also during foundation construction to confirm that no voids, marked changes in ground conditions, buried structures or any other signs which could signify the presence of a mine shaft beneath the development footprints.</p>
Foundations and Floor Slabs	<p>Foundations for small, lightly loaded retaining walls could be constructed on Made Ground provided net allowable bearing pressures did not exceed 50kN/m².</p> <p>For relatively lightly loaded structures, shallow spread foundations may be constructed on firm or stronger Head Deposits at a depth of no less than 1.00mbgl assuming a net allowable bearing pressure of no greater than 100kN/m².</p> <p>For heavier structures, foundations will need to be taken down to competent solid strata where a net allowable bearing pressure of 200kN/m² is considered appropriate where it is highly weathered at shallow depth. For less weathered mudstone at depth a net allowable bearing pressure of 400kN/m² may be appropriate but this would need to be confirmed by development specific ground investigations at the appropriate time.</p> <p>Foundations should be sufficiently rigid to ideally span any ground which has subsided and for preliminary purposes a span length of 3.00m and cantilever length of 1.50m may be appropriate to account for any loss of support.</p> <p>Multi-storey structures may therefore need to be supported on a slab and beam or cellular reinforced raft foundation.</p> <p>Consideration may also need to be given to incorporating sufficient flexible joints to compensate for continued movement.</p> <p>Basement foundations may need to be designed to withstand possible hydraulic uplift forces where they are constructed at depths below the groundwater table.</p> <p>Assessment of the clay shrinkage/heave potential should be undertaken in accordance with Appendix 4.2-A of NHBC Standards 2010, Foundations, Chapter 4.2, Building Near Trees.</p> <p>Floor slabs for the new structures should be suspended and sufficiently reinforced to withstand potential horizontal forces, unless a fully reinforced raft foundation is adopted.</p>
Excavations and Groundwater	<p>Excavations beneath the majority of the site should be feasible using an appropriate scale of hydraulic plant. However, deep excavations for the basement structures for Buildings 9 and 10 will extend into moderately strong mudstone, requiring the use of hydraulic breakers and ripping techniques.</p> <p>No significant groundwater inflow is anticipated into excavations although shallow perched groundwater conditions may occur locally. Conventional 'sump and pump' dewatering measures are however considered adequate to keep excavations dry.</p>
Pavements and Hardstanding	<p>New pavements should be designed on a CBR value for formation soils of no more than 3.0%, to be confirmed by in situ testing prior to construction.</p>
Concrete Classification	<p>The typical design sulphate (DS) class and "Aggressive Chemical Environment for Concrete" (ACEC) class for the site would be DS-1 and AC-1 respectively. However, in view of the potential for sulphate to be present in the PLCM strata, it may be prudent to increase the design class to DS-2 and the ACEC class to AC-2z.</p> <p>This should be confirmed where necessary by further chemical analysis of formation soils.</p>
Soakaways	<p>In consideration of the thickness of Made Ground and cohesive nature of the natural soils beneath the site, soakaways are not considered a feasible drainage option for the site.</p>
Ground Gas	<p>The site is indicated to classify as Characteristic Gas Situation (CS) 1 – Very Low Gas Risk' in accordance with BS8485:2015. Therefore, no specific gas protection measures are considered necessary for the proposed residential development,</p>

Appendix B Flood Risk Mapping

Flood Zone Mapping

Surface Water Flood Risk Mapping



**PROPOSED DEVELOPMENT, FORMER KIRKLEES COLLEGE, HUDDERSFIELD
EXTRACT FROM ENVIRONMENT AGENCY FLOOD MAP FOR PLANNING**

NOT TO SCALE



Flood risk



High



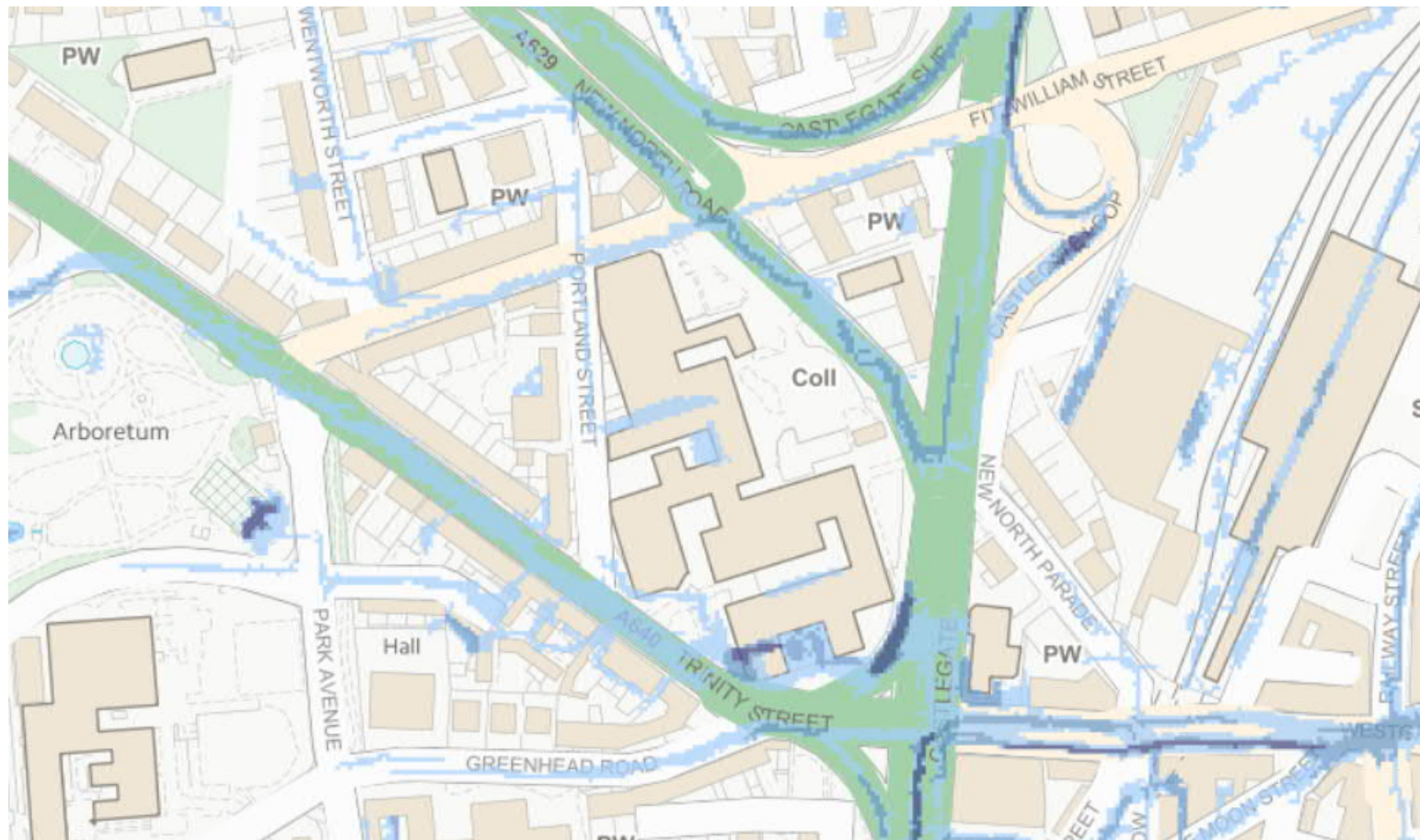
Medium



Low



Very low



PROPOSED DEVELOPMENT, FORMER KIRKLEES COLLEGE, HUDDERSFIELD
EXTRACT FROM ENVIRONMENT AGENCY MAPPING
FLOOD RISK FROM SURFACE WATER

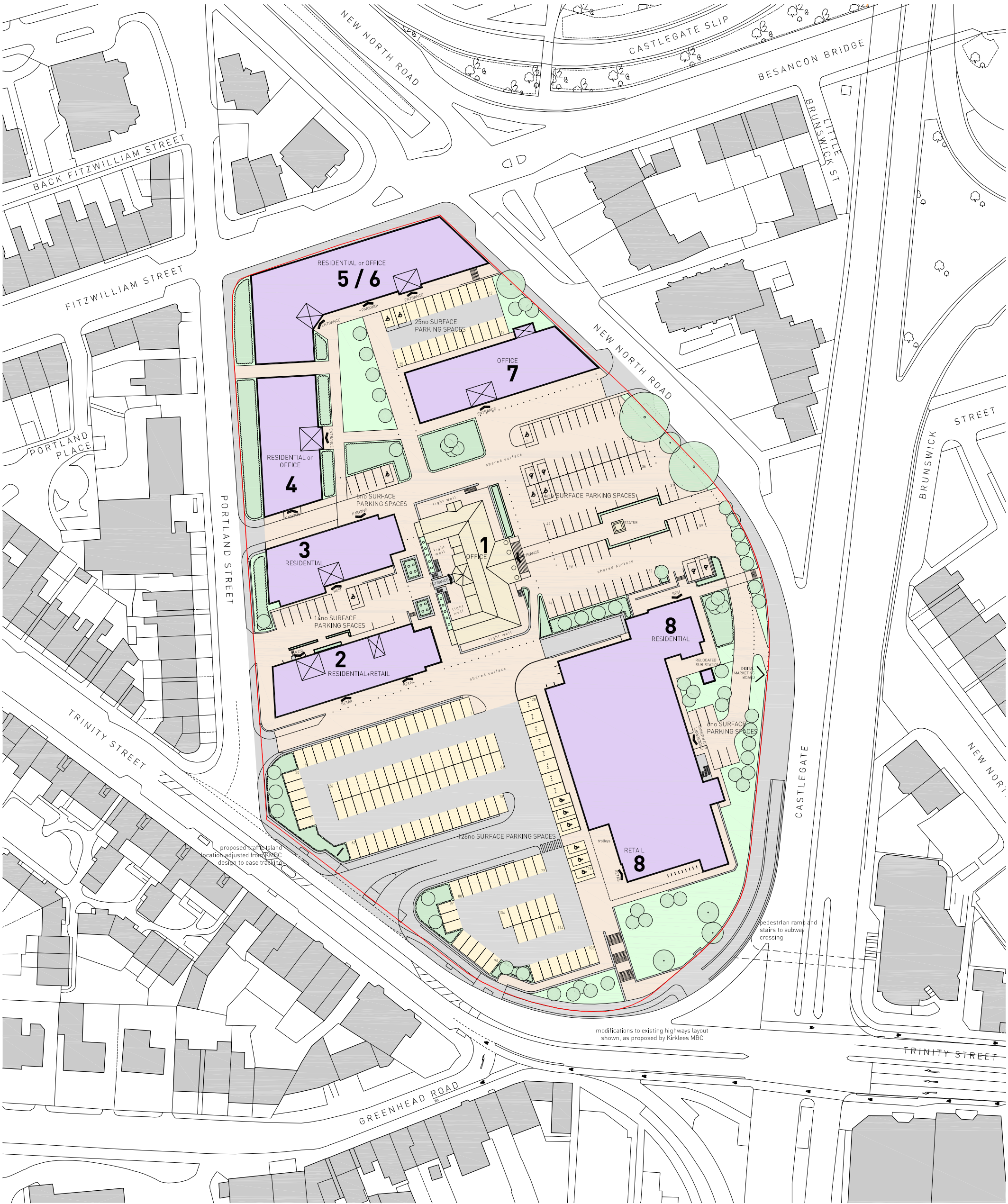
NOT TO SCALE

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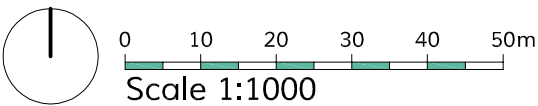
Appendix C Proposed Development

Master Plan

Preliminary Overland Flow Assessment



KEY:
Proposed New Buildings
Existing Listed Building
(to be retained and redeveloped)



Contractor must verify all dimensions on site before commencing any work or shop drawings. If this drawing exceeds the quantities taken in any way the Architects are to be informed before the work is initiated. Only figured dimensions to be taken from this drawing. Do not scale off this drawing. Drawings based on Ordnance Survey and / or existing record drawings - design and drawing content subject to Site Survey, Structural Survey, Site Investigations, Planning and Statutory Requirements and Approvals. Authorised reproduction from Ordnance Survey Map with permission of the Controller of Her Majesty's Stationery Office. Crown Copyright reserved. Enjoy Design Ltd.

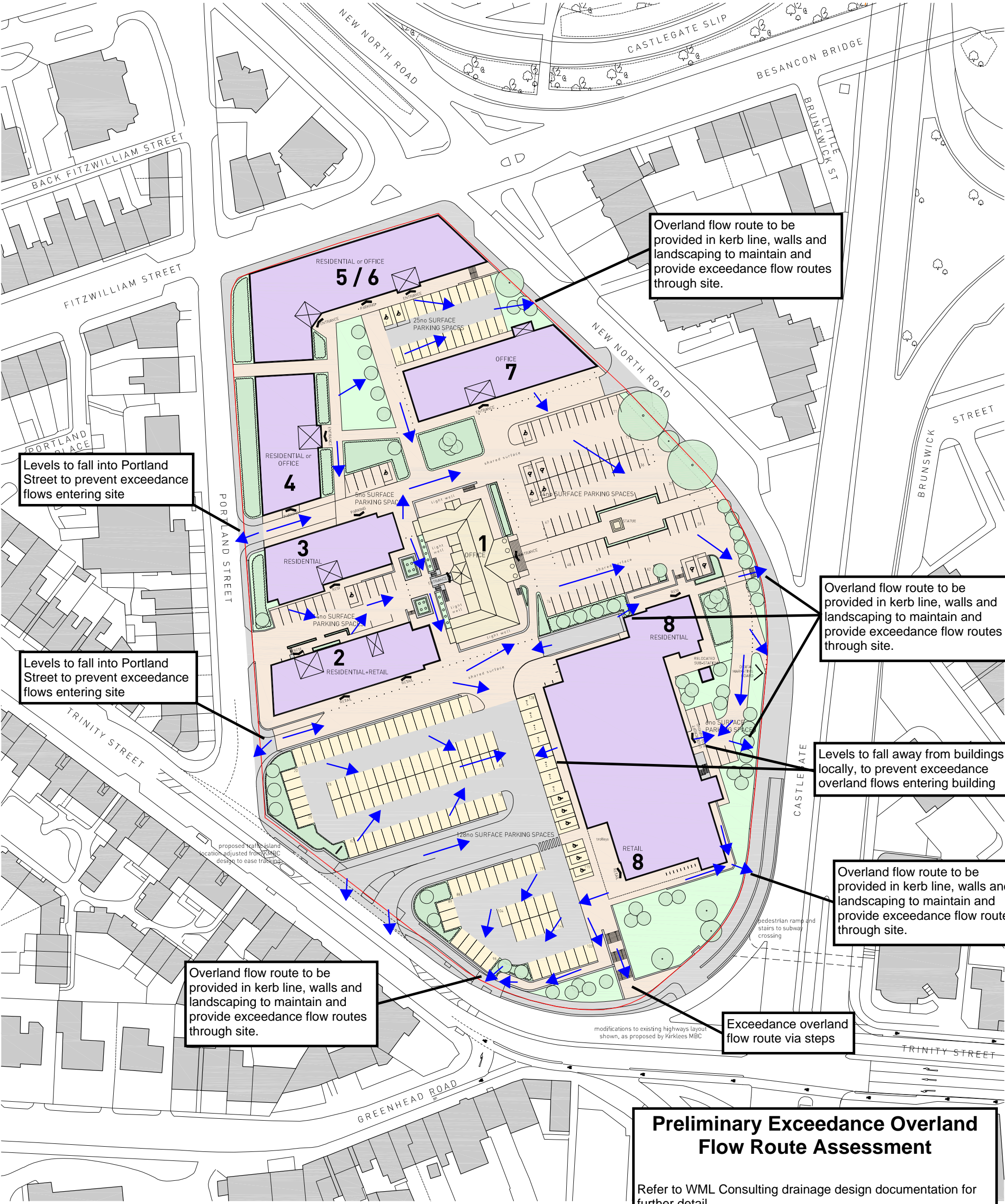
S	minor updates to footprints of bldgs 2 and 8; digital marketing board shown	JNS	11Jul18	RG
R	route from eastern footpath improved as KMBC request; latest Bldg1 design shown.	JNS	02Jul18	RG
P	Bldgs 2+3 shown as new build; minor realignment of steps from highway to supermarket entrance	JNS	01Jun18	RG
Rev.	Des.	By	Date	Ch.

APPROVAL

Client:	Trinity One LLP	Job No.	16,047
Project:	TRINITY ONE HUDDERSFIELD		
Title:	Proposed Site Plan		
Date:	Nov16	Scale:	1/1000@A3
Drawing No:	00 001	Drawn By:	JNS
Checked By:	RG	Revision:	S

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01020304050m

Scale 1:1000

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Rev.	Des.	By	Date Ch.

APPROVAL	Client:		Job No.
	Trinity One LLP		16,047
	Project:		
	TRINITY ONE HUDDERSFIELD		
	Title:		
	Proposed Site Plan		
Status:	Date:	Scale:	Checked By:
	Nov16	1/1000@A3	RG
	Drawing No:	Drawn By:	Revision:
	00 001	JNS	S

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Appendix D Consultation Responses

Kirklees Council Flood Risk Management

Yorkshire Water

Application No.

2017/20041

Proposed Development:

Pre application enquiry for mixed use scheme comprising residential, office, retail and hotel

Location:

Former Kirklees College site, New North Road, Huddersfield, HD1 5NN

LLFA Comments

The Lead Local Flood Authority (LLFA) is a statutory consultee on major planning applications. Major development being:

1. Residential Development: 10 dwellings or more or residential development with a site area of 0.5 hectares or more where the number of dwellings is not yet known.
2. Non Residential Development: Provision of a building or buildings where the total floor space to be created is 1000 square metres or more or where the floor area is not yet known, a site area of 1 hectare or more.

Reviewing the documents submitted we offer the following comments and informative.

Existing Flood Risk

The applicant should duly investigate flood risk to the site that could pose a risk to the development and consider whether they would be required to develop protection measures, we note for this application the site appears to be located within **Flood Zone 1 and has a 0.1%** chance of suffering Main River or Tidal flooding.

Flood Zone definitions are set out in the National Planning Policy Guidance:

- * Flood Zone 1 - land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%)
- * Flood Zone 2 - land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year
- * Flood Zone 3 - land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year

Additionally, viewing the Environment Agency Surface Water Flood Map the site **does** appear to have areas of surface water flood risk to a **low to high** degree in discreet locations throughout the site. There may be **pooling or a flow pathway** within the development boundary meaning that due consideration should be given for potential impacts. The applicant should consider what measures may be required to protect the properties from such flows within the development and be mindful

not to increase the risk of flooding to properties elsewhere. As part of any application it is now good practise to show proposed flow routes through the development in exceedance events therefore we request the applicant display flow pathways up to the first flood that runs off the site.

Existing Waterbodies

There are no recorded waterbodies in the immediate vicinity of the site however the does appear to have some waterbodies in the surrounding area, the applicant should consider whether these could pose a risk to the site and provide any necessary mitigation.

Mills and Mill Ponds

Throughout the Kirklees District and history of textile mills has resulted in an extensive network of mill leats (leet, lete or millstream), culverts and redundant mill ponds throughout the district. Local Policy Documentation has identified redevelopment of mill sites has to include the former infrastructure serving the mill. However, many mills have been demolished, already developed or their connections forgotten/lost. Therefore, applicants proposing to redevelop a site in close proximity of such developments are required to consider whether this infrastructure could pose risk to the development. This may include, but is not limited to, a inspection/survey of the system, drain tracing and dye testing.

Surface water discharge

All discharges should be assessed using the hierarchy of preference, that is-

1. Infiltration
2. Watercourse
3. Sewer

For infiltration we require infiltration testing to be performed to BRE Digest 365 standard, in a location representative of the proposed location of any soakaway/infiltrating feature and this rate to dictate the sizing and siting of these features.

If infiltration is proven not to be feasible we require details of the present and future discharges.

Discharge rate from all sites should be at pre-development runoff rates, this rate should be calculated for only the impermeable/positively drained areas. For brownfield sites if justification can be made for a higher rate it may be considered however these developments must provide a minimum 30% improved situation on existing infrastructure for all events and provide evidence as to why the proposed discharge is the lowest feasible.

The site is predominantly Brownfield with small areas of greenfield, the applicant should therefore investigate opportunities to reduce discharge rate from the site to Greenfield rates as a priority and only where these rates would prohibit the viability of the a scheme propose an elevated discharge rate. The LLFA would consider a rate greater than Greenfield up to a 30% reduction on existing discharge rates. Reviewing Kirklees records there appears to be combined drainage systems that the development could connect into.

Use of SuDS

Sustainable drainage systems (SuDS) are designed to control surface water run-off close to where it falls and to mimic natural drainage as closely as possible. One of their uses is to reduce the causes and impacts of surface water flooding. SuDS can include a number of different practices or mechanisms designed to drain or soak-up surface water in a more sustainable way than the conventional practice of draining water runoff through a pipe into a sewer. Practical examples include soakaways (draining water through permeable surfaces into the ground) and ponds (draining water into a surface water body).

(House of Commons Environment, Food and Rural Affairs Committee: Post-legislative scrutiny: Flood and Water Management Act 2010; 26th April 2017)

The applicant should fully investigate the opportunity to utilise Sustainable Drainage Systems (SuDS) on this site, preferably in the form of surface water SuDS that can provide drainage function as well as amenity and water quality improvements. Any subsequent application that does not use surface water SuDS would be questioned by the Lead Local Flood Authority as they can and should be used on all developments preferentially. Open space on any development should be used to provide multiple benefits so could be used for attenuation in addition to other informal functions. This then provides the multi-functionality of space desired for all SuDS schemes.

For this application the site is a mix of urban and commercial units therefore the site should fully investigate the opportunity to include above ground SuDS in the form of swales and attenuation basins that will provide visual amenity water quality improvements. Within such a culturally rich area and considering the progressive evolution of the site an innovate SuDS strategy incorporating attenuation and storage within landscaped areas would add considerable value and quality to the area.

Adoption and Maintenance

The applicant should appraise at the earliest opportunity the possibility for systems within the development to be adopted and what maintenance requirements these systems may have. The applicant should as part of the development follow good practise in CDM and ensure that systems can be safely maintained and replaced. This means avoiding attenuation systems being at excessive depths, safe access and egress to systems, avoiding confined space working where possible and minimising requirement for confined space work.

We also offer the following informative.

INFORMATIVE

Any areas of hardstanding areas (patio, driveways etc.) within the development shall be constructed of a permeable surface so flood risk is not increased elsewhere. There are three main types of solution to creating a permeable surface:

- Using gravel or a mainly green, vegetated area.

- Directing water from an impermeable surface to a border rain garden or soakaway.
- Using permeable block paving, porous asphalt/concrete.

Further information can be found here -

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/7728/pavingfrontgardens.pdf

In addition the development should explore disconnecting any gutter down pipes into rain water harvesting units and water butts, with overflow into rainwater garden/pond thus providing a resource as well as amenity value and improving water quality.

Tim Morley

From: Paul Farndale <Paul.Farndale@kirklees.gov.uk>
Sent: 05 September 2017 11:56
To: 'Tim Morley'
Subject: RE: Pre development enquiry - Redevelopment of Kirklees College, Huddersfield

Hello Tim,

Please see below in red.

Kind regards,

Paul Farndale
Principal Engineer
Flood Management & Drainage
Investment & Regeneration Service
Kirklees Council
01484 221000

From: Tim Morley [mailto:tim.morley@egorum.com]
Sent: 23 August 2017 12:48
To: Paul Farndale
Subject: Pre development enquiry - Redevelopment of Kirklees College, Huddersfield

Paul,

I am undertaking a FRA and Drainage Strategy Study for a proposed mixed use commercial and residential development for land at Kirklees College, Huddersfield.

Consultation is also being made with Yorkshire Water.

Proposed Development

The proposed development consist of the following approx. numbers and areas

- Residential flats / apartments (mixture of 1 and 2 bed).
- 2823m² of retail
- 4140m² offices
- 3760m² hotel
- Associated parking and landscaping.

Existing Drainage

Record drawings of existing drainage / previous surveys (see attached) show that surface water run-off from the existing site (approx. 85% impermeable, 2.09ha impermeable) drains to public combined sewers in the highways surrounding the site.

- Please can you provide details of any culverted watercourses within or in the vicinity of the site (none shown on searches to date)

No watercourses shown on our records.

Flood Risk

The site is in in FZ 1.

Surface water flood risk mapping shows some localised surface water flooding on the site, where water is trapped against existing buildings with the topographic slope and some overland flood flow routes and surface water flooding in the south of the site.

Provision of a positive drainage system and storage and carefully designed floor levels and external levels will deal with the localised surface water flood risk areas on site.

- Please provide details of any historical flooding at the site.

Flooding records show that the slip road to New North Road off the inner ring road has flooded causing difficulties in cars passing through on a few occasions. This will be due to a blocked gulley.

Surface water Drainage Strategy

Initial review of available information on ground conditions indicate that disposal of surface water by infiltration is unlikely to be viable.

- Please confirm whether or not intrusive site investigation will be required for an outline planning to confirm acceptability of infiltration / soakaways.

Not necessary on this occasion as BGS data shows unlikely to work. We do expect a desktop analysis in the blurb however.

The proposal is to restrict surface water run-off to the equivalent 1 in 1 year rate from the existing site less 30%. Storage would be provided on site such that there is no flooding for the 1 in 30 and all flows are retained on site for up to the 1 in 100+cc storm.

Use proved positively drained areas in hectares x 2.78 x 50, less 30%. Get confirmation of acceptance of YW on this so it proceeds more quickly.

Given the type of development – retail, hotel and apartments, 10% urban creep will not be included. 30% for climate change will be include in the storage calculations.

No problem

There are large areas of proposed parking and landscaped areas where non infiltration SuDS features can be incorporated – such as bio filtration areas, permeable paving, open graded sub base storage, shallow swales and small dray basins. Such features in combination with below ground storage will provide the surface water storage.

Not bothered if it ends up in combined and is treated anyway.

It is anticipated that the drainage on site will remain private and would be managed by a management company set up to maintain the landscaped areas.

- Please can you confirm your agreement in principle to the surface water drainage strategy

I confirm that I agree to the above.

Please contact me if you require any further details.

Thanks

Tim

Tim Morley
Director

tel: 0113 345 7678
mob: 0758 555 6861



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YorkshireWater

Mr T Morley
Elm Nook House
Pool Road
Pool-In-Wharfedale
Otley
LS21 1EG

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

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

Your Ref:
Our Ref: T014332

Email:
Technical.Sewerage@yorkshirewater.co.uk

For telephone enquiries ring:
Chris Roberts on 0345 120 8482

11th September 2017

Dear Mr Morley,

Kirklees College, Trinity Street, HD1 5 - Pre Planning Enquiry on R682150

Thank you for your recent enquiry. Our charge of £153.00 (plus VAT) will be added to your account with us, reference ECE106. 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 a 150 mm diameter combined public sewer recorded crossing the site. In this instance, building-over may take place under the control of Part H4 Building Regulations 2000.

Foul Water

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

Foul water domestic waste should discharge to the public combined sewers recorded around the site.

Foul water from kitchens and/or food preparation areas of any restaurants and/or canteens etc. must pass through a fat and grease trap of adequate design before any discharge to the public sewer network.

Surface Water

I can agree your surface water strategy in principle but before a formal agreement is issued -

1. I will need a copy of the evidence proving soakaways do not work.



2. I will need 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.

Surface water run-off from communal parking (greater than 800 sq metres or more than 50 car parking spaces) and hardstanding must pass through an oil, petrol and grit interceptor/separator of adequate design before any discharge to the public sewer network. Roof water should not pass through the traditional 'stage' or full retention type of interceptor/separator. It is good drainage practice for any interceptor/separator to be located upstream of any on-site balancing, storage or other means of flow attenuation that may be required.

Surface water run-off from areas of vehicular parking and/or hardstanding etc. must pass through an oil, petrol and grit interceptor/separator of adequate design before any discharge to the public sewer network. Roof water should not pass through the traditional 'stage' or full retention type of interceptor/separator.

It is imperative, however that surface water run-off from the forecourt of petrol stations, areas used for the delivery of fuel, areas used for and immediately adjacent to vehicle washing facilities and/or other similar areas where detergent is likely to be used is not discharged to any public surface water sewer network. Surface water from such areas must pass through an oil, petrol and grit interceptor/separator of adequate design before discharge to the public foul or combined sewer network. A trade effluent consent - that may be conditional and, amongst other things, place a restriction on the rate of discharge to public sewer - may be required for such discharges. The developer is advised to contact Yorkshire Water's Industrial Waste Section (telephone 0845 1242424) about any such proposal.

It is good drainage practice for any interceptor/separator to be located upstream of any on-site balancing, storage or other means of flow attenuation that may be required.

Other Observations

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

Under the provisions of section 111 of the Water Industry Act 1991 it is unlawful to pass into any public sewer (or into any drain or private sewer communicating with the public sewer network) any items likely to cause damage to the public sewer network interfere with the free flow of its contents or affect the treatment and disposal of its contents. Amongst other things this includes fat, oil, nappies, bandages, syringes, medicines, sanitary towels and incontinence pants. Contravention of the provisions of section 111 is a criminal offence.

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.



YorkshireWater

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

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

Yorkshire Water's Trade Effluent team must be consulted in respect of any proposed trade effluent discharge to the public sewer.

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 sincerely

Chris Roberts
Sewerage Technician
Developer Services

egorum

