

Holiday Inn Express

Flood Risk Assessment



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This document uses revision codes in accordance with ISO EN 19650:

P##: Preliminary (non-contractual) - review, comment or approval.
C##: Contractual - Approved for stage completion.

This document uses status codes in accordance with ISO EN 19650:

Work in progress
S0: WIP

Shared (non-contractual)
S1: Coordination
S2: Information
S3: Review
S4 & S5: Approval

Published (contractual)
A1, An, etc. (where "n" relates to the project stage)

This document uses project stages in accordance with the IStructE Structural Plan of Work 2020:

2: Concept
3: Coordination
4: Technical Design
4.5 Production Design
5: Construction
6: Handover

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1. Introduction & Scope

1.1. Introduction

Booth King Partnership Ltd. (BKP) were commissioned by Heeton SG 50 Limited to carry out Flood Risk Assessment (FRA) to complement the planning application for the **two storey upward extension** at Holiday Inn Express, 2 - 4 Oxford Road, Manchester, M1 5QA.

This FRA has been prepared in accordance with the National Planning Policy Framework (NPPF), Flood Risk and Coastal Change (www.gov.uk/guidance/flood-risk-and-coastal-change) and Planning Practice Guidance, as well as Environment Agency (EA) Guidance and the local Strategic Flood Risk Assessment (SFRA) Level 1. A full list of documents used to inform this report is shown in the Reference section.

Although the site has an area of less than 1 hectare, it lies within predominantly in Flood Zone 3 according to EA's "Product 4 therefore an FRA is compulsory in accordance with the NPPF. The proposed development should not increase the risk of flooding elsewhere and this FRA has therefore been prepared to demonstrate that this has been achieved. Consideration has also been given to BREEAM accreditation, including the requirements of Pol 03, the risk of pollution to controlled waters and the site conditions prior to, during and after development.

This report aims to identify and assess the risks of all forms of flooding to and from the site and demonstrate how these flood risks will be managed, taking climate change into account. The Flood Risk Assessment also considers the management of surface water run-off and outlines the proposed drainage strategy.

This report is based on information obtained from the recently undertaken site topographical and buried utilities survey, and drainage record plans.

1.2. Scope

Our client Heeton SG 50 Limited has requested Booth King Partnership Ltd. to undertake a flood risk assessment and a drainage design scheme for the purposes of planning permission from Manchester City Council for the erection of two storey upward extension, shown in Figure 1.

2. Existing Site

2.1. Location

The site comprises circa 0.051 hectares of an existing developed building located at the junction of Hulme Street and Oxford Road. Hulme Street forms the southern boundary of the site while Oxford Road bounds the site to the east. To the north the site is bounded by the River Medlock and to the west by other development. It is located at Ordnance Survey Grid Reference E: 38.4128, N: 397428.

Oxford Road is a main arterial road serving Manchester City Centre.

Figure 1 below provides an aerial view of the site location.

A Site Location Plan can be found in Appendix A with the existing plans and sections.

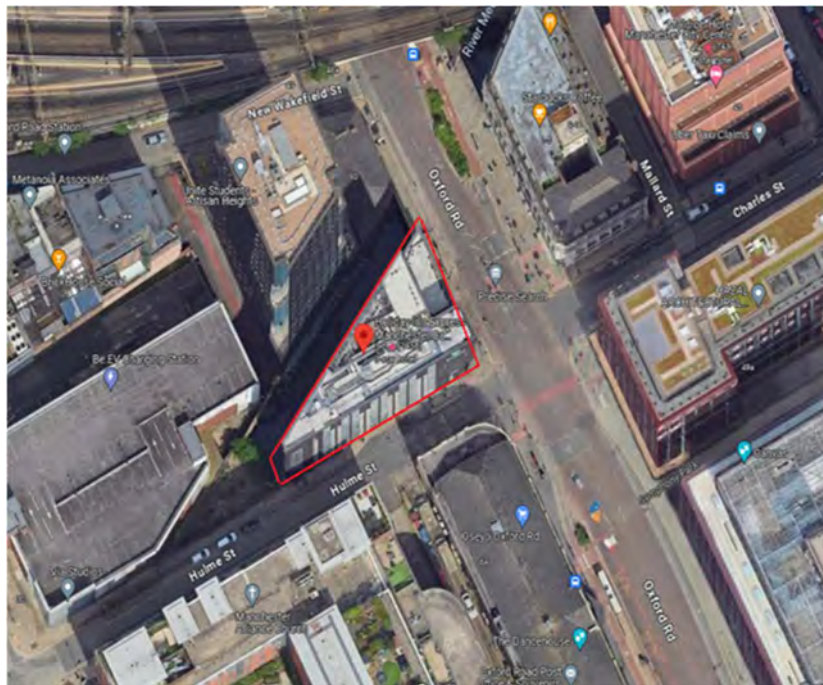


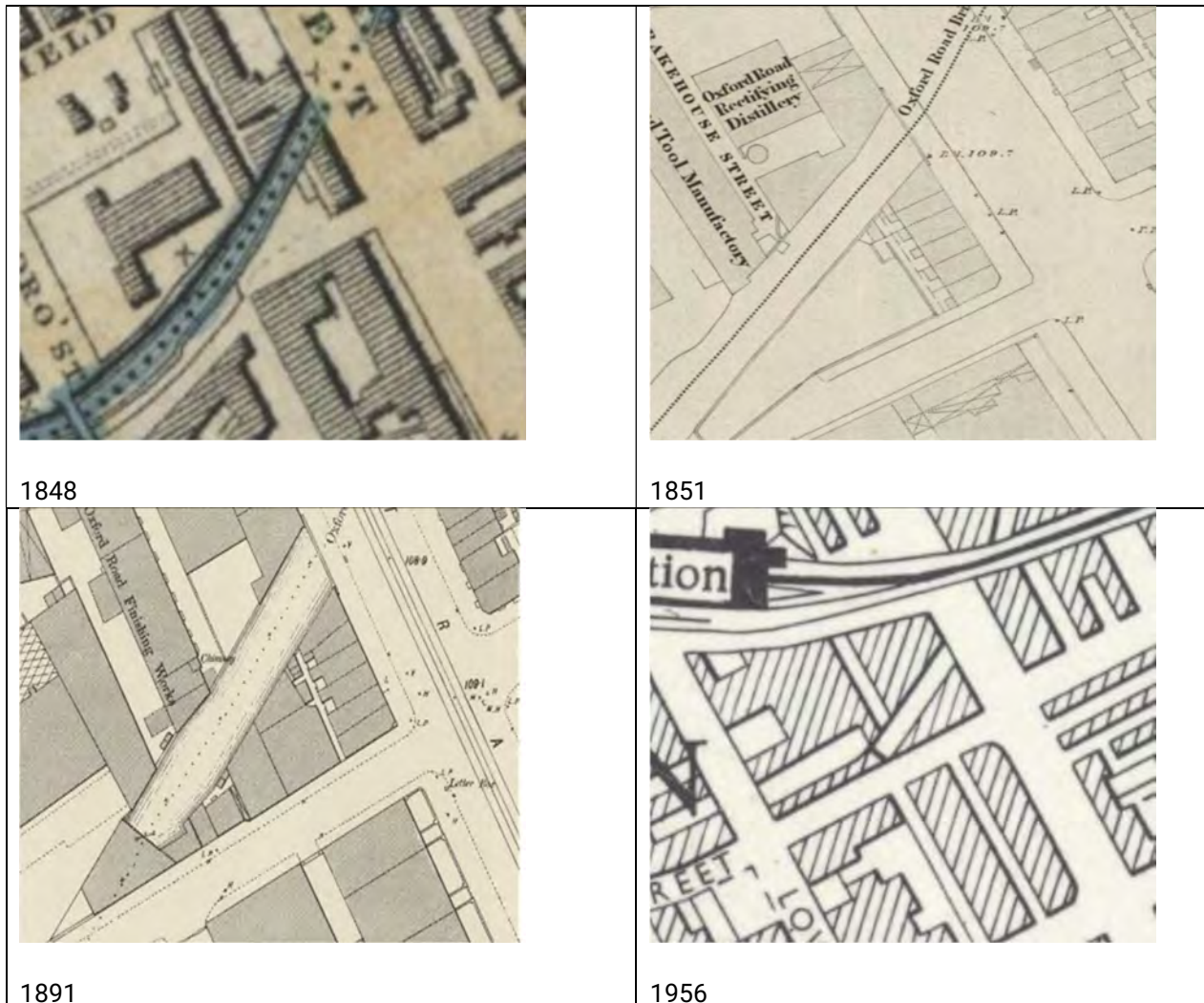
Figure 1. Existing Site

2.2. Site Levels

The site generally flat. According to the Flood Risk Assessment of the original planning application, Oxford Road is situated at approximately 33.24m AOD. Hulme Street is situated at approximately 33.21m AOD with levels dropping to 32.38m AOD to the west.

The topographical survey is presented Appendix D.

2.3. Site History



The purpose of describing the history of the site above is to assess the changing drainage patterns. It is clear that the site has been urban development since before 1848.

Phase 1 Investigation (Desk Study- November 2006) and Phase 2(i) Preliminary Intrusive Investigation (April 2007) were produced as part of the original planning application and can be found in Appendix C.

2.4.Existing Drainage

Based on the United Utilities Map, several public sewers located under Hulme Street Oxford Road.



Figure 2. United Utilities Asset Maps Extract

United Utilities Asset map can be found in Appendix D

2.5. Hydrology

The nearest surface water feature is identified as River Medlock, the northern boundary of the site.

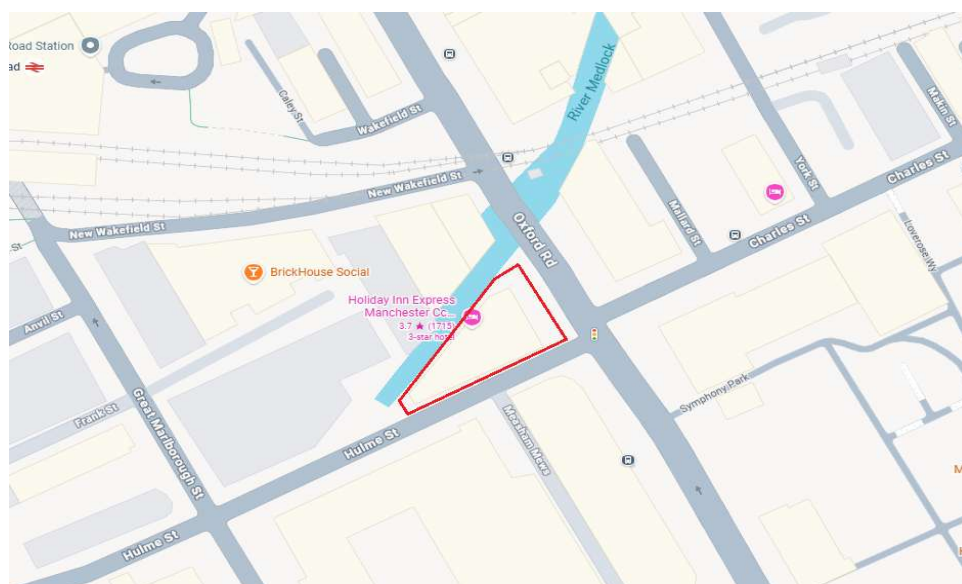


Figure 3. Google Map

2.6. Source Protection Zone

The site lies outside Source Protection Zones.



Figure 4. Magicmap Extract

Although the site is not located within a Special Area of Conservation (SAC), Special Protection Area (SPA), or a canal hazard zone, it is situated within the Central Conurbation Critical Drainage Area.

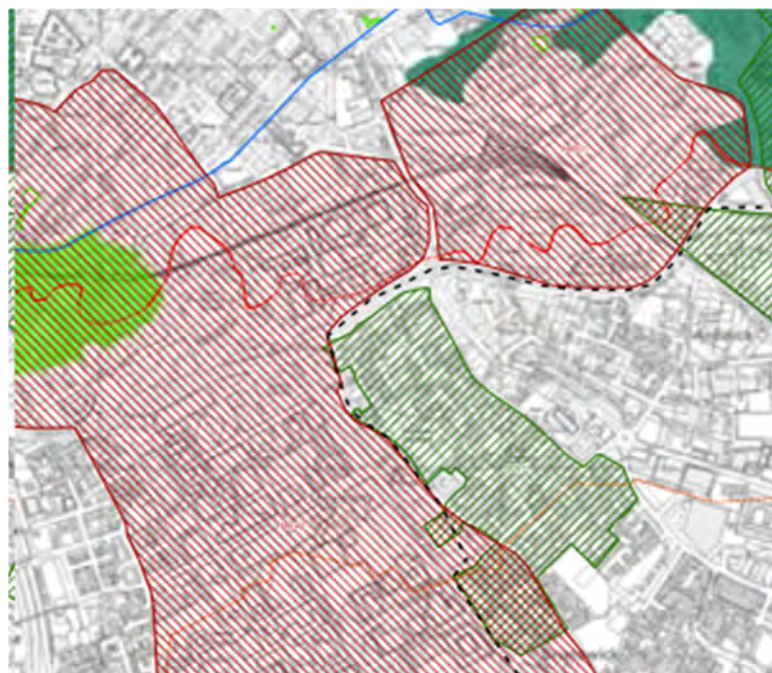


Figure 5. Extract of the SFRA Canal Hazard Zones

3. Proposed Development

The developer proposes the construction of two additional floors, which would provide an increase of 24 bedrooms to the existing accommodation.

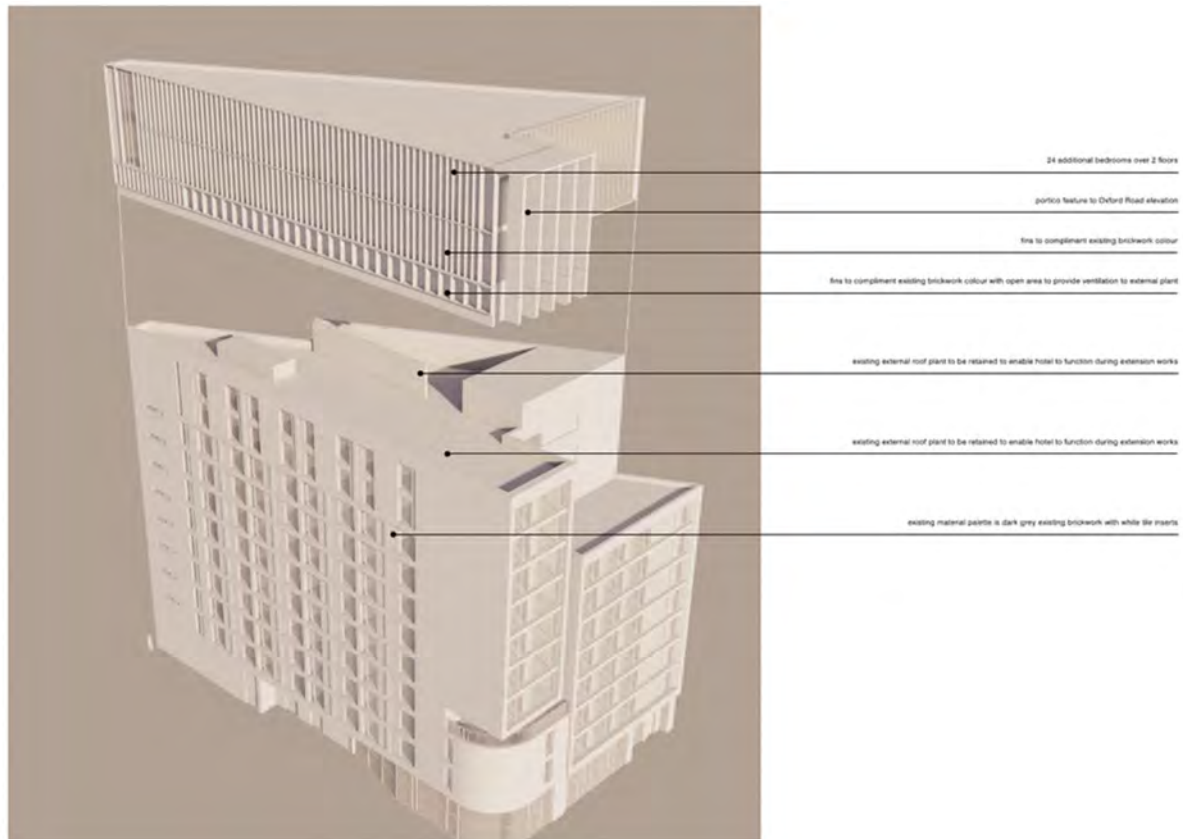


Figure 6. Proposed Plan

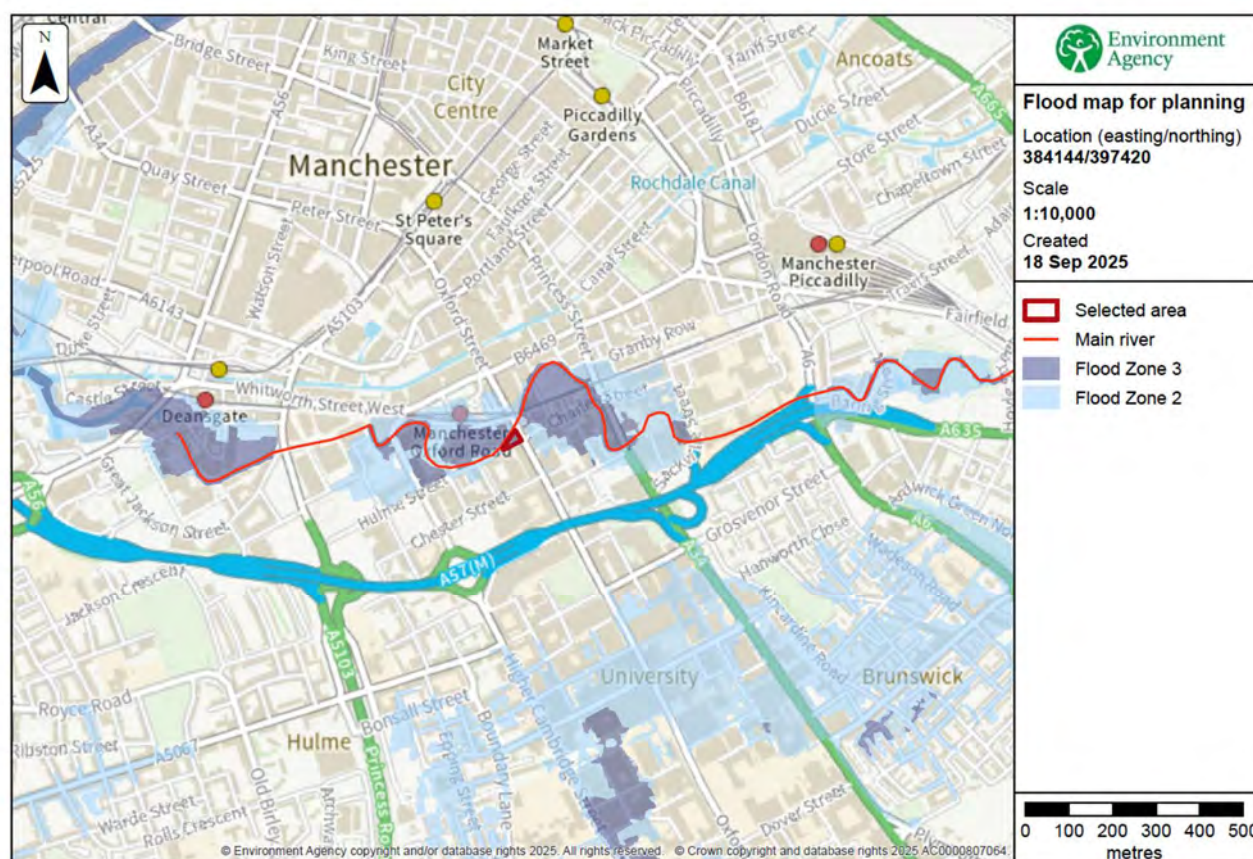
The proposal does not include any altering of the existing structures or levels, nor the amount of green space currently offered.

Proposed plans and section can be found in Appendix B.

4. Flood risk

The Environment Agency Product 4 Maps indicate that the site lies within Flood Zone 3. The flooding is associated with flooding River Medlock.

The vulnerability of the site to flooding from rivers and other sources has been considered and the local SFRA has been taken into account. Typical sources of flooding include fluvial, tidal, surface water, groundwater and anthropogenic sources such as sewer flooding and reservoir flooding. These are all considered in this Section.



Page 6
 Figure 7. EA Flood Maps for Planning

4.1. Sequential and Exception Test

The vulnerability of the site to flooding from rivers and other sources has been considered and the local SFRA has been taken into account. Typical sources of flooding include fluvial, tidal, surface water, groundwater and anthropogenic sources such as sewer flooding and reservoir flooding. These are all considered in this Section.

The probability of flooding from rivers and the sea is modelled by the JBA for the whole of the UK and mapped as Flood Zones which categorise areas according to the likelihood of flooding occurring. The zones are defined by the predicted extent of flooding during annual exceedance probability (AEP) events.

The flood zones are defined in Table 3.1 of the NPPF and Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA Level 1 SFRA Final March 2010 and Level 2 SFRA Final March 2011 as follows:

Flood Zone	Definition
Zone 1 – Low Probability	Lowest risk of flooding (less than 1 in 1000 probability per year)
Zone 2 – Medium Probability	Medium risk of flooding (between 1 in 1000 and 1 in 100 probability per year).
Zone 3a – High Probability	High risk areas (usually between 1 in 100 and 1 in 200 probability of flooding in any year).
Zone 3ai – High Probability	Areas which are already developed but have the same risk as Flood Zone 3b (1 in 20 probability per year).
Zone 3b – The Functional Floodplain	The undeveloped functional floodplain where it is desirable for water to be stored in times of flooding (usually greater than 1 in 20 probability of flooding in any year but also including areas which are designed to flood).

Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA Level 1 SFRA Final March 2010 states the following regarding the Sequential Test: *"The Sequential Test is based on development allocations, their situation in regard to flood risk, that level of risk and also the development's vulnerability to that risk. When allocating or approving land for development in flood risk areas, those responsible for making development decisions are expected to demonstrate that there are no suitable alternative development sites located in lower flood risk areas (i.e. the sequential approach). Exceptionally, proposed development sites can be taken forward, if the conditions of the Exception Test are fulfilled."*

Paragraph 162. Within the NPPF states: *"The aim of the sequential test is to steer new development to areas with the lowest risk of flooding from any source. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The strategic flood risk assessment will provide the basis for applying this test. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding."*

A Sequential Test Report has been produced by Booth King Partnership with document reference No: 15946-BKP-XX-XX-RP-C-0002 - Sequential Test.

Planning permission for the 11-storey hotel was granted in 2008, and the development has since been completed and operated. The ground floor was designated for retail use and is currently occupied by the supermarket chain SPAR.

The original planning application Ref. 082205/FO/2007/C3 was approved with conditions for the development of Demolition of existing 3 storey building and erection of 11 storey building incorporating 147 bedroom hotel (Use Class C1), ground floor retail (Use Class A1) and ancillary servicing areas.

Table 2 of the NPPF classifies the compatibility of different development end uses, based on their vulnerability to flooding, against the defined flood zones for rivers and sea, and an extract of the table is provided below.

Table 2: Flood risk vulnerability and flood zone 'incompatibility'

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	X	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	X	X	X	✓ *

Key:

✓ Exception test is not required

X Development should not be permitted

Figure 8. Table 2 of the NPPF

The NPPF defines the Flood Risk Classifications within Annex 3, and the definitions are not repeated here.

The proposed development is a residential accommodation in the form of hotel rooms (more vulnerable), the basement and ground floor level are in the form of retail and restaurant/ meeting rooms (less vulnerable).

The Exception Test therefore is not required.

4.2. Flooding from Sea/ Tidal Flooding

The development is considered to be at risk from tidal flooding.

4.3. Groundwater Flooding

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property.

According to Phase 2(i) Preliminary Intrusive Investigation, groundwater was not encountered within any of the sampling locations.

No information has been provided to suggest that the site is susceptible to groundwater flooding.

No records have been provided to suggest that the site has flooded from this source previously.

4.4. Surface Water Flooding

The EA's surface water flood map shown in Figure 7 shows the flooding risk is low for most of the site.

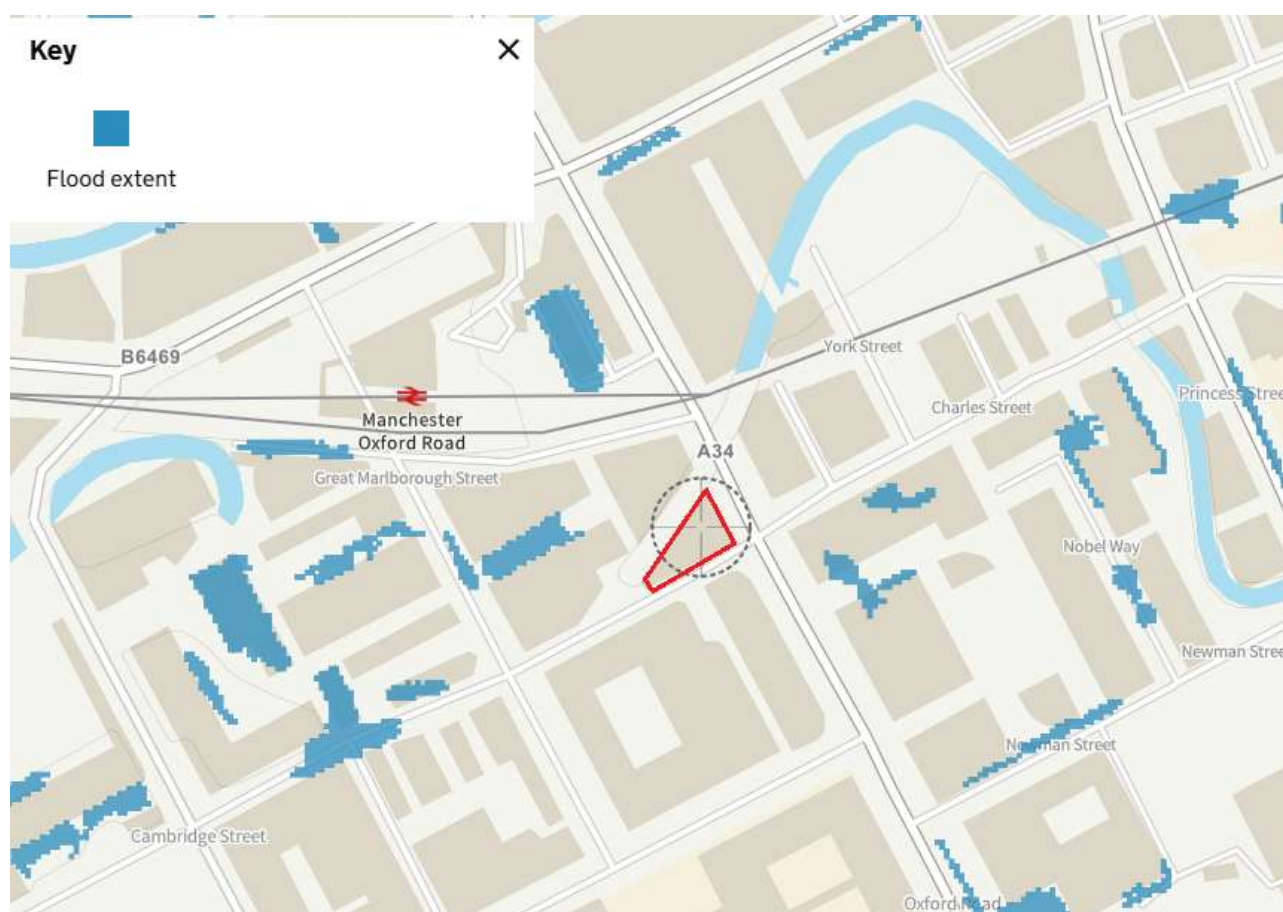


Figure 9. EA - Surface Water Flooding 1 in 30



Figure 10. EA - Surface Water Flooding 1 in 100



Figure 11. EA - Surface Water Flooding 1 in 100

Surface water flood risks usually result from pooling of surface waters and overland flow during heavy rainfall that is not able to drain away quickly enough. The local sewer network may be at risk of surcharging during such extreme rainfall events with flooding happening from manholes and gullies. This may be caused by inadequate maintenance of the existing system or simply that the density of hard surfaces in the local area are creating an overload of a system designed to deal with smaller volumes of water.

The proposed development should be designed in such a way so that it does not increase the flood risk elsewhere. In addition safe access and egress routes should be maintained. These factors are being considered within the preliminary drainage strategy within Section 5 of this report.

4.5. Flooding from Anthropogenic Sources

The EA's information states that reservoir flooding is extremely unlikely to happen and there has been no loss of life in the UK from reservoir flooding since 1925. The Reservoir Act of 1975 ensures that reservoirs are inspected regularly, and essential safety work is carried out.

The development will not experience flooding from a reservoir breach. The flooding shown above, as indicated in the key, refers to flooding from rivers as well.

4.6. Flooding from River/Fluvial Flooding

The EA's Flood Map for Planning (FMfP) and Product 4 data indicate that the site lies within Flood Zone 3, which is considered to have a high probability of flooding. A review of the supplied detailed EA Product Data suggests that the site would be located with the 3.3% Annual Exceedance Probability (AEP) flood extent, which is typically used to designate Flood Zone 3b (Functional Floodplain).

The Product 4 data from the Environment Agency has been used for the following assessment and can be found in Appendix E.

The risk of flooding from rivers and sea data, which was updated March 2025 as part of the EA's National Flood Risk Assessment (NaFRA), considers the site to be at high risk of flooding and in the climate change scenario. This information can differ from that presented in the EA's Flood Zones maps as the longer-term risk data includes local flood defence infrastructure.

No flood defences are present that defend the site, the flood levels in a non-defended scenario in relation to the site are shown below. Nodes 2 and 3 have been chosen for the data as they are located in the central line of the site.

The 1 in 100 year return period (100% AEP) u to 70% climate change.

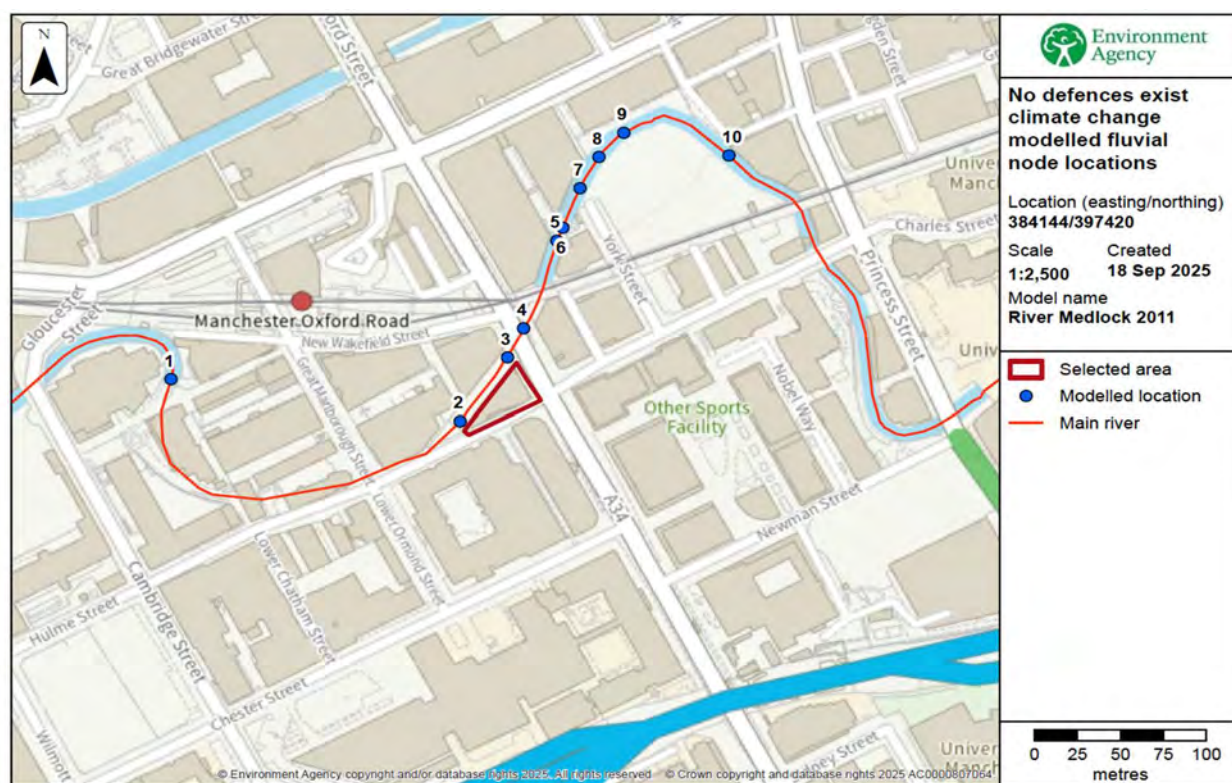


Figure 12. Current EA Flood

Table 3.1 Modelled fluvial depths for the River Medlock.

Return Period	Node 2 Annual Exceedance Probability – Maximum Water Levels (m ODN)	Node3 Annual Exceedance Probability – Maximum Water Levels (m ODN)
1% (1 in 100 year inc 20% CC)	30.80	30.88
1% (1 in 100 year inc 35% CC)	31.33	31.37
1% (1 in 100 year inc 70% CC)	31.77	31.77

Other year events, including the 1 in 1000 year event.

Table 3.2 Modelled fluvial depths for the River Medlock.

Return Period	Node 2 Annual Exceedance Probability – Maximum Water Levels (m ODN)	Node 3 Annual Exceedance Probability – Maximum Water Levels (m ODN)
4% (1 in 25 year)	29.64	29.76
1% (1 in 100 year)	30.34	30.34
0.1% (1 in 1000 year)	32.27	32.27

Also, **three different Scenarios** have been present by the EA “Product 4” flood maps, **Normal Operation, Latchford 1 Gate Closed Scenario and Latchford 3 Gates Closed Scenario**. The above information have been reviewed, and the worst case scenario appears to be the 1 in 1000 year event with and without the Latchford 3 Gates closed, with flood level of 32.32m AOD, whereas the finished ground floor level was set at 33.25m, almost a metre above.

It is an existing building, complete since 2010, no flooding has been reported. The proposed development is an upward extension without the possibility of flooding.

4.7. Historical Flood Events

The EA have no records of flooding affecting the site.

4.8. Flood Risk Assessment – Original Planning Application

Part of the original planning application Ref. 082205/FO/2007/C3, a flood risk assessment was produced, and it can be found in Appendix E.

4.9. Evacuation Plan and Flood Action Plan

Safe escape is usually defined as being through slow moving flood water no deeper than 25cm.

A safe means of escape is expected to be ensured through the existing hotel's flood warning and evacuation plan. The applicant has confirmed their commitment to implement an updated flood warning and evacuation plan following the development and to subscribe to the Environment Agency's Flood Warning Service.

5. Sustainable Drainage Systems (SuDS)

A separate document has been produced by Booth King Partnership, document reference No: 15017-BKP-V1-XX-RP-C-001 Drainage Impact Assessment - Rev A, that explores the use of SuDS for this development.

6. Drainage Strategy

It is proposed a two storey upward extension.

6.1. Proposed Foul Water Network

It is proposed to reuse existing pop-up positions within the current layout and in part install a new gravity system local to the newly converted rooms, the runs will be kept to a minimum depth and concrete encased (where required) so as to allow connection into the closest existing foul manhole. With reference to British Water Flows and Loads 4, flows for the hotel rooms and restaurant, site peak foul discharge was calculated to be 2.29 l/s.

British Water - Flows and Loads 4				
Hotel - Total - Existing	Rooms (2 person)	No.	FLOW (L)	
Hotel Guests (3*)	147	294	250	73500
Hotel full time staff		20	90	1800
Hotel part time staff		10	45	450
Restaurant	52	2	30	3120
Drinkers (allow)	91	1	12	1092
Toilets (WC) per use - allow 1 per cover	91	1	10	910
Toilets (Urinal) per use, allow 2 per drinker	91	2	5	910
Restaurant full time day staff (per day)		5	90	450
Restaurant part time staff (per day)		5	45	225
			Total	82457 litre/day
			Peak flow (total/10hr/60/60)	2.29 l/s
			Average flow (total/24hr/60/60)	0.95 l/s

Figure 13. Flows and loads – Estimate Existing Site Foul Volume

With reference to British Water Flows and Loads 4, flows from the site will increase site foul discharge by 0.33 l/s total.

British Water - Flows and Loads 4					
Hotel - Total - PROPOSED	Rooms (2 person)	No.	FLOW (L)		
Hotel Guests (3*)	171	342	250	85500	
Hotel full time staff		20	90	1800	
Hotel part time staff		10	45	450	
Restaurant	52	2	30	3120	
Drinkers (allow)	91	1	12	1092	
Toilets (WC) per use - allow 1 per cover	91	1	10	910	
Toilets (Urinal) per use, allow 2 per drinker	91	2	5	910	
Restaurant full time day staff (per day)		5	90	450	
Restaurant part time staff (per day)		5	45	225	
			Total	94457	litre/day
			Peak flow (total/10hr/60/60)	2.62	l/s
			Average flow (total/24hr/60/60)	1.09	l/s

Figure 13. Flows and loads – Estimate Proposed Site Foul Volume

6.2. Proposed Surface Water Network

Hierarchy of Surface Water Disposal

When developing or redeveloping a site, the control and dispersion of surface water falling on the site's catchment must always be considered. Wherever possible, surface water run-off should be managed on the surface, i.e. blue/green roofs. This enables the SuDS performance to be more easily inspected and managed with pollution incidents and potential flood risk being visible.

Paragraph 080 of the PPG-FRCC advises a hierarchy which reflects the guidance of the Building

Regulations Approved Document H:

'Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable:

1. Into the ground
2. To a surface water body
3. To a surface water sewer, highway drain, or another drainage system
4. To a combined sewer

As part of the proposed development, surface water drainage alterations have been minimised to the extent of only introducing rainwater pipes to the vertical extension. Existing rainwater pop-up discharge locations will be retained and reused, ensuring no increase in discharge points to the local drainage network. The only new surface water component introduced is a single vertical rainwater downpipe serving the extension

7. Conclusions & Recommendations

7.1. Conclusions

Booth King Partnership Ltd. (BKP) was commissioned by Heeton SG 50 Limited to undertake a Flood Risk Assessment (FRA) in support of the planning application for a proposed two-storey upward extension to the existing Holiday Inn Express, located at 2–4 Oxford Road, Manchester, M1 5QA.

The FRA has been prepared in accordance with the National Planning Policy Framework (NPPF), associated Planning Practice Guidance, the Environment Agency (EA) requirements, and the Manchester City Council Strategic Flood Risk Assessment (SFRA).

The site occupies approximately 0.051 hectares and lies predominantly within Flood Zone 3, indicating a high probability of flooding associated with the River Medlock, which forms the northern boundary of the site. Despite the site's location within this zone, the proposed works are limited to the vertical extension of the existing structure, with no alterations to ground levels, site layout, or impermeable areas. Consequently, the proposed development does not increase flood risk to the site or elsewhere.

The EA's Product 4 flood data identifies flood levels up to 32.32m AOD in the 1 in 1000-year event scenario (including climate change), while the finished floor level of the existing building is set at approximately 33.25m AOD, providing a freeboard of nearly 1 metre above the modelled flood level. The site therefore benefits from adequate protection against predicted flood levels.

Groundwater and surface water flood risks have been assessed as low, with no historical records of flooding at the site. The surface water drainage strategy will retain the existing discharge points and capacity, ensuring no increase in runoff rates or volumes. The proposed foul drainage system will reuse existing connections and provide sufficient capacity for the modest increase in flows resulting from the additional bedrooms.

Safe access and egress will continue to be managed through the existing flood warning and evacuation plan. The applicant has confirmed that an updated flood warning and evacuation plan will be implemented post-development and that the site will be registered with the Environment Agency's Flood Warning Service.

In conclusion, the proposed two-storey upward extension is considered to be appropriate in flood risk terms. The development:

Does not increase flood risk to the site or surrounding areas;

- Incorporates appropriate measures for flood resilience and emergency management;
- Complies with the requirements of the NPPF, Planning Practice Guidance, and local SFRA; and
- Provides a sustainable drainage approach in line with best practice and BREEAM considerations.

Accordingly, the proposed development is deemed acceptable with respect to flood risk and drainage.

8. Maintenance Plan

The Drainage network has been designed with minimal maintenance in mind. The maintenance is generally of a 'common sense' approach and is to comprise:

- Regular day to day care: - litter collection, grass cutting and checking the inlets and outlets where water enters or leaves a drainage feature.
- Occasional tasks: - managing vegetation in wet areas and removing any silt that builds up in the drainage features.
- Remedial work: - repairing damage when, and where, necessary.

Specific recommendations for each feature are provided in the following sections and should be referred to in the first instance if there are any issues. Please contact Booth King Partnership Ltd. if any further advice is required.

During the works the Contractor, subject to agreement from their client, will ensure that all drains on which the proposed drainage works rely will be jetted out and made good as required to ensure correct operation.

Maintenance Activity	Required Action	Frequency
Inspection	Inspect for sediment and debris in pre-treatment component such as gullies, sump units and catch pits.	Monthly for the first year and on a 6-monthly basis thereafter.
Gutters	Clear gutters and any leaf guards.	On a 6-monthly basis or as required following inspection regime.
Sump Units	Remove all obstructions and debris from all sump units (gullies, channels and catch pits).	On a 6-monthly basis or as required following inspection regime.
Pipe Work	Inspect all pipework for all silt accumulation and high pressure jet any pipe work which has silt accumulation. Care is to be taken that any silts within the pipework are not flushed using chamber bungs.	On a 6-monthly basis or as required following inspection regime.
Manholes	Covers should be lifted and inspected for litter and debris to ensure that the runs are free flowing.	On a 6-monthly basis or as required following inspection regime.

9. References

1.	C753. The SuDS Manual. CIRIA. 2015.
2.	Planning Practice Guidance. http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/
3.	National Planning Policy Framework. March 2012.
4.	Environment Agency Indicative Flood Mapping
5.	Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA LEVEL 2 SFRA Final March 2011
6.	082205/FO/2007/C3 Original Planning Application Documents
7.	Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA LEVEL 1 SFRA Final March 2010
8.	Joint statement by Manchester City Council Salford City Council Trafford Council Environment Agency MANCHESTER SALFORD TRAFFORD STRATEGIC FLOOD RISK ASSESSMENT
9.	Draft Manchester Local Plan Regulation 18 Consultation September 2025.
10.	Manchester City Council – Core Strategy Flood Risk Appraisal
11.	Manchester Hotel Study Prepared by Graham + Sibbald UK LLP On behalf of: Manchester City Council (Reference: Q20563) Date: 31 July 202 Ref: HMA/WB/MAN-2024/02/0011
12.	Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA Critical Drainage Areas
13.	Interactive Proposal Map https://mcr-council.maps.arcgis.com/apps/webappviewer/index.html?id=565a33eaba904b2dabf4c3dd8685db80
14.	Phase 1 Investigation (Desk Study) at Oxford Road, Manchester by Scott Hughes Design Engineer November 2006
15.	Phase 2(i) Preliminary Intrusive Investigation at Oxford Road, Manchester by Scott Hughes Design Engineer April 2007.
16.	Code of Practice Flows and Loads – 4 Sizing Criteria, Treatment Capacity for Sewage Treatment Systems
17.	PLACES FOR EVERYONE JOINT DEVELOPMENT PLAN DOCUMENT FOR BOLTON, BURY, MANCHESTER, OLDHAM, ROCHDALE, SALFORD, TAMESIDE, TRAFFORD AND WIGAN 2022 to 2039 ADOPTED 21 MARCH 2024

APPENDIX A

LOCATION PLAN – ARCHITECT’S EXISTING PLANS & SECTIONS



revision: P01 date: 2024.02.26 note: preliminary first issue

— site boundary

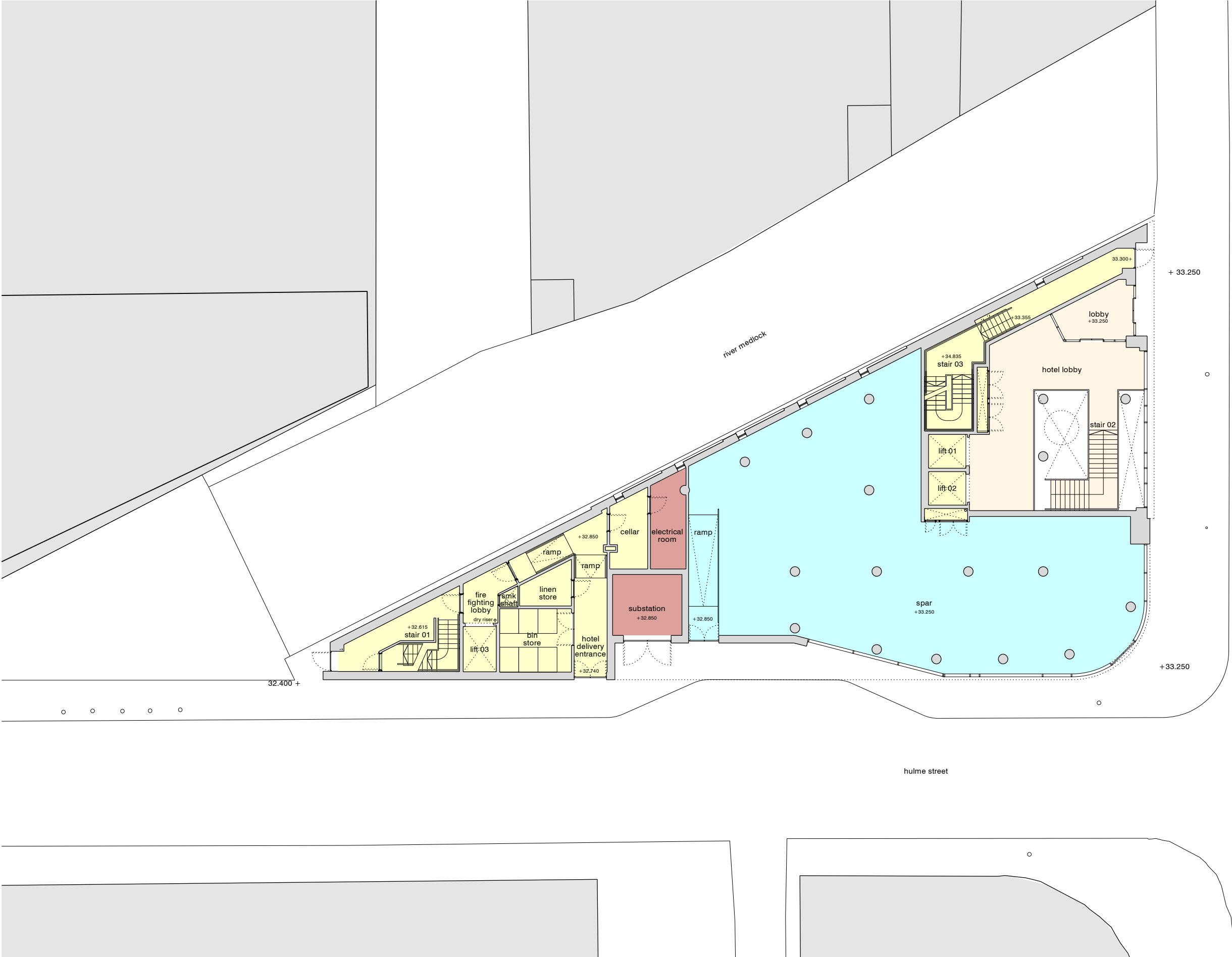
brancaster road



project
Holiday Inn Express
job no.
7612
title
location plan
scale
1:1250 @ A3
drawing no.
7612-al(04)0001

stephenson hamilton risley
STUDIO

3 riverside mews
4 commercial street
manchester, M15 4RQ
www.shr.studio
email@shr.studio
0161 832 0244



revision:	date:	note:
P01	2023.05.09	preliminary first issue
P02	2024.02.26	preliminary second issue

hotel front of house
back of house / circulation
retail
plant spaces
standard bedrooms
accessible bedrooms



project
Holiday Inn Express

job no.
7612

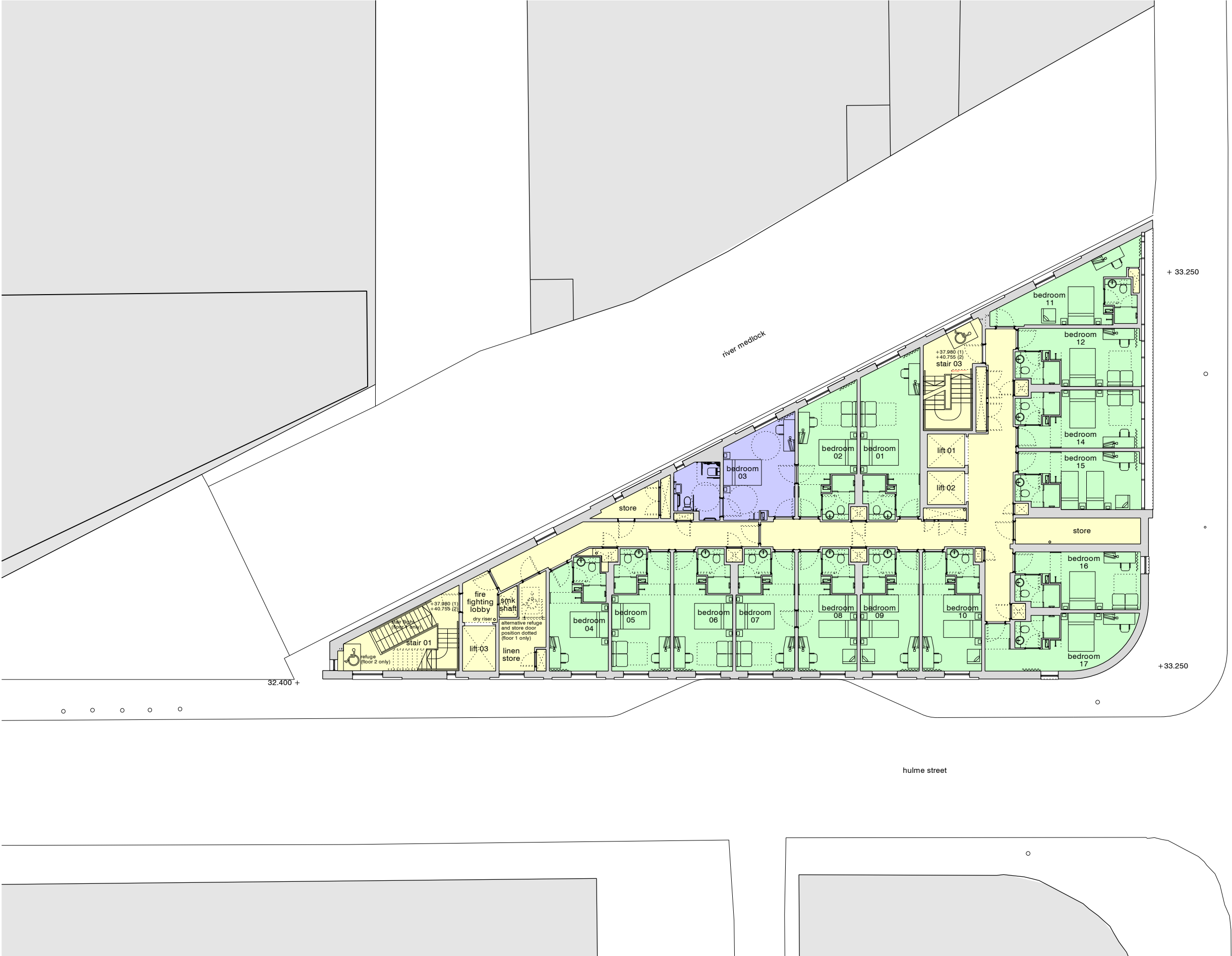
title
existing ground floor plan

scale
1:200 @ A3

drawing no.
7612-al(02)0004

stephenson hamilton risley
STUDIO

3 riverside mews
4 commercial street
manchester, M15 4RQ
www.shr.studio
email@shr.studio
0161 832 0244



revision:	date:	note:
P01	2023.05.09	preliminary first issue
P02	2024.02.26	preliminary second issue

hotel front of house
back of house / circulation
retail
plant spaces
standard bedrooms
accessible bedrooms



project
Holiday Inn Express

job no.
7612

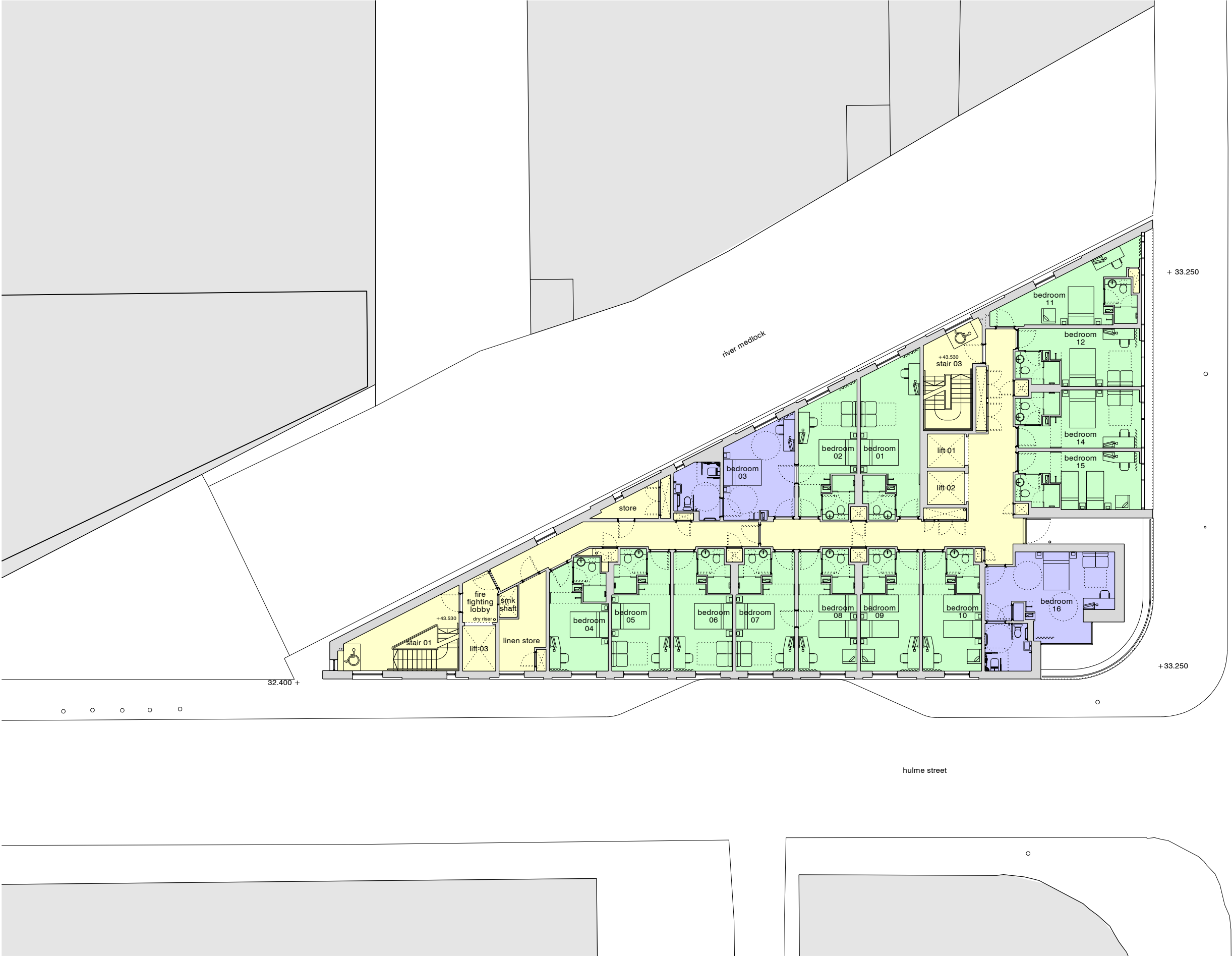
title
existing floor plan - level 01-02

scale
1:200 @ A3

drawing no.
7612-al(02)0005

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revision:	date:	note:
P01	2023.05.09	preliminary first issue
P02	2024.02.26	preliminary second issue

hotel front of house
back of house / circulation
retail
plant spaces
standard bedrooms
accessible bedrooms



project
Holiday Inn Express

job no.
7612

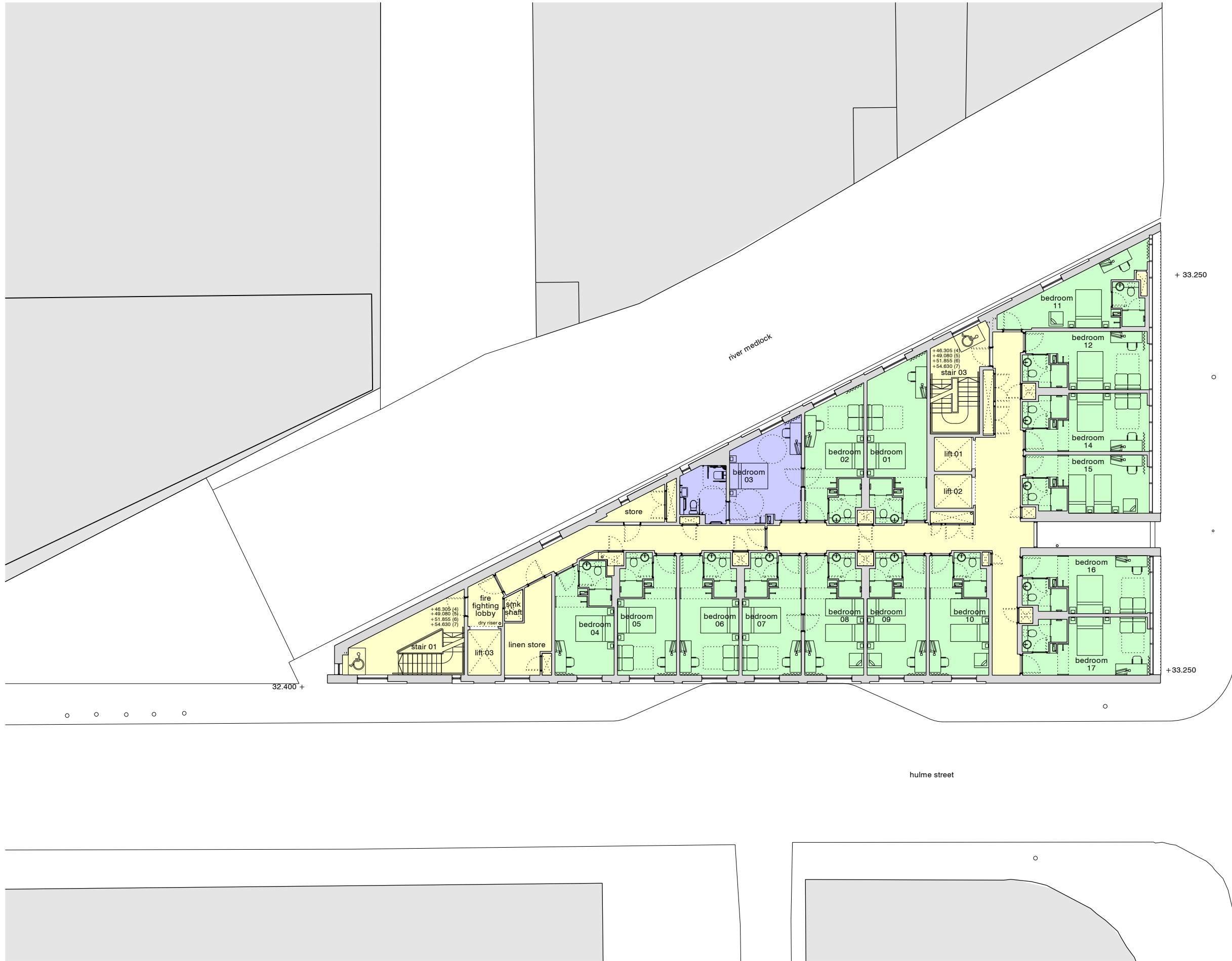
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Holiday Inn Express

job no.
7612

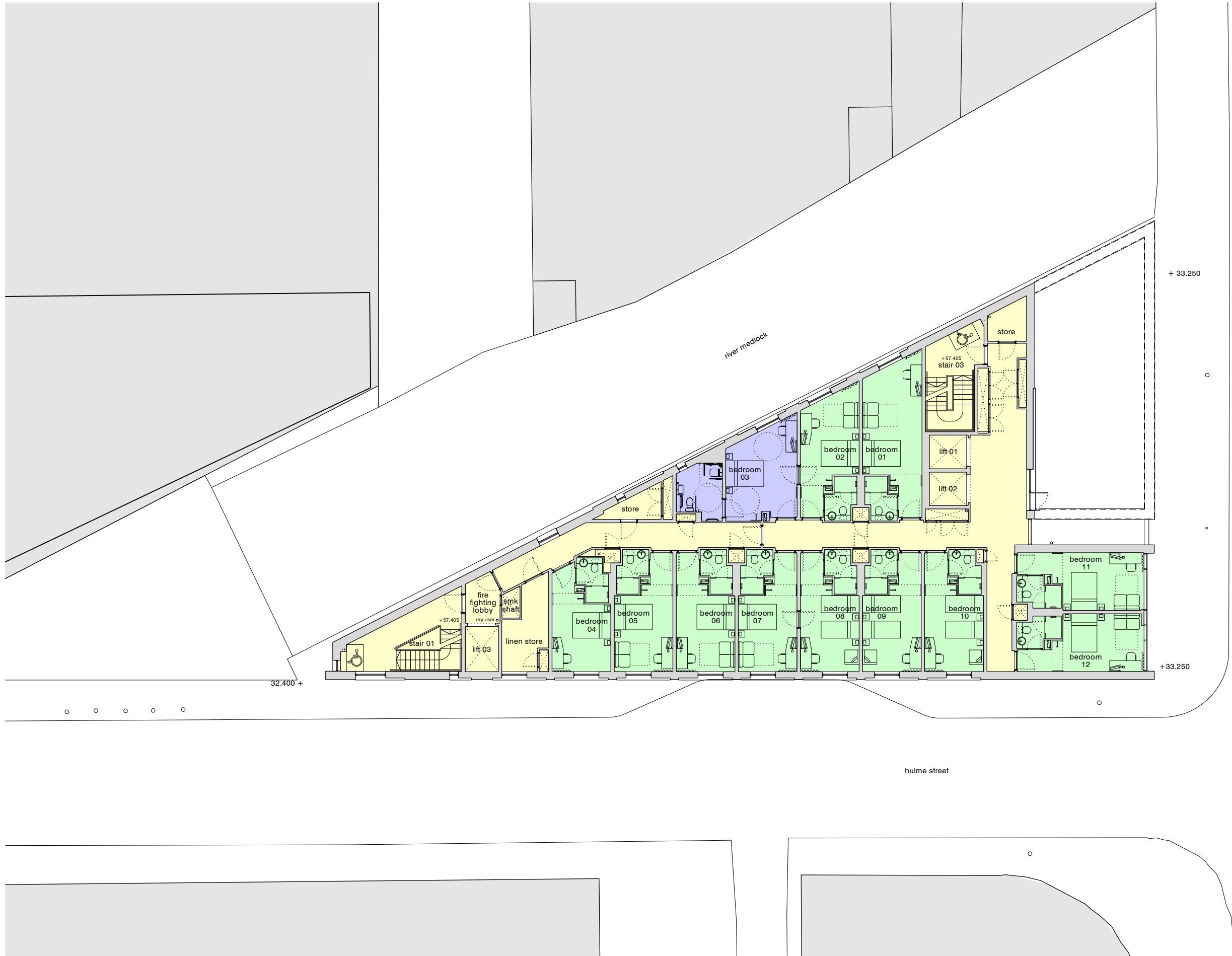
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7612

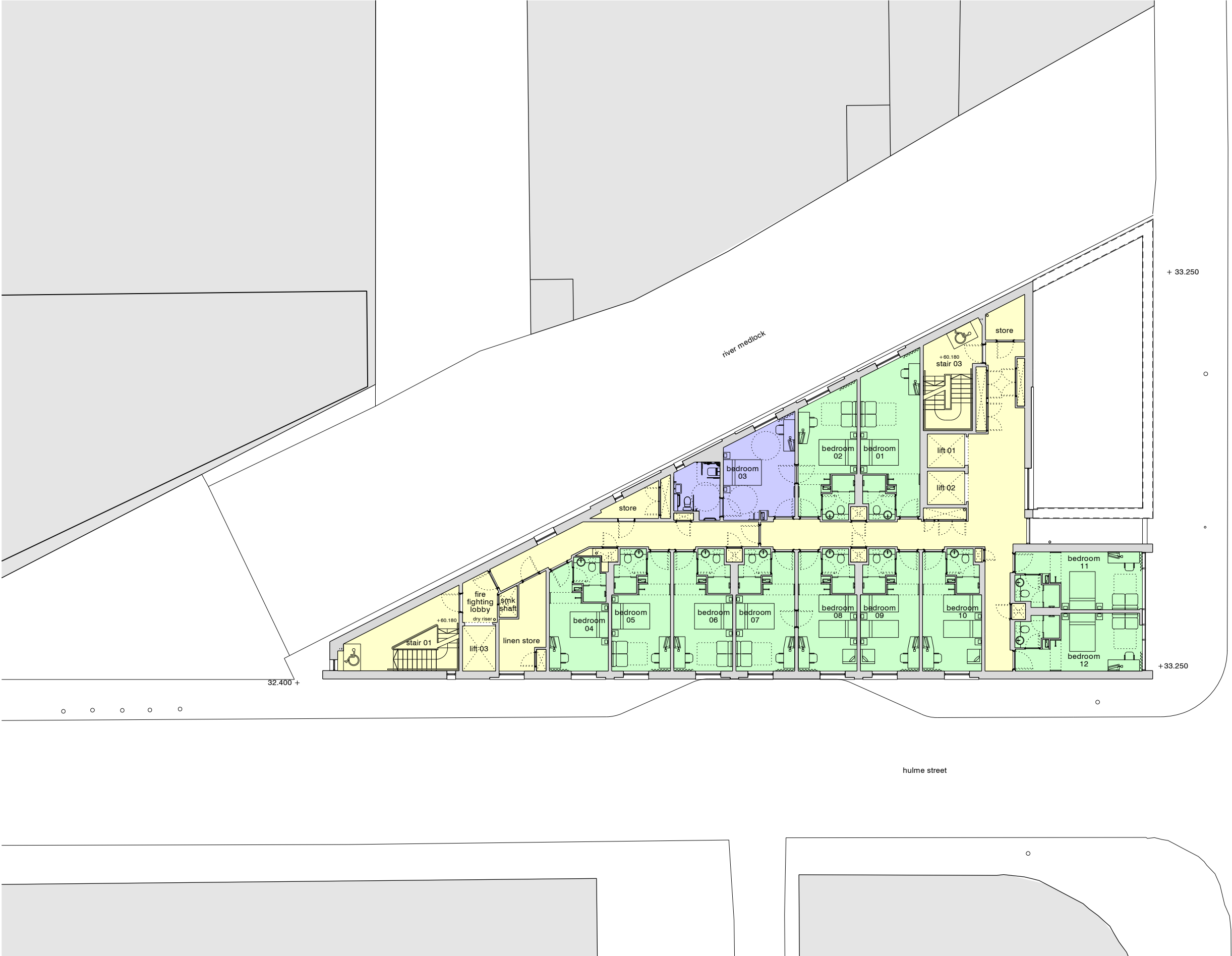
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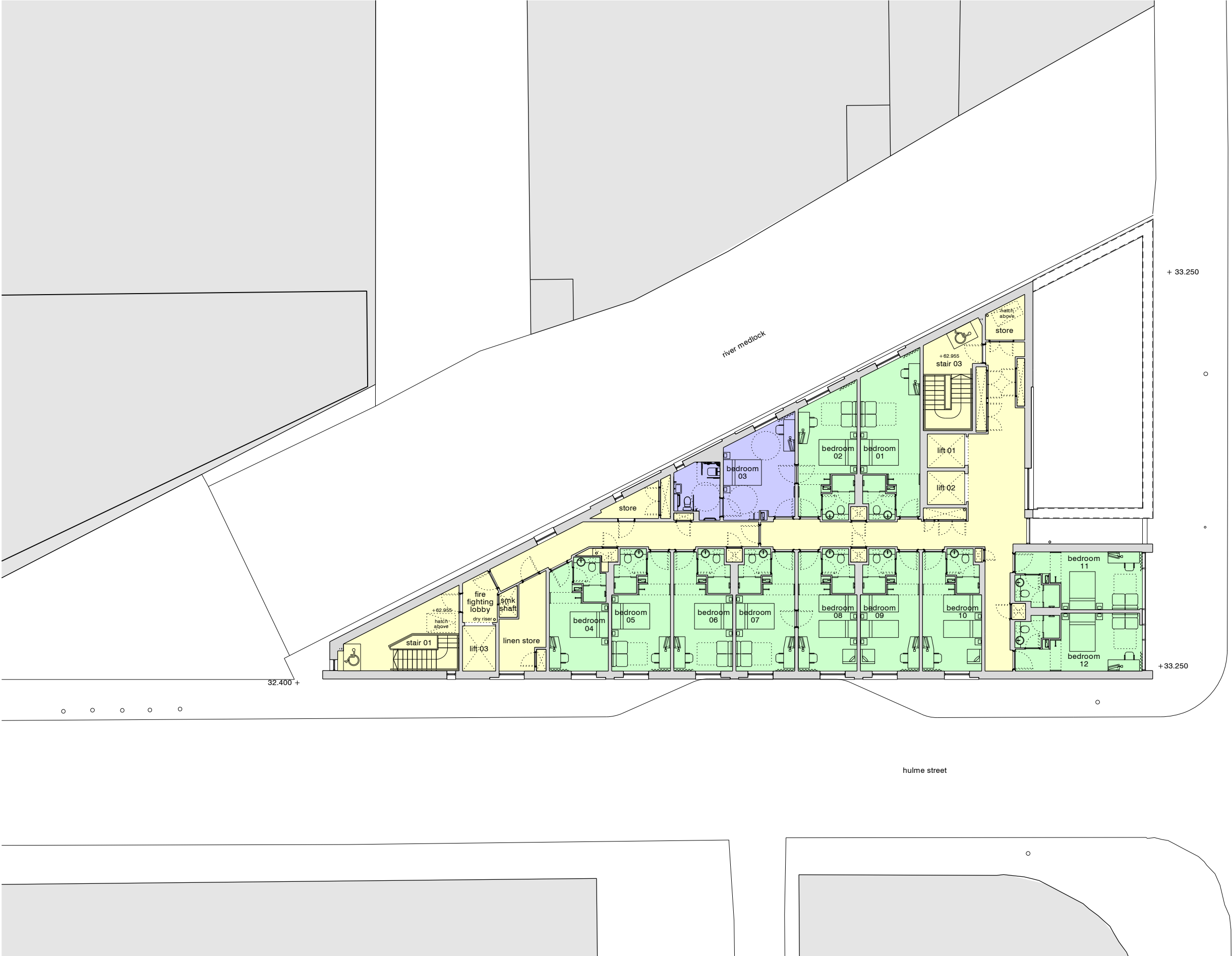
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- back of house / circulation
- retail
- plant spaces
- standard bedrooms
- accessible bedrooms



project
Holiday Inn Express
job no.
7612
title
existing floor plan - level 09
scale
1:200 @ A3
drawing no.
7612-al(02)0009

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hotel front of house
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project
Holiday Inn Express

job no.
7612

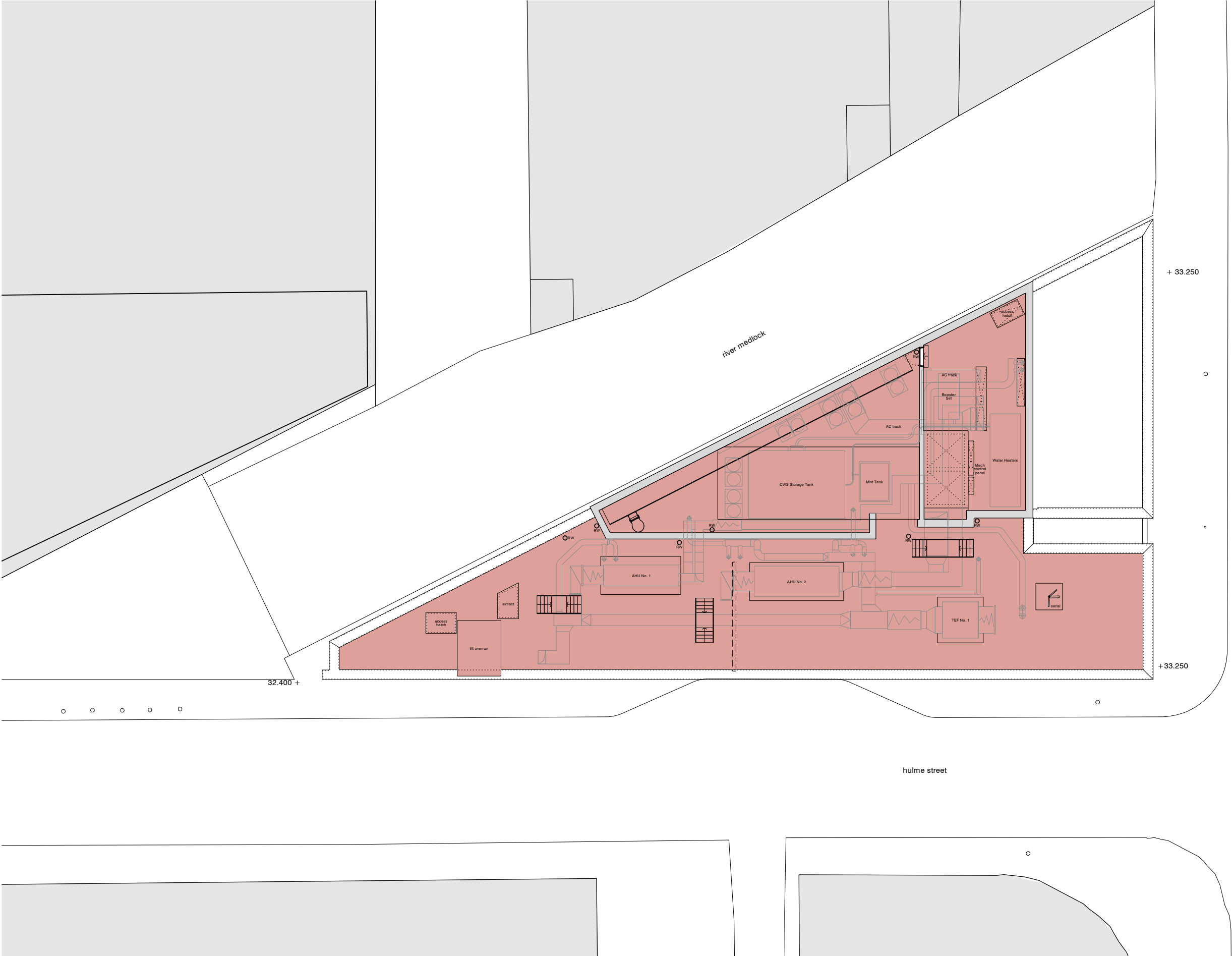
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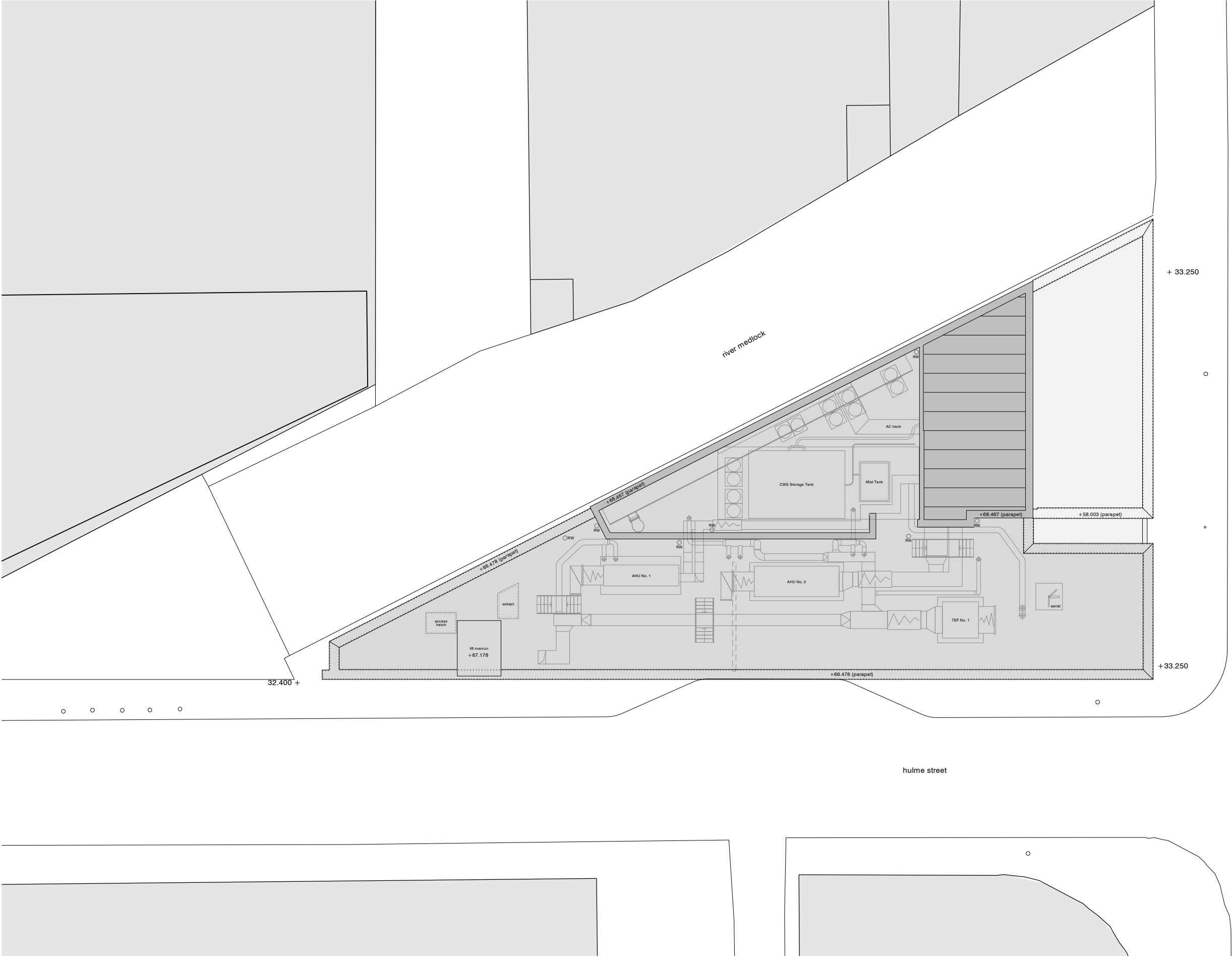
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- back of house / circulation
- retail
- plant spaces
- standard bedrooms
- accessible bedrooms



project
Holiday Inn Express
job no.
7612
title
existing floor plan - level 11
scale
1:200 @ A3
drawing no.
7612-al(02)0011

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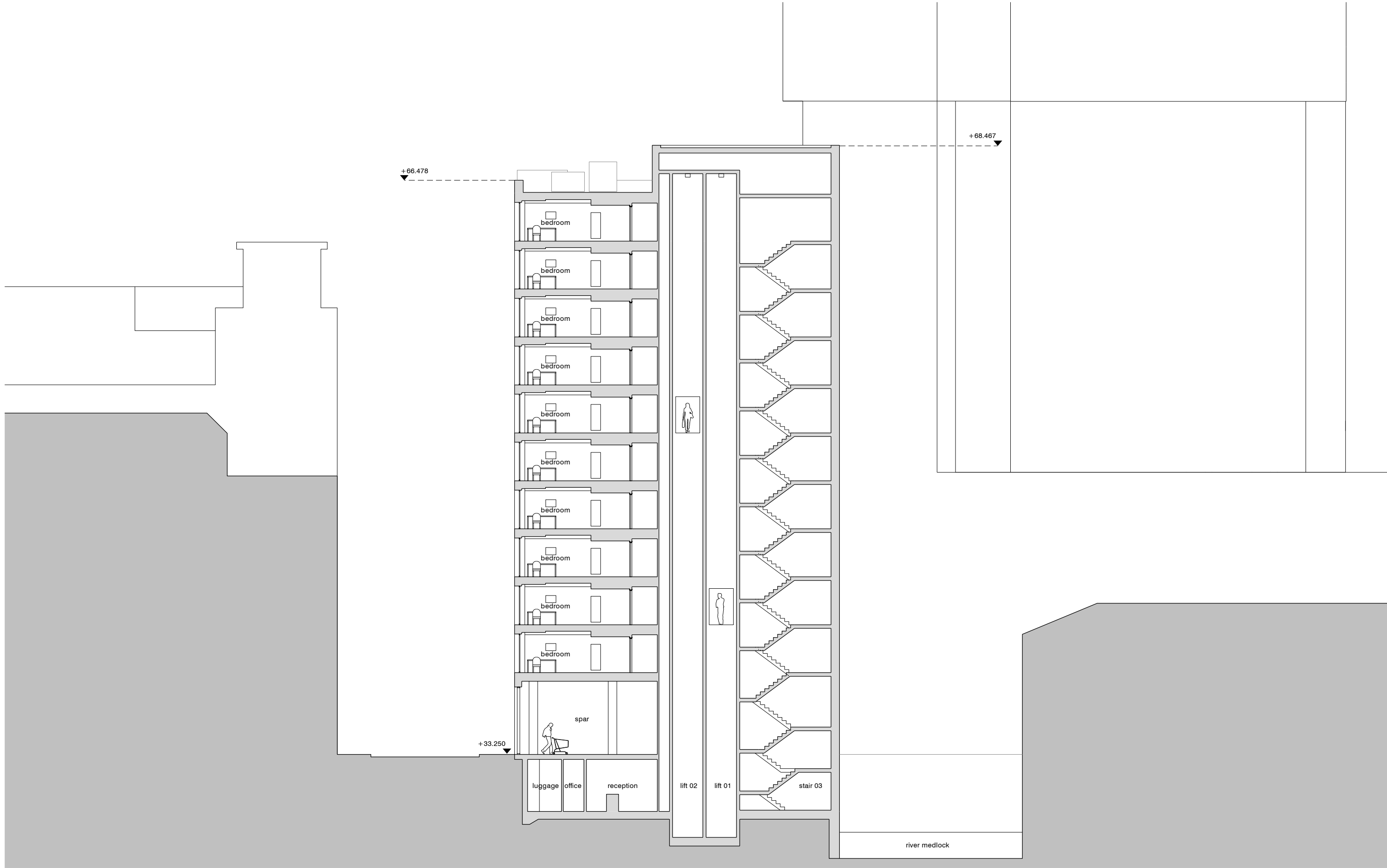
revision: P01 date: 2024.02.26 note: preliminary first issue

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back of house / circulation
retail
plant spaces
standard bedrooms
accessible bedrooms

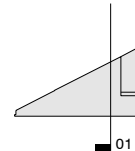


project
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job no.
7612
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existing roof plan
scale
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drawing no.
7612-al(02)0012

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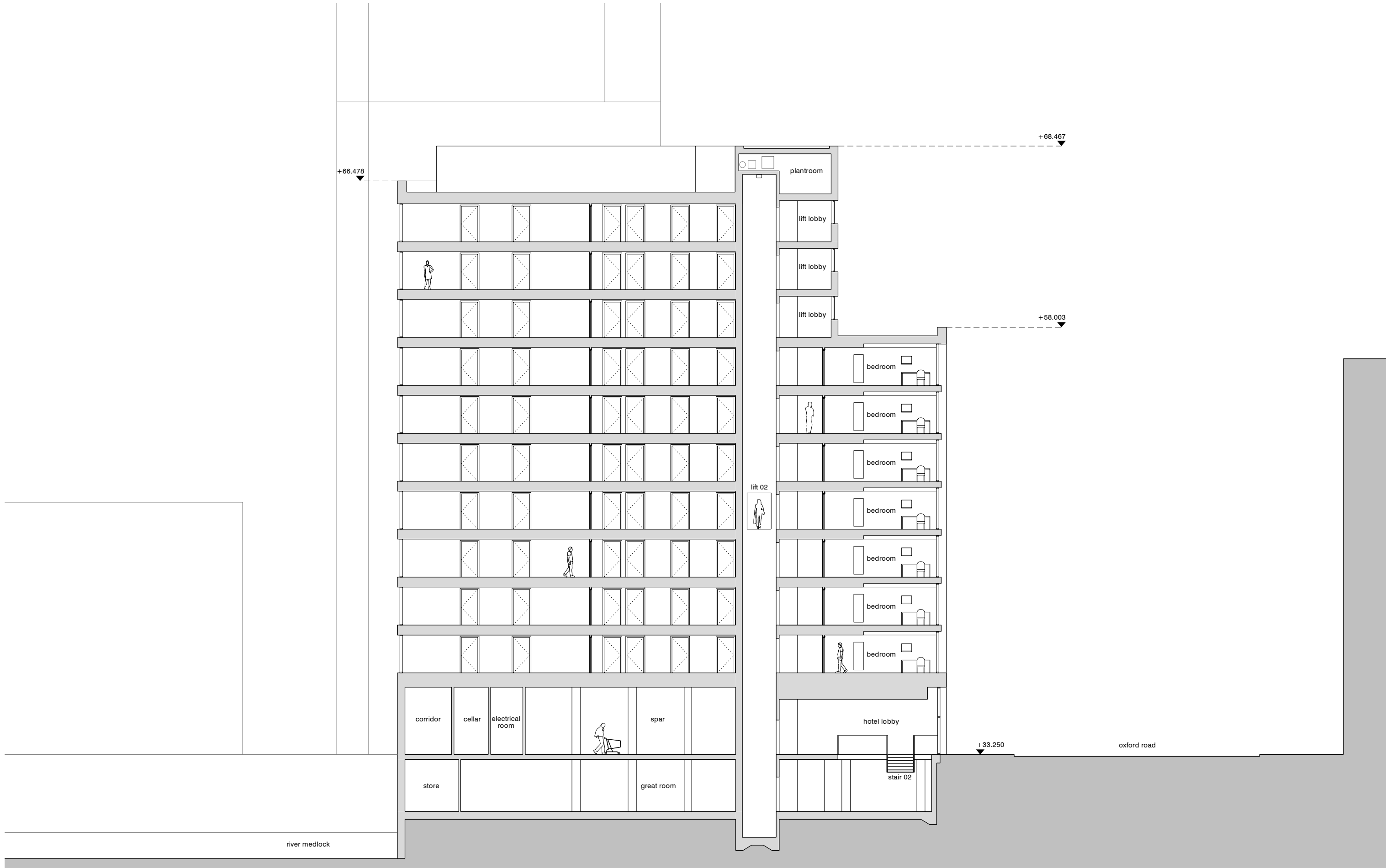
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date: 2024.02.26
note: preliminary first issue



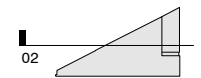
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Holiday Inn Express
job no.
7612
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1:200 @ A3
drawing no.
al(02)2001

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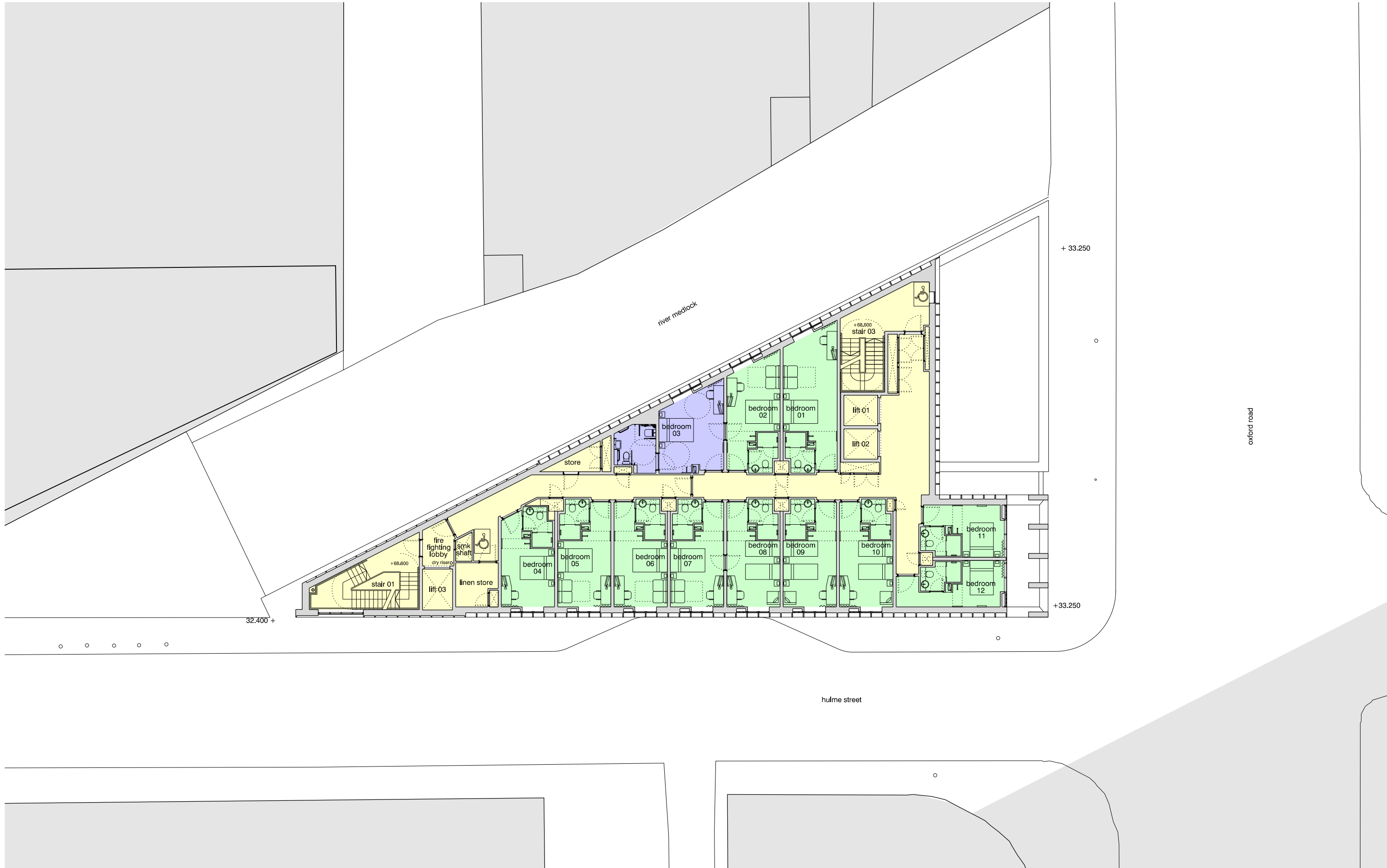
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job no.
7612
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drawing no.
al(02)2002

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APPENDIX B

ARCHITECT'S PROPOSED PLANS & SECTIONS



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P01	2024.02.26	preliminary first issue
P02	2025.09.24	updated to reflect planning comments

hotel front of house
back of house / circulation
retail
plant spaces
standard bedrooms
accessible bedrooms



project
Holiday Inn Express

job no.
7612

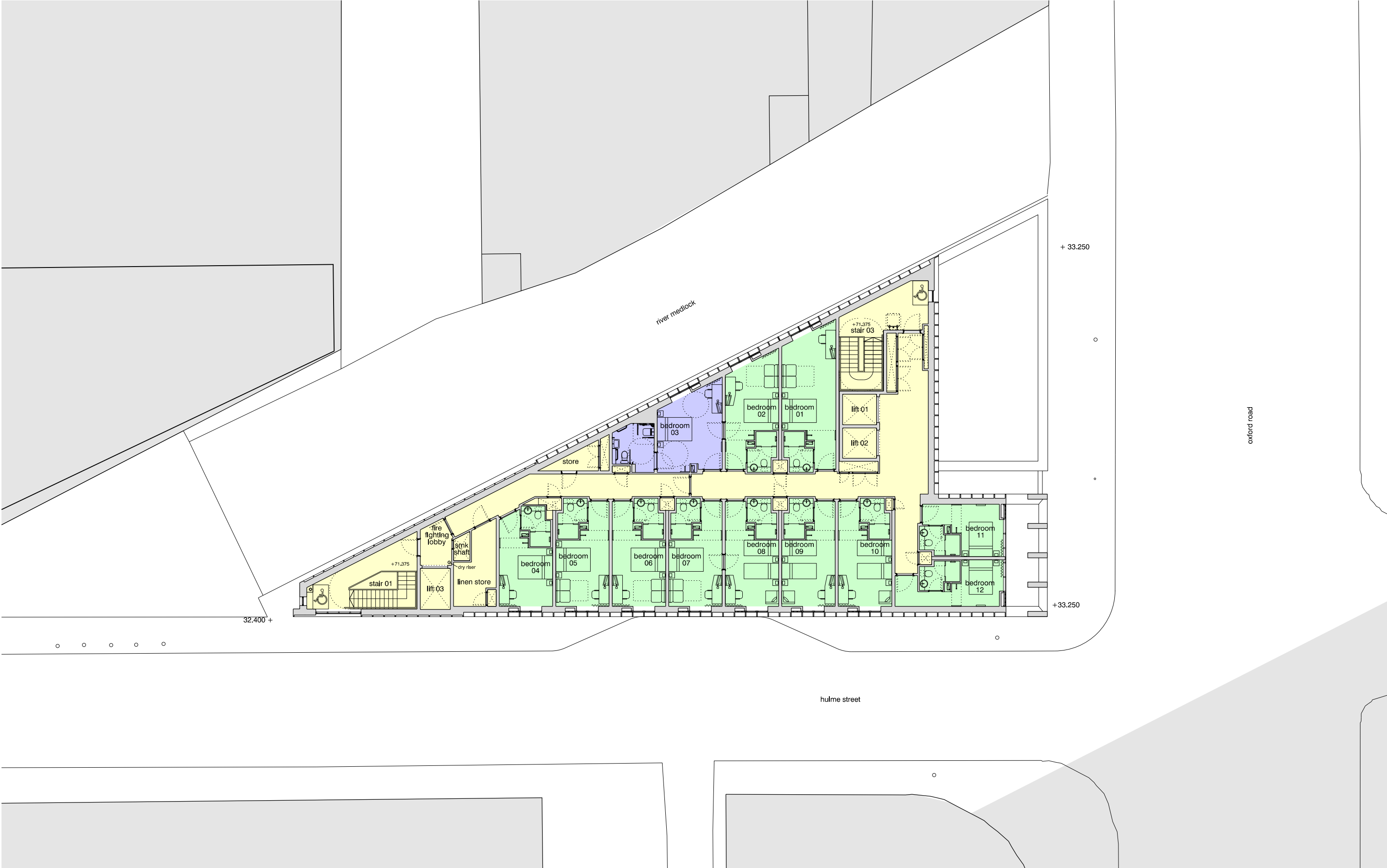
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proposed floor plan - level 12

scale
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drawing no.
7612-al(04)0012

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P02	2025.09.24	updated to reflect planning comments

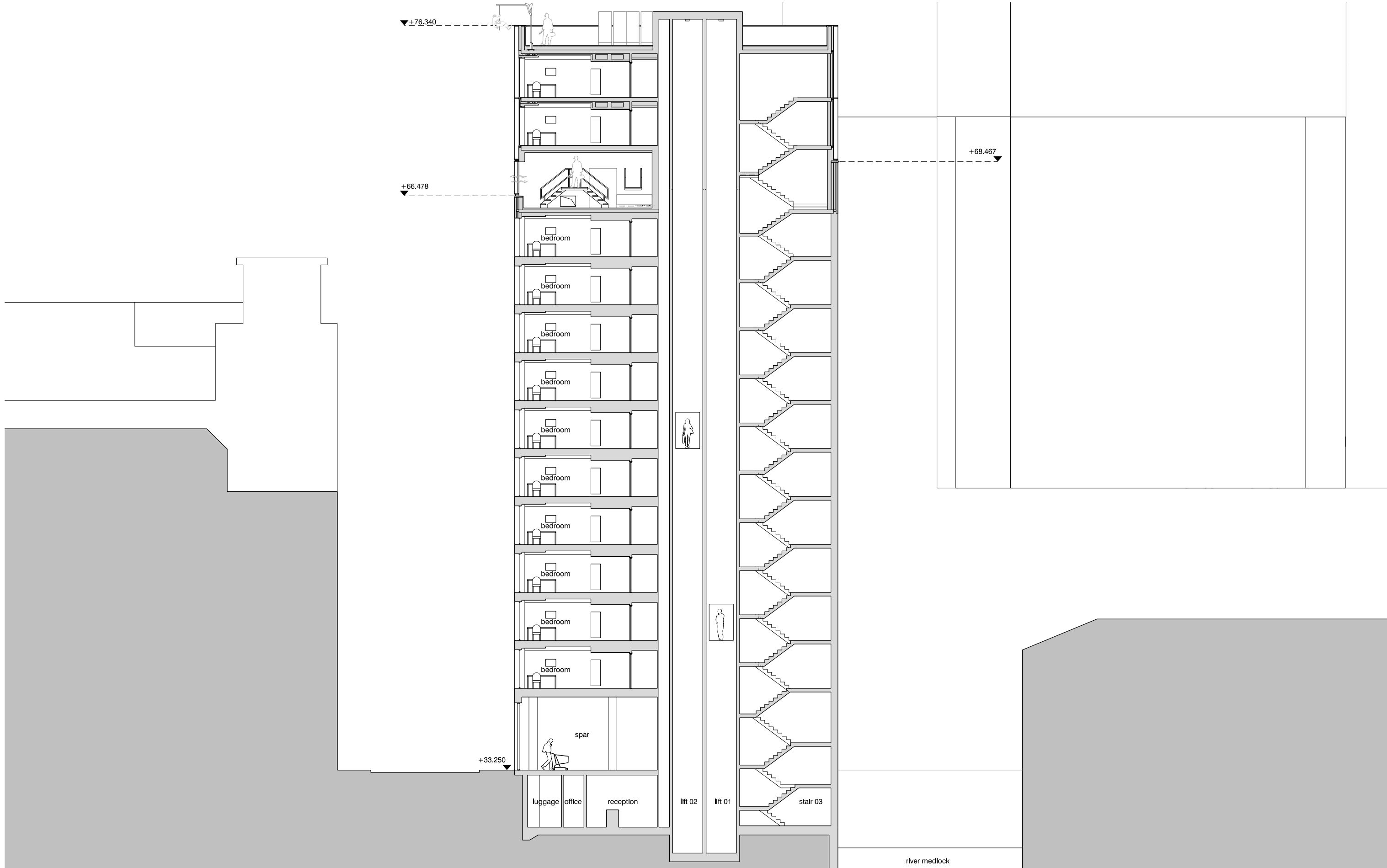
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retail
plant spaces
standard bedrooms
accessible bedrooms



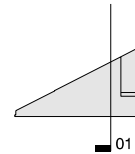
project
Holiday Inn Express
job no.
7612
title
proposed floor plan - level 13
scale
1:200 @ A3
drawing no.
7612-al(04)0013

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P02	2025.09.24	updated to reflect planning comments



project
Holiday Inn Express
job no.
7612
title
proposed section 01
scale
1:200 @ A3
drawing no.
al(04)2001

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STUDIO

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4 commercial street
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APPENDIX C

SITE INVESTIGATIONS

PLANNING		
ACK'D		
REPLIED		
RECD 16 NOV 2007		
M	DATE	
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EOL ACTION		

Phase I Investigation (Desk Study)
 at
Oxford Road, Manchester
 for
 Property Solutions (Oxford Road) Ltd

Engineer
 Scott Hughes Design

Project No : PN061372
 November 2006

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Phase I Investigation (Desk Study)

at

Oxford Road,
MANCHESTER

DRAFT

Project No : PN061372
November 2006

1.0 PURPOSE AND AIMS OF STUDY

A geoenvironmental desk study was undertaken by Geotechnics Ltd at the site of a proposed new build residential development in Manchester. The investigation was carried out to the instructions of Mr I Scott of Scott Hughes Design, acting on behalf of the Client, Property Solutions (Oxford Road) Ltd. This report describes the work undertaken and presents the data obtained together with an evaluation of their significance in relation to the proposed works. A schedule of works is presented with respect to the required Phase 2 Site Investigation.

The object of the desk study was to obtain information on ground and groundwater conditions relating to the design of the proposed works within the limitations posed by the incomplete, and in some cases inaccurate, readily available source data.

For this study the following information has been utilised:

1. 1:63360 Geological Sheet No 85, Manchester, (Drift Edition), 1970
2. 1:50,000 Geological Sheet No 85, Manchester (Solid Edition) 1975
3. Geological Memoir "The Geology of Manchester and the South East Lancashire Coal field", 1931
4. British Regional Geology Guide, The Geology of the Pennines and Adjacent Areas, 3rd Edition 1954
5. Hydro-geological Map of England & Wales, 1:625,000, 1977.
6. Hydro-geological Map of Clwyd and the Cheshire Basin, 1:100,000, 1989
7. Landmark Envirocheck Report Ref No EC20541226-1-1 November, 2006
8. Web based archive material
9. Department of the Environment, Industry Profile for "Miscellaneous Industries incorporating.....Printing and bookbinding Works"
10. British Geological Survey Borehole

Records, Refs SJ89NW:245, 3273, 107 & 106.

11. Coal Authority "Coal & Brine" Report ref 00066735-06
12. Previous Geotechnics Boreholes in the near vicinity

2.0 PRESENTATION

A description of the site and a summary of the procedures followed during the investigation process are presented in Section 3. The data obtained are presented in Appendices 2 to 4 of this report.

An interpretation of the data obtained is presented in Sections 5 and 6. Recommendations for intrusive investigation works are given in Section 7.

Attention is drawn to the General Notes and Investigation Procedures presented in Appendix 5 to aid an understanding of the procedures followed and the context in which the report should be read.

3.0 THE SITE

3.1 Location

The site is located in the centre of Manchester, approximately 2km south of Victoria Station, and a short distance north of the A57M Mancunian Way.

The approximate Ordnance Survey National Grid Reference for the centre of the site is SJ 841 975 and an extract from the relevant 1:50,000 Scale O.S. Map is included as Appendix 1.

3.2 Description

An initial walk over of the site revealed the following with respect to the sites current condition and surrounding land uses:

The site occupies a triangular plot of land situated at the junction of Oxford Road, and Hulme Street near Manchester city centre. The rear of the site abuts the River Medlock which runs in a trained section

from north east to south west. The local topography is such that the site occupies the bottom of a basin with ground sloping upwards away from the site in both north westerly (towards the City Centre), and south easterly directions.

The existing building is a multi storey property of substantial age, with a basement.

Details of the current site layout are given on the current mapping included in the Envirocheck Report in Appendix 2.

The site is currently part occupied by a Spar shop, and a commercial premises known as Charles Hadfield.

4.0 ENVIRONMENTAL SETTING

4.1 Geology, Hydro-geology and Hydrology

4.1.1 Superficial Geology

As with any urban setting a veneer of Made Ground is anticipated to lie above the natural superficial strata.

The Drift Edition Geological Map shows the site to lie in an area where Late Glacial Flood Gravels are expected to overlie Boulder Clay (Glacial Till).

Geotechnics Ltd have undertaken a number of investigations in the general area, and the information obtained from that data is summarised in the table below:

Location Grid Ref	Distance from site	Direction from site	Ground Conditions
SJ844969	600m	SE	2.7—3.4m of Made Ground over Sandstone
SJ850965	1050m	SE	1.2-3.8m of Made Ground over glacial till, mudstone bedrock between 7.2 and 11.5m depth
SJ835871	750m	ESE	0.65-2.7m of Made Ground, with intermittent alluvium to a depth of 1.0m. Sand and Gravel to depths of 5.4 to 5.8m overlying glacial till. Bedrock encountered between 8.5 and 9.4m
SJ839983	650m	WNW	Thin Made Ground over intermittent alluvium (maximum 1.0m deep) over glacial till. Weathered rock at 9.80m, with intact strata (sandstone) at about 11.0m

SJ975829	1350m	W	Thin Made Ground (0.15 to 1.0m) over soft alluvial clays, bedrock (sandstone) at shallow depth (3.0-4.2m)
SJ974835	600m	NW	Made Ground (1.5 -2.0m) over sandstone bedrock
SJ835985	1050m	NW	Made Ground between 1.0 and up to 4.25m depth, over sand, base at 5.0m, over sandstone
SJ833981	1000m	NW	Made Ground between 2.2 and 13.2m! deep over sandstone.

Borehole information obtained from the British Geological Survey is included in Appendix 3. This indicates the following:

Ref SJ89NW245 – Record 1944 boring at "Dunlop Rubber Company No 2 Well" and show standing water level at 15ft below surface, yielding 5000 gallons of water per hour, drawing down to 25feet below surface.

Ref SJ89NW245 – Record of 1944 boring at "Dunlop Rubber Company No 1 Well" showing water level 80 feet below surface, yielding 17,000 gallons per hour

Ref SJ89/209 – 1971 Record of Observation Well at Oxford Road Station. The aquifer is recorded as being "Bunter Sandstone"

Ref SJ89NW 104-108 Records of manhole excavations including "Near corner of Hulme Street and Oxford Road" which indicates the following strata:

Stratum	Thickness	Depth (bgl)
Brown clay earth	0.76m	0.76m
Gravel	1.07m	1.83m
Clay	6.10m	7.93m
Running Sand	0.91m	8.84m

Groundwater was encountered (described as "water line") at 7.93m at the base of the Clay stratum.

The BGS hold further records in the area belonging to Strata Surveys Ltd – but these are held on a Confidential basis.

4.1.2 Solid Geology

The Solid Edition Geological Map records the presence of Triassic "Bunter Sandstone" as the bedrock locally. This stratum is now more correctly labelled as the Sherwood Sandstone.

The Geological Memoir records the following general description for these rocks:

...the rock is a dull red sandstone with rare orange patches, and is for the most part devoid of pebbles. A few of the latter are however occasionally seen and these are the usual well rounded and sub angular quartzite types. Cross bedding at angles of 14-20 degrees may be seen and millet seed grains are fairly common

The West Manchester Fault runs through the site with a north west to south easterly trend, downthrowing strata to the east.

The Geological map indicates that the strata beneath the Bunter Sandstone are likely to comprise, in succession, the Manchester Marls, the Collyhurst Sandstone, and at depth the Ardwick Group of the Coal Measures.

The presence of the fault causes a sliver of the deeper Manchester Marl to be brought to outcrop immediately west of the fault.

The Geological Memoir records the following with respect to the Manchester Marl:

.....they are in the main red, with occasional alternations of green beds....lenticular beds of limestone are of frequent occurrence in the lower half of the Marls. These limestones may be highly calcareous marls, dolomitic limestones, or red stained non-magnesian limestones.

The consequence of this faulting therefore is the raising, to much nearer the surface, of the underlying Coal Measures strata.

A section on the published Geological map shows the effects of this in the vicinity of Oxford Road, and the Ardwick Group of the Coal Measures are indicated to lie at relatively shallow depth.

The following sketch section (Figure 2, NB not to scale) indicates the broad stratigraphy outlined above:

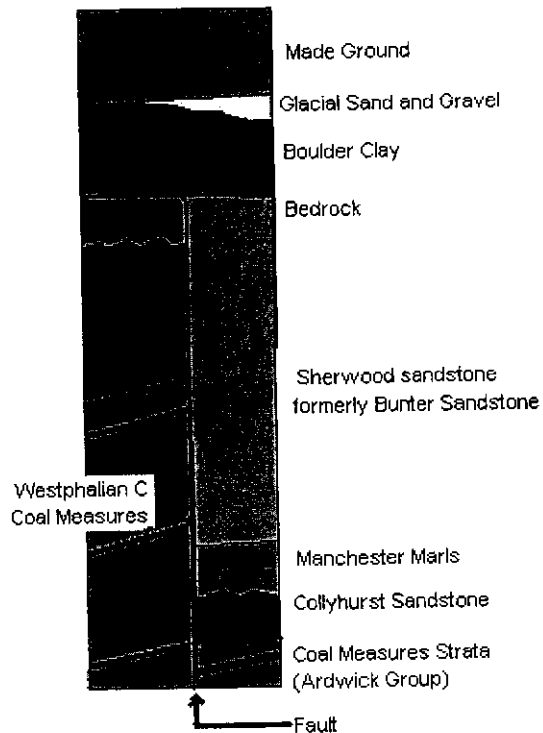


Fig1 – General Stratigraphy

4.1.3 Hydrology

The 1:100,000 Map of Clwyd and the Cheshire Basin indicates average rainfall in the general area for the period 1941 to 1970 to be between 800-900mm per annum. The nearest water feature to the site is the River Medlock which runs along the north western boundary of the site.

The site lies within the boundary of an area defined by the Environment Agency as being at risk from flooding.

The River Medlock is recorded as being of River Quality E, and to have a flow volume of less than 0.31 cumecs.

4.1.4 Hydrogeology

The 1:100,000 Map of Clwyd and the Cheshire Basin records the presence of Till drift deposits, with Sherwood Sandstone Group strata comprising the local solid geology.

A contour line is shown relating to the potentiometric surface of the Sherwood Sandstone Group in metres relative to Ordnance Datum. This indicates an elevation of approximately 23m OD in the vicinity of the site.

The Sherwood Sandstone is classified as a "Major Aquifer" deemed to be Highly Permeable, whilst the Manchester Marl is recorded as a Non aquifer (Negligibly permeable).

The soils in the area are recorded as being of "High Leaching Potential" as a worst case assumption, based on the local, predominantly urban, environment.

4.2 Coal Workings, Mining, Quarrying

The Envirocheck Report is equivocal with respect to this aspect of ground stability with the risk of Shallow Mining Hazards recorded as "No Hazard", but the site also recorded to lie in "an area which may be affected by coal mining activity".

A Coal Authority report has been obtained and this records the following:

- The property is not in the likely zone of influence of any past underground coal workings, nor of any present workings
- The property is not in an area where future workings are currently planned, although reserves do exist
- There are no coal mine entries recorded within 20 metres of the site
- There are no faults or other lines of weakness caused by coal mining that have made the property unstable
- The site is not affected by past, present or planned future opencast mining
- The Coal Authority has not received any stop notice or claim since January 1984, nor has it received any request to carry out works under section 33 of the Coal Mining Subsidence Act.
- There is no record of any gas emission, nor of any remedial works associated with any Emergency Call out.

The full Coal Authority Report is included in Appendix 4.

4.3 Local Authority Information: prescribed processes, hazardous substances etc

There are two Local Authority Air Pollution Controls within 500m of the site, associated with activities at Dunlop Ltd (Authorisation revoked), and Jessop & Baird (Authorisation has varied). These are

located, respectively 289m and 432m south west of the site.

4.4 Environment Agency Information: Abstractions, water quality, Integrated Pollution Controls etc

4.4.1 Discharge Consents

The River Medlock is listed as the receiving water for a number of discharges including Storm Sewage Overflows and Surface water drainage. These include a number which appear to originate within, or close to the site itself. In total there are seventeen listed discharge consents within 250m of the site.

4.4.2 Registered Radio-active Substances

Within 500m of the site there are nineteen registered records of radioactive substances all related to academic institutions at Manchester Metropolitan University, UMIST and the University of Manchester

4.4.3 Pollution Incidents to Controlled Waters

There are three 3 Category 3 (Minor) Incidents recorded within 250m of the site, involving a blocked sewer, accidental spillage and diesel spill.

There is a single Category 1 (Major) Incident within 1km of the site relating to pollution of the River Mersey catchment with sewage.

4.4.4 Water Abstractions

There are two water abstractions listed within 500m of the site relating to Dunlop Rubber Co (266m SW) and North Western Electricity Board (280m N). These are both recorded as being revoked.

Within 1km of the site there is a further abstraction for cooling water at George St (578m N) for BT plc.

4.4.5 Licensed Waste Management Facilities

There is a single Waste Management Facility in the near vicinity of the site, located at Great Marlborough Street, approximately 155m west of the site. This relates to a mobile plant licence.

4.5 Current and Recent Site Use and Surrounding Land Uses

4.5.1 Current Contaminative Site Use

The following list records the contemporary trade activities within 50m of the site – arbitrarily deemed to represent "on site" activity:

Bookbind: Bookbinders (inactive).

4.5.2 Surrounding Contaminative Land Use

The following list records the contemporary (active) trade activities between 51m and 250m of the site – arbitrarily deemed to represent "surrounding" activity:

Carpet and rug manufacture, Garage Services, Car body repairs, T-shirts, Injection Moulding (plastics), Air Conditioning systems, Sheet metal work, Railways, Machine tools, Medical/Dental laboratories, Commercial cleaning.

There is a single (now obsolete) Fuel station entry within 500m of the site (Ormond Street Motors) which was located 124m south west of the site.

4.6 Site History

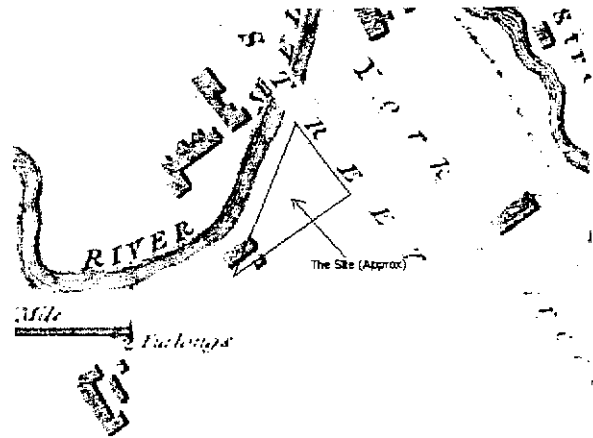
The earliest available site history relates to secondary material gathered from web based searches, and predates the First Edition Ordnance Survey Mapping of 1848.

The available information is summarised below in broad chronological order:



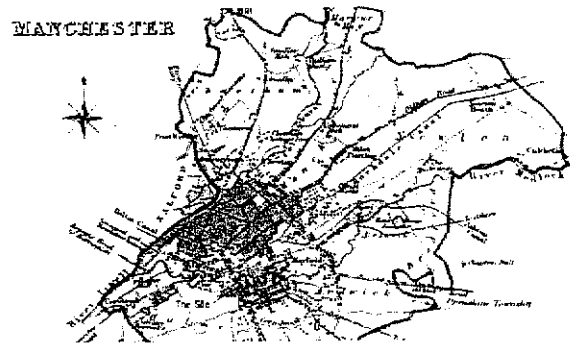
1788

On the 1788 map (above) the Oxford Street crossing of the River Irwell can be identified, together with the road layout to the south of the site (NB this map has south to the top). No detail with respect to the presence of any buildings in the immediate vicinity of the site is apparent.



1801

By the time of the 1801 map a number of small buildings are apparent on the north bank of the River Medlock, together with two small buildings situated near the south western corner of the site.



1835

By 1835 the site is seen to be enclosed by the growing Manchester urban area, with no actual detail identifiable with respect to the developments on or around the site itself.

The next available information is the First Edition 1:10560 OS Sheet of 1848. This, and subsequent remaining historical records are included in Appendix 5.

On the 1848 map the site appears to be developed along the Oxford Road frontage, but to be undeveloped behind. The surrounding area to the south and south west is given over to a large systematically laid out terrace style residential area. To the north and west the Medlock valley is seen to be the site of a number of industrial developments.

By the time of the 1896 map the site appears to be occupied by a single structure, with the distinctive triangular plan apparent. Hulme Street has been constructed immediately south of the site, with the River Medlock having been culverted from a point at the site's south western corner. Considerable urban infill development is apparent since the previous map.

The 1908 map is the first map available at 1:2,500 scale. This shows the site's familiar triangular shape but this is seen to be sub divided into a number of small units with three units fronting on to Oxford Road, and 4 fronting on to Hulme Street. The immediate area is seen to be associated with the textile industry with underwear manufacture, cotton waste milling, and finishing works in evidence. Approximately 300m west of the site are tanks and chimneys associated with the Cambridge Street India Rubber Works. No significant change is apparent on the 1909 1:10,560 map, the 1922 1:2,500 map or on the 1938 1:10560 map.

The 1948, 1950, 1954 and 1955 1:1250 maps record the site to be occupied by a single unit, recorded as a printing works. Across Hulme Street from the site is an additional print works building. Elsewhere the rubber works can be seen to be much expanded, and to be under the Dunlop Rubber Works banner. Immediately across the River Medlock from the site are a number of Warehouse buildings, a garage premises and a timber works.

There is no significant change apparent on the 1:10560 map of 1956.

The 1962 and 1965 maps record both the former Printing Works now only as "Works". There is substantial clearance of the former terraced housing stock south of Chester Street, to the south of the site.

The Printing Works are again labelled as such on the 1969, 1970 and 1972 maps which also show extensive new building (John Dalton College of Technology) on the area of former terraced housing south of Chester Street. These maps also show the construction of the elevated Mancunian Way 200m south of the site.

The 1975 map records construction of Television Studios across Oxford Road from the site. No significant change is apparent on the subsequent 1978 or 1980 maps.

The 1985 map records the demolition of the former Printing Works to the south of Hulme Street, this now being replaced by an area given over to Car Parking.

On the 1987 map the building on the site is no longer recorded as a Printing Works. No significant change is apparent on the 1990, 1992, 1994, 1995 or 2004 maps.

4.7 Geotechnical / foundation risks

The following table summarises the findings of the Envirocheck Report:

Risk	Comment
Collapsible Ground	No Hazard
Compressible Ground	No Hazard
Ground Dissolution	No Hazard
Landslide	Very Low Hazard
Running Sand	Very Low Hazard
Shrinking / Swelling Clay	No hazard (becoming very low immediately east of the site)
Radon	Less than 1% of homes above Action Level, and no radon protection measures necessary

It should be noted however that one of the BGS records (SJ89NW107 – near corner of Hulme Street and Oxford Road) does record "Running Sand" below the water table (at 7.93m depth).

5.0 PRELIMINARY RISK ASSESSMENT

5.1 Source Pathway Receptor Methodology

The existing legal framework for addressing contaminated land, in the context of new build development works, utilises the Source – Pathway - Receptor methodology, along with a Fit for Purpose Criterion.

This utilises the Phase 1 (and any subsequent Phase 2) investigation to establish the presence of both a source and potential receptors. A risk is seen to be present if the Conceptual Model allows a significant Pollutant Linkage or Pathway between Source and Receptor.

The subsequent remediation recommendations are then based on breaking the pollutant pathway between source and receptor. This can be done by:

- Removing , or immobilising the source
- Closing any pollutant pathway

- Removing, or isolating, potential receptors

5.2 Potential Contaminant Sources

In this instance the following significant potential past land uses and the following potential contaminants identified:

Past Land Use	Contaminants
General filling	Various, typically ash, metals
Bookbinding and printing	Metals and metalloids, inorganic ions, acids, organic solvents etc
Heating, electrical equipment etc	Fuel Oils, PCBs
Old structural fabric and insulation material	Asbestos

5.3 Potential Receptors Identified

The following receptors have been identified as being of concern:

- Construction Workers
- Controlled Waters
- Future Site Occupiers and Residents
- Elements of the Built Environment

5.4 Existing Pollutant Linkages

The following potential pollutant linkages have been identified as being of concern with the site in its current condition:

- Risk of ongoing leaching of material from Made Ground, and in particular old drainage runs to the River Medlock
- Exposure of casual site users to possible asbestos

6.0 PRELIMINARY CONCEPTUAL SITE MODEL

The section on the facing page summarises the conceptual site model developed during this initial desk study phase, and illustrates the significant pollutant linkages that will need to be addressed prior to development works commencing. As can be seen the key elements identified are:

- Leaching of contaminants from Made

Ground and drainage runs to the River Medlock

- Exposure of construction workers to contaminants in drain runs etc
- Exposure of construction workers to asbestos, during and following demolition of the existing structure

7.0 RECOMMENDATIONS FOR INTRUSIVE INVESTIGATION

The following investigation design is based on the assumption that in addition to the formal Phase 2 Contamination Investigation a full geotechnical design is also required.

The works which are required will include a full asbestos survey of the existing structure. This is outside the scope of the services offered by Geotechnics Ltd.

With regard to the works which are to be undertaken by Geotechnics Ltd we anticipate the investigation to comprise the following works:

Preliminary Works

These works are to be undertaken prior to demolition of the existing structure.

Two days hand digging with a two man digging crew and Supervising Engineer to establish existing foundations, investigate condition of River Wall, trace surface drainage runs and obtain samples of shallow sub soil for preliminary contamination testing.

Further Investigation

To be undertaken following demolition of the existing building. This work is to consist of 3 No cable percussion boreholes drilled (using aquifer protection measures if necessary) to prove bedrock. It is anticipated that approximately 15m of superficial deposits are present overlying bedrock.

Full chemical / contamination analysis is required this will be based on the following suite of tests:

Soil Screening Suite

Organic Contaminant Suite

Concrete Design Add-on

DRAFT

Leachability test – inorganic

Leachability test - organic

Written by:

.....
Keith Nicholls BSc MSc FIM³ MIQ MICE CEng
Principal Engineer

Checked by:

.....
Colin Dodd BSc MSc MICE CEng
Principal Engineer
Geotechnics Ltd: North West Office

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LOCATION		

Phase 2(i) Preliminary Intrusive Investigation
 at
Oxford Road, Manchester
 for
 Property Solutions (Oxford Road) Ltd

Engineer
 Scott Hughes Design

Project No : PN061372
 April 2007

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Phase 2(i) Preliminary Intrusive Investigation Report

at

**Oxford Road,
Manchester**

Project No : PN061372

April 2007

1.0 PURPOSE AND AIMS OF STUDY

A geoenvironmental ground investigation was undertaken by Geotechnics Ltd at the site of a proposed residential development located in Oxford Road, Manchester, as shown on the Site Location Plan in Appendix 1. The investigation was carried out to the instructions of Scott Hughes Design on behalf of the Client, Property Solutions (Oxford Road) Ltd.

This report describes the work undertaken and presents the data obtained together with an evaluation of their significance in relation to the proposed works.

The object of the investigation was to obtain information on ground and groundwater conditions relating to the design of the proposed works within the limitations posed by exploratory hole numbers, locations, depths, methods adopted and the scope of approved insitu and laboratory testing.

The Phase 2(i) Investigation Report followed an earlier Phase 1 (Desk Study) Report prepared by Geotechnics Ltd, and should only be read in conjunction with that report.

It is anticipated that a further phase (Phase 2ii) of intrusive investigation will be undertaken following demolition of the existing structure on the site. The Phase 2i investigation was undertaken with the existing building still in-situ, and investigation positions were therefore restricted by access considerations.

2.0 REVIEW OF PREVIOUS DATA

The previous desk study revealed the following key elements:

- The rear of the site abuts onto the trained

section of the River Medlock.

- The existing building includes a sub level Basement.
- The superficial geology is expected to consist of Made Ground overlying glacial natural strata (both sands and boulder clay).
- The underlying solid geology is expected to comprise a faulted section of rock, with either Manchester Marl or Sherwood Sandstone bedrock present beneath the site.
- The Sherwood Sandstone is considered to be a "Major Aquifer".
- It is not considered likely that coal mining hazards pose a threat to the development.
- The site has been part of the Manchester urban area since the Mid 19th Century. The existing buildings have been used as a printing works since at least the middle of the 20th Century.
- A preliminary Conceptual Model has been produced indicating the main potential pollutant linkages thought to be of concern, and this is represented in a sketch section of the following facing page. These are:
 1. Leaching of contaminants from Made Ground and drainage runs to the River Medlock
 2. Exposure of construction workers to contaminants in drain runs etc
 3. Exposure of construction workers to asbestos, during and following demolition of the existing structure.
 4. Potential gassing from degrading materials in Made Ground

3.0 SITE INVESTIGATION METHODOLOGY

3.1 General

The procedures followed in this site investigation are based on BS 5930 (1999) - *Code of Practice for Site Investigations*. Where relevant, the general

requirements and principles outlined in BS10175: (2001), Investigation of potentially contaminated sites – Code of Practice, have also been adhered to. The site was designated as a yellow site (SISG definition) during the course of the works and appropriate working methods adopted.

All the work was carried out under the direction of Geotechnics engineering staff.

The Trial Pit and Window Sample Records are included in Appendices 3 and 4, and the approximate positions of the investigation points are shown on the Exploratory Hole Location Plan in Appendix 2.

It should be noted that the levels shown on the Window Sample and Trial Pit Records were not related to Ordnance Datum and the depths quoted are in metres below the local basement floor level. This is located at a significant depth (of the order of 3m) below the local external ground level.

The positions of the exploratory holes were determined with reference to the Phase 1 Desk Study Report, and were targeted as follows:

Exploratory Hole	Target
WS1	Ground beneath Existing basement
WS2	Ground beneath Existing basement
TP1	Existing foundation – Hulme Street side
TP2	Existing Foundation – River Medlock side
TP3	Existing basement floor

3.2 Hand dug pits

Three (3 No) hand dug pits were excavated to depths of between 0.45m and 1.20m below basement floor level. The work was carried out on 22nd and 23rd February 2007.

Small disturbed samples were obtained at intervals from the excavated soil where possible. Note was made of ground stability characteristics and ground water observations where appropriate. On completion of the works pits were backfilled with arisings.

3.3 Window Sampling

Two (2 No) Window Sample Boreholes were undertaken to depths of 1.90m and 4.30m below

basement floor level. The work was carried out on 23rd February 2007.

The Window Samples were taken using a hand held percussive device which drives lined steel tubes into the ground in 1m lengths. Samples are retrieved in the plastic liners. The hole is not cased and progress depends on the nature of the strata penetrated.

The recovered liners were sealed on site prior to transportation to Geotechnics Ltd stores for logging and sub sampling.

4.0 LABORATORY TESTING

Selected samples of soil were tested in external laboratories for a number of determinands in order to check on any potential site contamination. Where appropriate, the testing was undertaken under MCERTS conditions, at Alcontrol Geochem's laboratory in Chester.

The determinands were based on an in house general contamination screening suite derived from the available DEFRA SGVs and BRE Guidance on Sub Surface Concrete. The following were analysed:-

Arsenic
Cadmium
Chromium
Mercury
Nickel
Selenium
Lead
Copper
Zinc
pH
Soil Organic Matter
Water Soluble Sulphate
Acid Soluble Sulphate
Magnesium
Chloride
Nitrate
Total Sulphur

In addition testing was undertaken on samples of soil subject to leachate extraction. In this case the following suite of analysis was undertaken:

Dissolved Arsenic
Dissolved Cadmium
Dissolved Chromium
Dissolved Boron
Dissolved Nickel

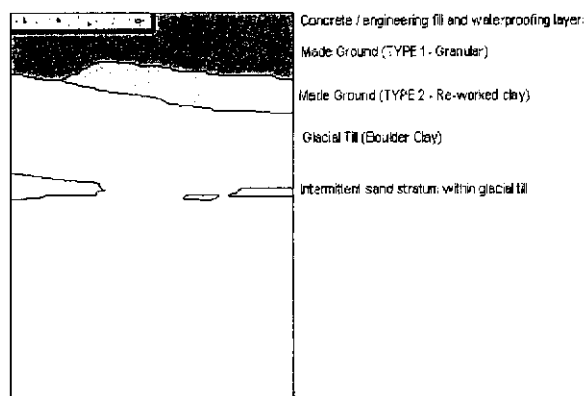
Dissolved Selenium
Dissolved Lead
Dissolved Copper
Dissolved Zinc
pH
Sulphate

The results are tabulated in Appendix 5.

5.0 GROUND CONDITIONS PROVEN

5.1 Superficial Geology

The following sketch illustrates the superficial geology encountered during this preliminary phase of intrusive investigation:



The Made Ground sequence encountered is rather complex, and reflects the presence of the trained section of the River Medlock at the rear of the site. Beneath the existing concrete floor slab a bitumen based waterproofing layer is present, together with engineering fill / Made Ground of two main types:

1. Essentially granular materials, sand and gravel with cobbles of brick concrete
2. Essentially cohesive materials, comprising reworked clay

The natural stratum encountered (at between 0.70m and 2.80m below local ground level in the two Window Sample bore holes) was a firm, becoming stiff, grey or brown clay.

A single occurrence of a fine to medium silty sand was recorded between 3.60m and 3.85m below local ground level.

5.2 Solid Geology

The underlying bedrock was not encountered during the course of the investigation works.

5.3 Groundwater Regime

Trial Hole TP3 was abandoned due to rapid ingress of groundwater at a depth of 0.45m below the basement floor slab level. None of the other pits or borings encountered groundwater. At this stage it is not clear whether this reflects the presence of a drain or similar feature, at the TP3 position, or whether this reflects the presence of the local water table, associated with the River Medlock.

In this latter case the dry condition of the remaining pits and borings demonstrates the effectiveness of the historic engineering works in controlling the local groundwater table.

5.4 Gas

This aspect of the required investigation will be covered in the subsequent Phase 2ii investigation.

6.0 CONCEPTUAL SITE MODEL

The information described above is shown in a sketch cross section on the facing page. Whilst somewhat over simplified in comparison with the real situation this broad conceptual model is a useful tool in visualising the key contaminant pathways.

This has been updated from the Preliminary Conceptual Model described in our Phase 1 Investigation Report and shown earlier in this report.

7.0 RISK ASSESSMENT

The existing legal framework for addressing contaminated land, in the context of new build development works, utilises the Source - Pathway - Receptor methodology, along with a Fit for Purpose Criterion.

This utilises the Phase 1 and Phase 2 investigation processes to establish the presence of both a source and potential receptors. A risk is seen to be present if the Conceptual Model allows a significant Pollutant Linkage or Pathway between Source and Receptor.

The subsequent remediation recommendations are then based on breaking the pollutant pathway between source and receptor. This can be done by:

- Removing, or immobilising the source
- Closing any pollutant pathway
- Removing, or isolating, potential receptors

The data obtained from the laboratory has been reviewed and the following points should be noted:

1. The four samples tested yielded 95th percentile concentrations less than the published Soil Guideline Values (SGVs) for Residential Land Use (with plant uptake – as a conservative option) for the following contaminants, as shown in the table below:

Arsenic, Cadmium, Chromium, Mercury, Nickel, Selenium, Lead

Contaminant	95 th percentile concentration (mg/kg)	DEFRA SGV (mg/kg) for residential land use
Arsenic	18	20
Cadmium	<0.3	8 ⁽¹⁾
Chromium	29	130
Mercury	<0.6	8
Nickel	38	50
Selenium	<3	35
Lead	53	450

⁽¹⁾ based on pH >8

2. The pH was in the range 8.17-9.20, with a mean of 8.49. The peak water soluble sulphate concentration was 0.39g/l.
3. The peak values of dissolved leachate sources compare with the Drinking Water Standards (DWS), and Environmental Water Quality Standards (EQS), as indicated in the following table:

Contaminant	Peak Concentration (units as shown)	EQS ⁽¹⁾	DWS
Arsenic	5 µg/l	50 µg/l	10 µg/l
Boron	73 µg/l	2000 µg/l	1000 µg/l
Chromium	6 µg/l	5000 µg/l	50 µg/l
Copper	660 µg/l	5000 µg/l	2000 µg/l
Lead	2 µg/l	4000 µg/l	10 ⁽²⁾ µg/l
Nickel	1 µg/l	50000 µg/l	20 µg/l
Selenium	1 µg/l	N/A	10 µg/l
Zinc	<3 µg/l	30000 µg/l	N/A
pH	7.75-8.01	6-9	6.5-10

⁽¹⁾ worst case assumption with respect to water

hardness, coarse rather than salmonid fish stock assumed.

⁽²⁾ 10 µg/l comes into effect on 25th December 2013, current standard = 25µg/l

In this instance the following potential sources have been identified:

- Heavy metals, including arsenic and nickel, since current 95th percentile values lie close to (but below) the published SGVs.
- Sulphates, in respect of concrete design. Appropriate concrete design will be required taking into account potentially mobile groundwater characteristics, and the brownfield setting of the site.
- Asbestos – no formal asbestos survey has been undertaken to date, and as such its presence should be assumed given the age of the building, and the presence of service connections, building extensions and partitions etc.

The following potential receptors have been identified:

Construction Workers, Residents, Elements of Built Environment, Controlled Waters.

The key pollution linkages identified are those between:

1. Construction workers and asbestos
2. Future residents and asbestos left over by inappropriate demolition / refurbishment activities
3. Controlled groundwaters and potentially leachable metals (concentrations in leachate of arsenic, lead and copper reach respectively 50%, 20% and 33% of the acceptable threshold for Drinking Water Standards.

8.0 FURTHER INVESTIGATION REQUIREMENTS

8.1 General

As described previously, the works carried out to date represent an initial assessment prior to demolition of the existing structure. On the basis of these works the contamination status of the site appears to be of less concern than anticipated at the

time of completion of the initial Phase I Desk Study report. The following additional works are proposed as part of an additional phase of intrusive investigation (Phase 2ii) prior to establishing a formal Remediation Strategy (if required) and or Implementation Plan.

It should be noted that no demolition works should be undertaken at this site until such time as a thorough Asbestos Survey has been completed. All demolition work will need to be carried out in accordance with the requirements established by that survey.

8.2 Cable Percussion Drilling

It will be necessary to undertake additional investigation works to properly characterise the site with respect to foundation design, and contamination pathways. In particular, further information will be required on the deeper natural superficial materials, and the depth of bedrock locally.

It is currently anticipated that the structure to be built will be founded on piles driven, or bored, to bedrock. As yet, no information is available with respect to the bedrock. Three (3 No) cable percussion boreholes are therefore expected to be drilled to approximately 15m below ground level to prove the presence of suitable foundation stratum.

8.3 Rotary Drilling

Depending on the anticipated foundation loadings it may well be prudent to undertake rotary coring of the uppermost 5m of bedrock stratum to assess the likely Rock Mass characteristics of the founding stratum with respect to potential excessive settlements. This arises as a potential consequence of the presence of a substantial fault in the vicinity of the site.

The sandstone strata may well be reduced to the condition of a soil along such fault planes, and appropriate design measures may be required such as oversize boring, or dowelling below the base of the pile to increase the effective length of the pile.

It should be noted that if suitable bedrock is not encountered (ie the rock mass is not seen to be competent) it will be prudent to extend the coring below this initial proposal of 5m depth. The rotary drilling will be best undertaken as a follow-on exercise in conjunction with the proposed cable percussion drilling works.

8.4 Laboratory Testing

8.4.1 Geotechnical

A full suite of geotechnical design parameters will need to be established and it is therefore anticipated that the Phase 2ii works will involve a significant amount of geotechnical laboratory testing to include some, or all, of the following

BS 1377 (1990)

Test No.	Test Description
Part 2	
3.2	Moisture Content Determination
4.3 & 5.3	Liquid and Plastic Limit Determination
9.2 & 9.3	Mechanical Analysis - Sieving
9.4	Mechanical Analysis - Sedimentation
Part 3	
5.2, 5.5	Sulphate Analysis - Soil
5.4, 5.5	Sulphate Analysis - Water
5.3, 5.5	Sulphate Analysis - Water Extract
9.5	pH Determination
Part 5	
3	Oedometer Consolidation Test
Part 7	
9	Shear Strength Measurement - 100mm diameter (Single Stage) Quick Undrained Triaxial Compression Test
9	Shear Strength Measurement - 100mm diameter (Multi-Stage) Quick Undrained Triaxial Compression Test

8.4.2 Chemical / Contamination

It will be necessary to confirm the findings of this initial investigation with respect to contamination matters, and in particular to confirm the concentrations of arsenic, lead and copper present in the Made Ground. Samples will therefore be obtained from the cable percussion boreholes to add to the existing chemical data.

It will also be necessary to firm up concrete design

by undertaking appropriate chemical testing for a brownfield development site.

The following suite of analysis is therefore considered appropriate:

Arsenic
Cadmium
Chromium
Mercury
Nickel
Selenium
Lead
Copper
Zinc
pH
Soil Organic Matter
Water Soluble Sulphate
Acid Soluble Sulphate
Magnesium
Chloride
Nitrate
Total Sulphur

period of 3 months will be required before finalising design requirements.

Written by

.....
Keith Nicholls BSc MSc FIM³ MIQ MICE CEng
Principal Engineer

Checked by

.....
Colin Dodd BSc MSc CEng
Principal Engineer

In addition to the above further leachate testing will be undertaken to assess the likely leachability / mobility of any potential contaminants identified as being present at concentrations of concern with respect to human health or controlled groundwaters.

If considered necessary a suite of organic contaminants will also be undertaken comprising

PAHs (16 Speciated)
EPH (with interpretation)
GRO
BTEX
MTBE
Phenol

As with the other contaminants, if appropriate leachate / mobility testing will be undertaken.

8.5 Gas and Groundwater Monitoring

It will be necessary to install gas and groundwater monitoring standpipes and / or piezometers to fully model the site for both foundation design purposes, and for contamination assessment (Controlled Waters remain one of the key receptors identified at this site).

It is anticipated that a minimum of 6 no visits over a

APPENDIX I
SITE LOCATION PLAN

Project : Oxford Road, Manchester
Project No : PN061372

SITE LOCATION PLAN



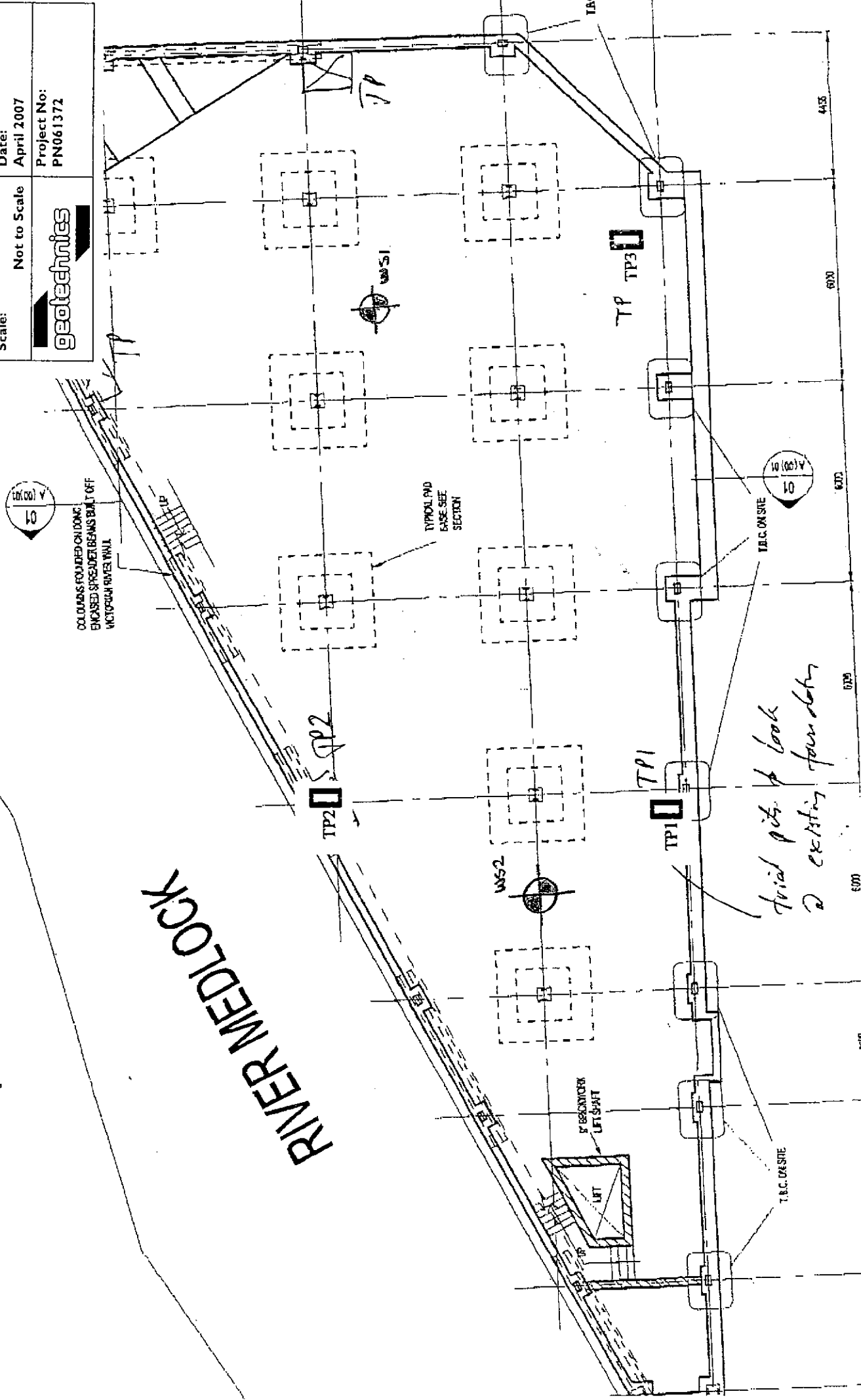
APPROX. SCALE 1:50,000

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APPENDIX 2

EXPLORATORY HOLE LOCATION PLAN

Engineer: Scott Hughes Design	
Project: Oxford Road, Manchester	
Drawing Title: Exploratory Hole Location Plan	
Scale: Not to Scale	Date: April 2007
	
Project No: PN061372	



This drawing shows EXISTING building foundations

RIVER MEDLOCK

trial pits to look @ existing foundations

APPENDIX 3
TRIAL PIT RECORDS

DATA SHEET - Symbols and Abbreviations used on Records

Samples

B	Bulk disturbed sample
BLK	Block sample
C	Core sample
D	Small disturbed sample (tub/jar)
E	Environmental test sample
ES	Environmental soil sample
EW	Environmental water sample
G	Gas sample
L	Liner sample
P	Piston sample (PF - failed piston sample)
TW	Thin walled push in sample
U -	Open Tube - 102mm diameter with blows to take sample. (UF - failed U sample)
V	Vial sample
W	Water sample

Insitu Testing / Properties

S	Standard Penetration Test (SPT)
C	SPT with cone
VN	Strength from Insitu Vane
HV	Strength from Hand Vane
PP	Strength from Pocket Penetrometer
	(All other strengths from undrained triaxial testing)
w%	Water content
N	SPT Result
-/-	Blows/penetration (mm) after 150mm seating.
*/-	Total blows/penetration (mm)
()	Extrapolated value

Rotary Core

RQD	Rock Quality Designation (% of intact core >100mm)
FRACTURE INDEX	Fractures/metre
FRACTURE SPACING (mm)	Maximum Minimum

Groundwater

Water Strike	
Highest recorded standing water level	

Instrumentation

Inclinometer	Standpipe Seal	Piezometer Seal
	Tip	Tip
	Filter	Filter

Strata

Made Ground	Type 1
	Type 2

Topsoil

Cobbles and Boulders

Gravel

Sand

Silt

Clay

Peat

Note: Composite soil types shown by combined symbols

Chalk

Limestone

Sandstone

Coal

Mudstone

Siltstone

Metamorphic Rock

Igneous Rock

TRIAL PIT RECORD

Project OXFORD ROAD - MANCHESTER

Engineer

SCOTT HUGHES DESIGN LTD

Trial Pit
Project No

TP1
PN061372

Client PROPERTY SOLUTIONS LTD

Samples and Tests				Strata		Scale 1:50	
Depth	Type	Stratum No	Results	Description	Depth	Legend	
0.10- 0.12	D			Concrete.	G.L.		
0.30- 0.45	D			Hard black bitumen compound. (Possible waterproofing).	0.10		
0.45- 0.70	D			Layer of placed whole red bricks.	0.12		
				MADE GROUND: Red-brown clayey gravelly sand. Gravel is medium to coarse angular to sub-angular of concrete and brick fragments.	0.30		
				MADE GROUND: Red-brown slightly sandy gravelly clay. Gravel is fine to coarse angular to sub-angular of concrete and brick fragments.	0.45		
				At 0.70m yellow-brown sandstone drain.	0.72		
				End of Excavation			

Excavation

Plant Hand tools.
Date 22/02/2007
Shoring None.
Stability Stable during excavation.

Width (B) 0.30
Length (C) 0.30

Date Backfilled 23/02/2007

Groundwater

Depth Observed	Depth of Pit	Details
		None encountered during excavation.

Remarks Inspection pit hand excavated to 0.72m depth.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged by JH

Figure 1 of 1
11/04/2007

geotechnics

TRIAL PIT RECORD

Project OXFORD ROAD - MANCHESTER

Engineer

SCOTT HUGHES DESIGN LTD

Trial Pit
Project No

TP2
PN061372

Client PROPERTY SOLUTIONS LTD

Samples and Tests				Strata	Scale 1:50		
Depth	Type	Stratum No	Results	Description	Depth	Legend	
0.00- 0.02	D			Cement based floor screed.	G.L.		
0.02- 0.28	D			Concrete with red brick inclusions.	0.02		
					0.28		
0.40- 1.00	D			Hard black bitumen compound. (Possible waterproofing).	0.30		
					0.40		
				Layer of placed whole red bricks.			
1.00- 1.20	D			MADE GROUND: Stiff dark brown clay with occasional gravel. Gravel is medium to coarse sub-rounded including concrete and brick fragments.	1.00		
				MADE GROUND: Dark brown gravelly medium to coarse sand. Gravel is fine to medium angular to sub-angular.	1.20		
				At 1.10m Half brick.			
				At 1.20m fragments of metal pipe.			
				End of Excavation			

Excavation				Groundwater		
Plant	Hand tools.	Width (B)	0.30	Depth Observed	Depth of Pit	Details
Date	22/02/2007	Length (C)	0.30			
Shoring	None.	Date Backfilled	23/02/2007			None encountered during excavation.
Stability	Stable during excavation.					

Remarks	Inspection pit hand excavated to 1.20m depth.	Logged by	JH
Symbols and abbreviations are explained on the accompanying key sheet.		Figure	1 of 1
All dimensions			11/04/2007

TRIAL PIT RECORD

Project OXFORD ROAD - MANCHESTER

Engineer

SCOTT HUGHES DESIGN LTD

Trial Pit
Project No

TP3
PN061372

Client PROPERTY SOLUTIONS LTD

Samples and Tests				Strata	Scale 1:50	
Depth	Type	Stratum No	Results	Description	Depth	Legend
0.40- 0.45	D			Concrete.	G.L.	
				Hard black bitumen compound. (possible water-proofing).	0.28	
				Layer of placed whole red bricks.	0.30	
				MADE GROUND: Red-brown slightly sandy fine to coarse gravel of concrete and brick.	0.40	
				End of Excavation	0.45	

Excavation				Groundwater		
Plant	Hand tools.	Width (B)	0.30	Depth Observed	Depth of Pit	Details
Date	23/02/2007	Length (C)	0.50	0.40	0.45	Rapid ingress.
Shoring	None.	Date Backfilled	23/02/2007			
Stability	Stable during excavation.					

Remarks The Trial Pit terminated at a depth of 0.45m due to groundwater inflow.

Logged by JH

Symbols and abbreviations are explained on the accompanying key sheet.

Figure 1 of 1
11/04/2007

All dimensions

geotechnics

APPENDIX 4

WINDOW SAMPLE RECORDS

BOREHOLE RECORD - Window Sampling

Project OXFORD ROAD - MANCHESTER

Engineer

SCOTT HUGHES DESIGN LTD

Borehole
Project No

WS1
PN061372

Client PROPERTY SOLUTIONS LTD

Sampling			Properties		Strata		Scale 1:50	
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	Description	Depth	Legend	
0.05- 0.40	D				Concrete.	G.L. 0.05		
0.40- 0.60	D				MADE GROUND: Red and grey-brown fine to coarse angular gravel of broken brick and concrete.	0.40		
0.60- 0.70	D				MADE GROUND: Red-brown and black gravelly medium to coarse sand. Gravel is fine to coarse angular of concrete and brick with occasional coal fragments.	0.60		
0.70- 1.00	D				Firm brown slightly sandy gravelly CLAY. Gravel is medium to coarse sub-rounded.	0.70		
1.00- 1.90	D				Stiff brown CLAY.	1.00		
					Stiff grey-brown CLAY.	1.90		
					End of Borehole			

Boring				Progress					Groundwater					
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	In Mins	Depth Sealed	Remarks on Groundwater
1.90		Windowless Sampler	PS	G.L. 1.90			23/02/07	10:00						None encountered during boring.
							23/02/07	11:30						

Window Sample Borehole backfilled with arisings on completion.

Remarks
Symbols and abbreviations are explained on the accompanying key sheet.
All dimensions

Logged by JH

Figure 1 of 1
11/04/2007

geotechnics

BOREHOLE RECORD - Window Sampling

Project OXFORD ROAD - MANCHESTER

Engineer

SCOTT HUGHES DESIGN LTD

Borehole
Project No

WS2
PN061372

Client PROPERTY SOLUTIONS LTD

Sampling			Properties		Strata		Scale 1:50	
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	Description	Depth	Legend	
0.05- 0.80	D				Concrete	G.L. 0.05		
0.80- 1.00	D				MADE GROUND: Mottled red-brown clayey gravel. Gravel is medium to coarse angular of concrete and brick. Some pockets of sandy clay.	0.80 1.00		
					MADE GROUND: Soft grey-brown slightly sandy gravelly clay with occasional plant remains. Gravel is fine to medium angular of brick with occasional coal fragments.			
					PROBABLY MADE GROUND: Red-brown in places mottled grey -yellow slightly sandy slightly gravelly silt/clay.			
2.20- 2.80	D							
2.80- 3.00	D				Firm to stiff dark brown mottled grey CLAY.	2.80		
3.60- 3.70	D				Dark brown fine to medium silty SAND.	3.60		
3.70- 3.85	D				Firm to stiff dark brown CLAY.	3.85		
3.85- 4.00	D				Stiff dark brown speckled black CLAY.	4.00		
4.15- 4.30	D				End of Borehole	4.30		

Boring

Progress

Groundwater

Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
4.30		Windowless Sampler	PS	G.L. 4.30			23/02/07 23/02/07	12:00 14:00						None encountered during boring.

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions

Borehole backfilled with arisings on completion.
Between 1.00-2.00m very little recovery.

Logged by JH

Figure 1 of 1
11/04/2007

geotechnics

APPENDIX 5

CHEMICAL / CONTAMINATION TESTING

ALcontrol Geochem Analytical Services

Sample Descriptions

Job Number: 07/05126/02/01
Client: Geotechnics Ltd
Client Ref : PN061372

Grain sizes	
<0.063mm	Very Fine
0.1mm - 0.063mm	Fine
0.1mm - 2mm	Medium
2mm - 10mm	Coarse
>10mm	Very Coarse

[illegible]

* These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials-whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

¹ Sample Description supplied by client

☒

- # ISO 17025 accredited
- M MCERTS accredited
- * Subcontracted test
- » Shown on prev. report

Matrix: SOLID
Location: OXFORD ROAD, MANCHESTER
Client Contact: John Booth

All results expressed on a dry weight basis.

Date 03.04.2007

☒[illegible]

- # ISO 17025 accredited
- M MCERTS accredited
- * Subcontracted test
- » Shown on prev. report

Matrix: LEACHATE
Location: OXFORD ROAD, MANCHESTER
Client Contact: John Booth

[illegible]

Date 03.04.2007

ALcontrol Geochem Analytical Services

Table Of Results - Appendix

Job Number: 07/05126/02/01
 Client: Geotechnics Ltd
 Client Ref. No.: PN061372

Report Key :

NDP No Determination Possible * Subcontracted test
 NFD No Fibres Detected » Result previously reported (Incremental reports only)
 # ISO 17025 accredited M MCERTS Accredited
 PFD Possible Fibres Detected EC Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

Summary of Method Codes contained within report :

Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample ¹	Surrogate Corrected
TM050	Method 5310B, AWWA/APHA, 20th Ed., 1999 / DIN EN 13137	Total Organic Carbon determination by combustion method	✓		DRY	
TM068	ASTM D-1552	Total sulphur determination by combustion method	✓		DRY	
TM097	Modified: US EPA Method 325.1 & 325.2	Determination of Chloride using the Kone Analyser	✓		DRY	
TM098	Method 4500E, AWWA/APHA, 20th Ed., 1999	Determination of Sulphate using the Kone Analyser			NA	
TM098	Method 4500E, AWWA/APHA, 20th Ed., 1999	Determination of Sulphate using the Kone Analyser	✓		DRY	
TM102	Method 4500H, AWWA/APHA, 20th Ed., 1999	Determination of Total Oxidised Nitrogen using the Kone Analyser	✓		DRY	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer			DRY	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer	✓		DRY	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer	✓	✓	DRY	
TM133	BS 1377: Part 3 1990	Determination of pH in Soil and Water using the GLpH pH Meter			NA	
TM133	BS 1377: Part 3 1990	Determination of pH in Soil and Water using the GLpH pH Meter	✓	✓	WET	
TM149	BS 1377: Part 3 1990 (Extraction)	Analysis of Total Sulphate using ICP-OES Spectrophotometer			DRY	
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS			NA	

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

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Job Number: 07/05126/02/01
Client: Geotechnics Ltd
Client Ref. No.: PN061372

Summary of Coolbox temperatures

[illegible]

ALcontrol Geochem - Table Of Results

Job Number: 07/05126/02/01

Client: Geotechnics Ltd

Client Ref: PN061372

Matrix: SOLID

All results expressed on a dry weight basis.

Sample Identity		TP2	WS1	WS2	WS2	
Depth		0.4-1.0	0.7-1.0	0.05-0.8	2.8-3.0	
Sample Type		SOLID	SOLID	SOLID	SOLID	
Sample Received Date		21/03/2007	21/03/2007	21/03/2007	21/03/2007	
Sampled Date		23/02/2007	23/02/2007	23/02/2007	23/02/2007	
Batch		1	1	1	1	
Sample Number(s)		1	2	3	4	
Method		Units	Method Detection Limit			
Total Sulphate BRE	TM149	%	<0.01			
Arsenic	TM129	mg/kg	<3.0			
Cadmium	TM129	mg/kg	<0.3			
Chromium	TM129	mg/kg	<4.5			
Copper	TM129	mg/kg	<6			
Lead	TM129	mg/kg	<2			
Mercury	TM129	mg/kg	<0.6			
Nickel	TM129	mg/kg	<0.9			
Selenium	TM129	mg/kg	<3			
Zinc	TM129	mg/kg	<2.5			
Soil Organic Matter	TM050	%	<0.35			
Chloride 2:1soil/water extract BRE	TM097	g/l	<0.001			
Magnesium 2:1soil/water extract BRE	TM129	g/l	<0.001			
Nitrate 2:1 soil/water extract BRE	TM102	g/l	<0.0003			
pH Value	TM133	pH Units	<1.00			
Soluble Sulphate 2:1 Extract as SO4 BRE	TM098	g/l	<0.003			
Total Sulphur	TM068	%	<0.01			
			0.13	0.05	0.15	0.03
			<3	<3	10	19
			<0.3	<0.3	<0.3	<0.3
			23	21	23	30
			18	20	85	35
			9	13	65	16
			<0.6	<0.6	<0.6	<0.6
			30	25	34	37
			<3	<3	<3	<3
			61	56	69	67
			1.9	1.5	4.0	1.7
			0.016	0.019	0.094	0.004
			0.070	0.019	<0.001	0.005
			0.063	0.0025	0.13	0.0006
			8.38	8.19	9.20	8.17
			0.39	0.14	0.21	0.040
			0.06	0.04	0.10	0.03

ALcontrol Geochem - Table Of Results

Job Number: 07/05126/02/01
 Client: Geotechnics Ltd
 Client Ref: PN061372
 Matrix: LEACHATE

Sample Identity		TP2	WS1	WS2	WS2
Depth		0.4-1.0	0.7-1.0	0.05-0.8	2.8-3.0
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID
Sample Received Date	21/03/2007	21/03/2007	21/03/2007	21/03/2007	21/03/2007
Sampled Date	23/02/2007	23/02/2007	23/02/2007	23/02/2007	23/02/2007
Batch	1	1	1	1	1
Sample Number(s)	1	1	2	3	4
Method	Units	Method Detection Limit			
Arsenic Dissolved (NRA) (ICP-MS)	ug/l	<1	<1	5	3
Boron Dissolved (NRA) (ICP-MS)	ug/l	<10	54	73	<10
Cadmium Dissolved (NRA) (ICP-MS)	ug/l	<0.4	<0.4	<0.4	<0.4
Chromium Dissolved (NRA) (ICP-MS)	ug/l	<1	<1	3	6
Copper Dissolved (NRA) (ICP-MS)	ug/l	<1	3	4	7
Lead Dissolved (NRA) (ICP-MS)	ug/l	<1	<1	<1	2
Nickel Dissolved (NRA) (ICP-MS)	ug/l	<1	<1	<1	1
Selenium Dissolved (NRA) (ICP-MS)	ug/l	<1	<1	1	<1
Zinc Dissolved (NRA) (ICP-MS)	ug/l	<3	<3	<3	<3
Sulphate (NRA)	mg/l	<3	29	44	31
pH (NRA)	pH Units	7.75	7.86	7.81	8.01

APPENDIX 6

INVESTIGATION TECHNIQUES AND GENERAL NOTES

INVESTIGATION TECHNIQUES

INTRODUCTION

The following brief review of Ground Investigation techniques, generally used as part of most Site Investigations in the U.K., summarises their methodology, advantages and limitations. Detailed descriptions of the techniques are available and can be provided on request. This review should be read in conjunction with the accompanying General Notes.

TRIAL PITS

The trial pit is amongst the most simple yet effective means of identifying shallow ground conditions on a site. Its advantages include simplicity, speed, potential accuracy and cost-effectiveness. The trial pit is most commonly formed using a backhoe excavator which can typically determine ground conditions to some 4 metres below ground level. Hand excavation is often used to locate, expose and detail existing foundations, features or services. In general, it is difficult to extend pits significantly below the water table in predominantly granular soils, where flows can cause instability. Unless otherwise stated, the Trial Pits will not have been provided with temporary side support during their construction. Under such circumstances ground conditions to some 1.2 metres can be closely inspected, subject to stability assessment, but below this depth, entrance into the pit is not permitted in the absence of shoring and hence observations will have been made from ground surface and samples taken from the excavator bucket.

Trends in strata type, level and thickness can be determined, shear surfaces identified and the behaviour of plant, excavation sides and excavated materials can be related to the construction process. They are particularly valuable in land slip investigations. Some types of insitu test can be undertaken in such pits and large disturbed or block samples obtained.

CABLE PERCUSSION BORING

The light Cable Percussion technique of soft ground boring, typically at a diameter of 150mm, is a well established simple and flexible method of boring vertical holes and generally allows data to be obtained in respect of strata conditions other than rock. A tubular cutter (for cohesive soils) or shell with a flap valve (for granular soils) is repeatedly lifted and dropped using a winch and rope operating from an "A" frame. Soil which enters these tools is regularly removed and either sampled for subsequent examination or test, or laid to one side for backfilling. Steel casing will have been used to prevent collapse of the borehole sides where necessary. A degree of disturbance of soil and mixing of layers is inevitable and the presence of very thin layers of different soils within a particular stratum may not be identified. Changes in strata type can only be detected on recognition of a change in soil samples at surface, after the interface has been passed. For the foregoing reasons, depth measurements should not be considered to be more accurate than 0.1 metre.

In cohesive soils cylindrical samples are retrieved by driving or pushing in 100mm nominal diameter tubes. In soft soils, piston sampling or vane testing may be undertaken. In granular soils and often in cohesive materials, insitu Standard Penetration Tests (SPT's) are performed. The SPT records the number of standard blows required to drive a 50mm diameter open or cone ended probe for 300mm after an initial 150mm penetration. A modified method of recording is used in more dense strata. Small disturbed samples are obtained throughout.

The technique can determine ground conditions to depths in excess of 30 metres under suitable circumstances and usually causes less surface disturbance than trial pitting.

ROTARY DRILLING

Rotary Drilling to produce cores by rotating an annular diamond-impregnated tube or barrel into the ground is the technique most appropriate to the forming of site investigation boreholes through rock or other hard strata. It has the advantage of being able to be used vertically or at an angle. Core diameters of less than 100mm are most common for site investigation purposes. Core is normally retrieved in plastic lining tubes. A flushing fluid such as air, water or foam is used to cool the bit and carry cuttings to the surface.

Examination of cores allows detailed rock description and generally enables angled discontinuity surfaces to be observed. However, vertical holes do not necessarily reveal the presence of vertical or near-vertical fissures or joint discontinuities. The core can be subjected to test in the field or laboratory. Core recovery depends upon rock type and/or techniques used. Where open hole rotary drilling is employed, descriptions of strata result from examination of surface of small particles ejected from the borehole in the flushing medium. In consequence, no indication of fissuring, bedding, consistency or degree of weathering can be obtained. Small scale plant can be used for auger drilling to limited depth where access is constrained.

Depths in excess of 60 metres can be achieved under suitable circumstances using rotary techniques, with minimal surface disturbance.

WINDOW SAMPLING

This technique involves the driving of an open-ended tube into the ground and retrieval of the soil which enters the tube. The term "window sample" arose from the original device which had a "window" or slot cut into the side of the tube through which samples were taken. This has now been superseded by the use of a thin-walled plastic liner within a sampler which has a solid wall. Diameters range from 36 to 86mm. Such samples can be used for qualitative logging, selection of

samples for classification and chemical analysis and for obtaining a rudimentary assessment of strength.

Driving devices can be hand-held or machine-mounted and the drive tubes are typically in 1m lengths. The hole formed is not cased, however, and hence the success of this technique is limited when soils and groundwater conditions are such that the sides of the hole collapse on withdrawal of the sampler. Obstructions within the ground, the density of the material or its strength can also limit the depth and rate of penetration of this light-weight investigation technique. Nevertheless, it

is a valuable tool where access is constrained such as within buildings or on embankments. Depths of up to 8m can be achieved in suitable circumstances but depths of 4m to 6m are more common.

EXPLORATORY HOLE RECORDS

The data obtained by these techniques are generally presented on Trial Pit, Borehole, Drillhole or Window Sample Records. The descriptions of strata result from information gathered from a number of sources which may include published geological data, preliminary field observations and descriptions, insitu test results, laboratory test results and specimen descriptions. A key to the symbols and abbreviations used accompanies the records. The descriptions on the exploratory hole records accommodate but may not necessarily be identical to those on any preliminary records or the laboratory summaries.

The records show ground conditions at the exploratory hole locations. The degree to which they can be used to represent conditions between or beyond such holes, however, is a matter for geological interpretation rather than factual reporting and the associated uncertainties must be recognised.

DYNAMIC PROBING

This technique typically measures the number of blows of a standard weight falling over a standard height to advance a cone-ended rod over sequential standard distances (typically 100mm). Some devices measure the penetration of the probe per standard blow. It is essentially a profiling tool and is best used in conjunction with other investigation techniques where site-specific correlation can be used to delineate the distribution of soft or loose soils or the upper horizon of a dense or strong layer such as rock.

Both machine-driven and hand-driven equipment is available, the selection depending upon access restrictions and the depth of penetration required. It is particularly useful where access for larger equipment is not available, disturbance is to be minimised or where there are cost constraints. No samples are recovered and some techniques leave a sacrificial cone head in the ground. As with other lightweight techniques, progress is limited in strong or dense soils. The results are presented both numerically and graphically. Depths of up to 10m are commonly achieved in suitable circumstances.

The hand-driven DCP probing device has been calibrated by the TRL to provide a profile of CBR values over a range of depths of up to 1.50m.

INSTRUMENTATION

The most common form of instrument used in site investigation is either the standpipe or else the standpipe piezometer which can be installed in investigation holes. They are used to facilitate monitoring of groundwater levels and water sampling over a period of time following site work. Normally a standpipe would be formed using rigid plastic tubing which has been perforated or slotted over much of its length whilst a standpipe piezometer would have a filter tip which would be placed at a selected level and the hole sealed above and sometimes below to isolate the zone of interest. Groundwater levels are determined using an electronic "dipmeter" to measure the depth to the water surface from ground level. Piezometers can also be used to measure permeability. They are simple and inexpensive instruments for long term monitoring but response times can limit their use in tidal areas and access to the ground surface at each instrument is necessary. Remote reading requires more sophisticated hydraulic, electronic or pneumatic equipment.

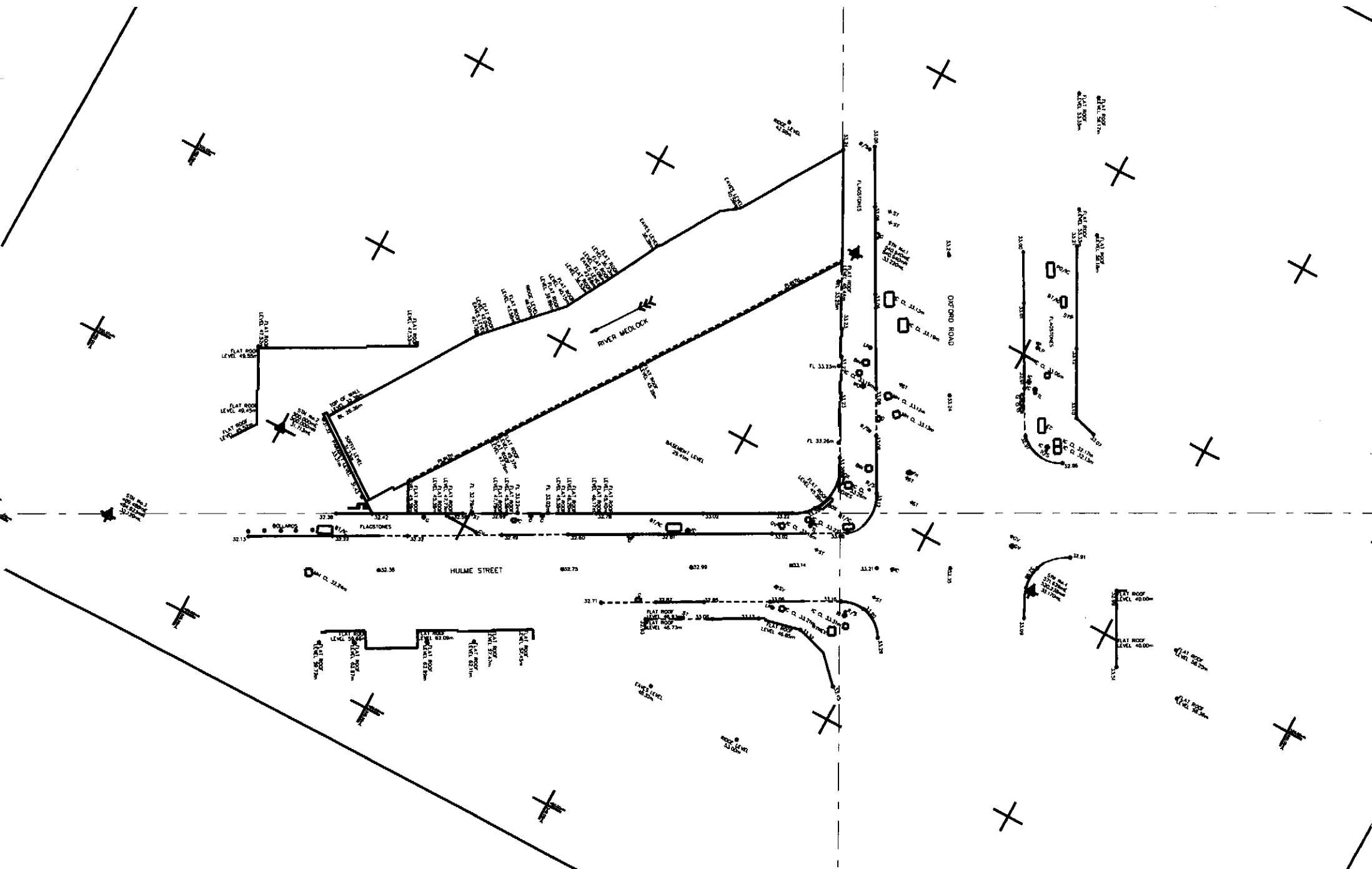
Settlement can be monitored using surface or buried target plates whilst lateral movement over a range of depths is monitored using slip indicator or inclinometer equipment.

GENERAL NOTES

1. The report is prepared for the exclusive use of the Client named in the document and copyright subsists with Geotechnics Limited. Prior written permission must be obtained to reproduce all or part of the report. It is prepared on the understanding that its contents are only disclosed to parties directly involved in the current investigation, preparation and development of the site.
2. Further copies may be obtained with the Client's written permission, from Geotechnics Limited with whom the master copy of the document will be retained.
3. The report and/or opinion is prepared for the specific purpose stated in the document and in relation to the nature and extent of proposals made available to Geotechnics Limited at that time. Re-consideration will be necessary should those details change. The recommendations should not be used for other schemes on or adjacent to the site without further reference to Geotechnics Limited.
4. The assessment of the significance of the factual data, where called for, is provided to assist the Client and his Engineer and/or Advisers in the preparation of their designs.
5. The report is based on the ground conditions encountered in the exploratory holes together with the results of field and laboratory testing in the context of the proposed development. The data from any commissioned desk study and site reconnaissance are also drawn upon. There may be special conditions appertaining to the site, however, which are not revealed by the investigation and which may not be taken into account in the report.
6. Methods of construction and/or design other than those proposed by the designers or referred to in the report may require consideration during the evolution of the proposals and further assessment of the geotechnical and any geoenvironmental data would be required to provide discussion and evaluations appropriate to these methods.
7. The accuracy of results reported depends upon the technique of measurement, investigation and test used and these values should not be regarded necessarily as characteristics of the strata as a whole (see accompanying notes on Investigation Techniques). Where such measurements are critical, the technique of investigation will need to be reviewed and supplementary investigation undertaken in accordance with the advice of the Company where necessary.
8. The samples selected for laboratory test are prepared and tested in accordance with the relevant Clauses of BS 1377 Parts 1 to 8, where appropriate, in Geotechnics Limited's UKAS accredited Laboratory, where possible. A list of tests is given.
9. Tests requiring the use of another laboratory having UKAS accreditation where possible are identified.
10. Any unavoidable variations from specified procedures are identified in the report.
11. Specimens are cut vertically, where this is relevant and can be identified, unless otherwise stated.
12. All the data required by the test procedures are recorded on individual test sheets but the results in the report are presented in summary form to aid understanding and assimilation for design purposes. Where all details are required, these can be made available.
13. Whilst the report may express an opinion on possible configurations of strata between or beyond exploratory holes, or on the possible presence of features based on either visual, verbal, written, cartographical, photographic or published evidence, this is for guidance only and no liability can be accepted for its accuracy.
14. Classification of materials as Made Ground is based on the inspection of retrieved samples or exposed excavations. Where it is obvious that foreign matter such as paper, plastic or metal is present, classification is clear. Frequently, however, for fill materials that arise from the adjacent ground or from the backfilling of excavations, their visual characteristics can closely resemble those of undisturbed ground. Other evidence such as site history, exploratory hole location or other tests may need to be drawn upon to provide clarification. For these reasons, classification of soils on the exploratory hole records as either Made Ground or naturally occurring strata, the boundary between them and any interpretation that this gives rise to should be regarded as provisional and subject to re-evaluation in the light of further data.
15. Ground conditions should be monitored during the construction of the works and the report should be re-evaluated in the light of these data by the supervising geotechnical engineers.
16. Any comments on groundwater conditions are based on observations made at the time of the investigation, unless specifically stated otherwise. It should be noted, however, that the observations are subject to the method and speed of boring, drilling or excavation and that groundwater levels will vary due to seasonal or other effects.
17. Any bearing capacities for conventional spread foundations which are given in the report and interpreted from the investigation are for bases at a minimum depth of 1m below finished ground level in naturally occurring strata and at broadly similar levels throughout individual structures, unless otherwise stated. The foundations should be designed in accordance with the good practice embodied in BS 8004 : 1986 - Foundations, supplemented for housing by NHBC Standards. Foundation design is an iterative process and bearing pressures may need adjustment or other measures may need to be taken in the context of final layouts and levels prior to finalisation of proposals.
18. Unless specifically stated, the investigation does not take account of the possible effects of mineral extraction or of gases from fill or natural sources within, below or outside the site.
19. The costs or economic viability of the proposals referred to in the report, or of the solutions put forward to any problems encountered, will depend on very many factors in addition to geotechnical or geoenvironmental considerations and hence their evaluation is outside the scope of the report.

APPENDIX D

TOPO SURVEY & UU ASSET MAP



Booth King**Calico
55 Mosley Street, Booth King
MANCHESTER,
M2 3HQ****FAO:****How to contact us:****United Utilities Water Limited
Property Searches
Haweswater House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP****Telephone: 0370 7510101****E-mail: propertysearches@uuplc.co.uk****Your Ref: Holiday Inn
Our Ref: UUPS-ORD-551447
Date: 27/02/2024****Dear Sirs****Location: HOLIDAY INN EXPRESS 2-4 OXFORD ROAD, MANCHESTER, M1 5QA**

I acknowledge with thanks your request dated 23/02/2024 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. <http://www.unitedutilities.com/work-near-asset.aspx>.

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please [contact us](#).

Yours Faithfully,



Karen McCormack
Property Searches Manager

TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

TERMS AND CONDITIONS:

- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.



Reho	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
3175413	305	CO	30.61	1500			BR	11.18034	
3031041	CO	CO	30.61	1500			BR	30.8707	1 in 134
1118034	CO	CO	0	890			VC	14.74682	
308707	BR	BR	32.8	610			VC	43.61659	
1474682	BR	BR	29.14	300			VC	21.47091	
4361659	BR	BR	0	150			VC	44.77723	
2147091	BR	BR	0	300			VC	131.103	1 in 27
4477723	BR	BR	28.88	225			VC	74.24319	
131103	BR	BR	24.97	300			VC	36.80714	
7424319	BR	BR	25.93	225			VC	44.53334	
3680714	BR	BR	28.86	600			VC	35.38361	1 in 49
4453334	BR	BR	30.05	700			VC	80.52069	1 in 1
3538361	BR	BR	24.42	600			VC	5.830952	1 in 51
8052069	BR	BR	29.59	1800			VC	8.734437	
5830952	BR	BR	32.42	300			VC	22.13894	1 in 9
8734437	BR	BR	24.85	610			VC	18.78629	
2213894	BR	BR	28.59	1800			VC	60.16655	1 in 137
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420201	BR	BR	26.37	600			VC	52.11986	
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191321	BR	BR	27.34	225			VC	54.70532	
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4981302	BR	BR	29.59	1800			VC	26.23	1 in 21
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APPENDIX E

EA 'PRODUCT 4' MAPS – FRA FROM THE ORIGINAL PLANNING APPLICATION

Flood risk assessment data



Location of site: 384144 / 397420 (shown as easting and northing coordinates)

Document created on: 18 September 2025

This information was previously known as a product 4.

Customer reference number: CCB1N2XTA3Y1

Map showing the location that flood risk assessment data has been requested for.



How to use this information

You can use this information as part of a flood risk assessment for a planning application. To do this, you should include it in the appendix of your flood risk assessment.

We recommend that you work with a flood risk consultant to get your flood risk assessment.

Included in this document

In this document you'll find:

- how to find information about surface water and other sources of flooding
- information on the models used
- definitions for the terminology used throughout
- flood map for planning (rivers and the sea)
- past floods
- modelled data
- information about strategic flood risk assessments
- information about this data
- information about flood risk activity permits
- help and advice

Information that's unavailable

This document **does not** contain:

- flood defences and attributes

We aren't able to display flood defence locations and attributes as there are no formal flood defences in the area of interest.

Surface water and other sources of flooding

When using the surface water map on the [check your long term flood risk service](#) the following considerations apply:

- surface water extents are suitable for use in planning
- surface water climate change scenarios may help to inform risk assessments, but the available data fall short of what is required to assess planned development
- surface water depth information should not be used for planning purposes

To find out about other factors that might affect the flood risk of this location, you should also check:

- [reservoir flood risk](#)
- groundwater flood risk - you could use the [British Geological Survey groundwater flooding data](#), [groundwater: current status and flood risk](#) and the guide on [mining and groundwater constraints for development](#) - further information may be available from the lead local flood authority (LLFA)
- your local planning authority's SFRA, which includes future flood risk

Your Lead Local Flood Authority is Manchester District.

For information about sewer flooding, contact the relevant water company for the area.

About the models used

Model name: Manchester Ship Canal 2018

Scenario(s): Normal Operation, Latchford 1 Gate Closed, Latchford 3 Gates

Closed. Date: 1 May 2020

Model name: River Medlock 2011

Scenario(s): No defences exist fluvial, no defences exist climate change fluvial

Date: 22 December 2010

These models contain the most relevant data for your area of interest.

Terminology used

Annual exceedance probability (AEP)

This refers to the probability of a flood event occurring in any year. The probability is expressed as a percentage. For example, a large flood which is calculated to have a 1% chance of occurring in any one year, is described as 1% AEP.

Metres above ordnance datum (mAOD)

All flood levels are given in metres above ordnance datum which is defined as the mean sea level at Newlyn, Cornwall.

Flood map for planning (rivers and the sea)

Your selected location is in flood zone 3.

Flood zone 3 shows the area at risk of flooding for an undefended flood event with a:

- 0.5% or greater probability of occurring in any year for flooding from the sea
- 1% or greater probability of occurring in any year for fluvial (river) flooding

Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- between a 0.1% and 0.5% probability of occurring in any year for flooding from the sea
- between a 0.1% and 1% probability of occurring in any year for fluvial (river) flooding

It's important to remember that the flood zones on this map:

- refer to the land at risk of flooding and do not refer to individual properties
- refer to the probability of river and sea flooding, ignoring the presence of defences
- do not take into account potential impacts of climate change



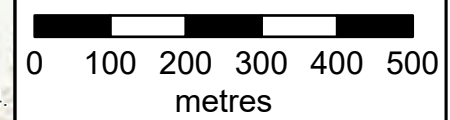
Flood map for planning

Location (easting/northing)
384144/397420

Scale
1:10,000

Created
18 Sep 2025

-  Selected area
-  Main river
-  Flood Zone 3
-  Flood Zone 2



Modelled data

This section provides details of different scenarios we have modelled and includes the following (where available):

- outline maps showing the area at risk from flooding in different modelled scenarios
- modelled node point map(s) showing the points used to get the data to model the scenarios and table(s) providing details of the flood risk for different return periods
- map(s) showing the approximate water levels for the return period with the largest flood extent for a scenario and table(s) of sample points providing details of the flood risk for different return periods

Climate change

The climate change data included in the models may not include the latest [flood risk assessment climate change allowances](#). Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

The Environment Agency will incorporate the new allowances into future modelling studies. For now, it's your responsibility to demonstrate that new developments will be safe in flood risk terms for their lifetime.

Modelled scenarios

The following scenarios are included:

- No defences exist modelled fluvial: risk of flooding from rivers where there are no flood defences
- No defences exist climate change modelled fluvial: risk of flooding from rivers where there are no flood defences, including estimated impact of climate change



**No defences exist
climate change
modelled fluvial extent**

Location (easting/northing)
384144/397420

Scale Created
1:10,000 18 Sep 2025

Model name
River Medlock 2011

-  Selected area
-  Main river
- Modelled flood extent
 -  1% AEP (+20%)
 -  1% AEP (+35%)
 -  1% AEP (+70%)

Flood extents may not be
visible where they overlap
other return periods





No defences exist modelled fluvial extent

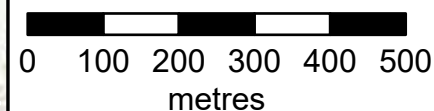
Location (easting/northing)
384144/397420

Scale Created
1:10,000 18 Sep 2025

Model name
River Medlock 2011

-  Selected area
-  Main river
- Modelled flood extent
 -  1% AEP
 -  0.1% AEP

Flood extents may not be
visible where they overlap
other return periods





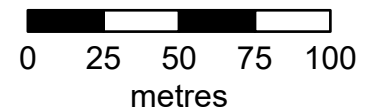
No defences exist climate change modelled fluvial node locations

Location (easting/northing)
384144/397420

Scale Created
1:2,500 18 Sep 2025

Model name
River Medlock 2011

-  Selected area
-  Modelled location
-  Main river



Modelled node locations data

No defences exist climate change

Label	Modelled location ID	Easting	Northing	1% AEP (+20%)	1% AEP (+35%)	1% AEP (+70%)	1% AEP (+20%)	1% AEP (+35%)	1% AEP (+70%)
				Level	Level	Level	Flow	Flow	Flow
1	1468007	383949	397433	29.69	30.17	30.59	65.18	68.53	69.92
2	1468179	384117	397407	30.80	31.33	31.77	65.18	68.53	69.92
3	1468073	384145	397447	30.88	31.37	31.77	66.18	72.89	78.41
4	1468173	384154	397465	31.64	32.30	32.88	66.17	72.89	78.42
5	1468182	384174	397520	31.84	32.51	33.08	47.67	48.05	47.73
6	1468181	384177	397529	31.96	32.62	33.17	47.67	48.05	47.73
7	1468015	384187	397554	31.99	32.62	33.16	45.23	45.63	45.93
8	1468056	384198	397573	31.99	32.62	33.13	47.21	47.69	48.01
9	1468178	384213	397589	31.99	32.62	33.20	48.61	49.14	49.47
10	1468124	384274	397574	31.99	32.62	32.94	54.61	54.99	55.34

Data in this table comes from the River Medlock 2011 model.

Level values are shown in mAOD, and flow values are shown in cubic metres per second.

Any blank cells show where a particular scenario has not been modelled for this location.



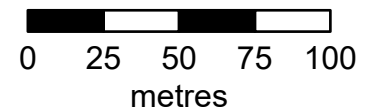
No defences exist modelled fluvial node locations

Location (easting/northing)
384144/397420

Scale Created
1:2,500 18 Sep 2025

Model name
River Medlock 2011

-  Selected area
-  Modelled location
-  Main river



Modelled node locations data

No defences exist

Label	Modelled location ID	Easting	Northing	4% AEP	1% AEP	0.1% AEP	4% AEP	1% AEP	0.1% AEP
				Level	Level	Level	Flow	Flow	Flow
1	1468007	383949	397433	29.01	29.38	31.18	52.48	59.57	70.22
2	1468179	384117	397407	29.64	30.22	32.29	52.23	59.57	70.22
3	1468073	384145	397447	29.76	30.34	32.27	51.67	59.59	82.10
4	1468173	384154	397465	30.06	30.87	33.55	51.67	59.59	82.09
5	1468182	384174	397520	30.20	31.05	33.71	47.19	47.63	47.22
6	1468181	384177	397529	30.32	31.22	33.77	47.19	47.63	47.22
7	1468015	384187	397554	30.44	31.29	33.74	40.15	42.35	45.96
8	1468056	384198	397573	30.44	31.29	33.80	42.37	44.39	48.01
9	1468178	384213	397589	30.45	31.29	33.74	43.65	45.76	49.58
10	1468124	384274	397574	30.45	31.29	33.90	48.11	51.56	55.79

Data in this table comes from the River Medlock 2011 model.

Level values are shown in mAOD, and flow values are shown in cubic metres per second.

Any blank cells show where a particular scenario has not been modelled for this location.



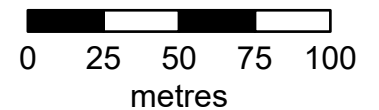
No defences exist modelled fluvial node locations

Location (easting/northing)
384144/397420

Scale Created
1:2,500 18 Sep 2025

Model name
Manchester Ship 2018

-  Selected area
-  Modelled location
-  Main river



Map Reference	Model Node Reference	Easting	Northing	Data	Undeferred											Latchford 1 Gate Closed		Latchford 3 Gates Closed	
					20 % AEP (1 in 5 year)	10 % AEP (1 in 10 year)	4 % AEP (1 in 25 year)	2 % AEP (1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year) + 30% increase in flow	1 % AEP (1 in 100 year) + 35% increase in flow	1 % AEP (1 in 100 year) + 70% increase in flow	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year)	0.1 % AEP (1 in 1000 year)	
1	ea013_0251_MEDL01_0722	383944	397455	Modelled Water Level (m aodN)	29.05	29.26	29.51	29.75	29.91	30.05	30.55	30.62	31.20	30.41	31.52	30.05	30.05	31.52	
				Modelled Flow (cumecs)	31.63	36.94	43.63	50.71	55.68	59.89	76.30	79.01	99.56	71.64	121.53	59.89	59.89	121.53	
2	ea013_0251_MEDL01_0749	383949	397437	Modelled Water Level (m aodN)	29.07	29.28	29.53	29.78	29.94	30.08	30.58	30.66	31.24	30.44	31.58	30.08	30.08	31.58	
				Modelled Flow (cumecs)	31.53	36.82	43.49	50.55	55.50	59.70	76.05	78.75	99.10	71.42	121.21	59.70	59.70	121.21	
3	ea013_0251_MEDL01_0998	384114	397407	Modelled Water Level (m aodN)	29.41	29.76	30.20	30.70	31.06	31.37	31.84	31.84	32.10	31.72	32.28	31.37	31.37	32.28	
				Modelled Flow (cumecs)	31.53	36.82	43.49	50.55	55.50	59.70	76.05	78.75	99.10	71.42	121.21	59.70	59.70	121.21	
4	ea013_0251_MEDL01_1022	384127	397425	Modelled Water Level (m aodN)	29.41	29.75	30.20	30.69	31.06	31.36	31.79	31.83	32.08	31.71	32.25	31.36	31.36	32.25	
				Modelled Flow (cumecs)	31.45	36.72	43.36	50.40	55.35	59.53	75.83	78.52	98.73	71.22	120.94	59.53	59.53	120.94	
5	ea013_0251_MEDL01_1038	384135	397435	Modelled Water Level (m aodN)	29.43	29.77	30.22	30.71	31.07	31.38	31.81	31.85	32.12	31.73	32.31	31.38	31.38	32.31	
				Modelled Flow (cumecs)	31.39	36.65	43.28	50.31	55.24	59.42	75.69	78.37	98.47	71.08	120.76	59.42	59.42	120.76	
6	ea013_0251_MEDL01_1051	384140	397442	Modelled Water Level (m aodN)	29.43	29.77	30.22	30.71	31.08	31.38	31.86	32.12	31.73	32.32	31.38	31.38	32.32		
				Modelled Flow (cumecs)	31.34	36.59	43.21	50.23	55.16	59.33	75.57	78.25	98.26	70.97	120.61	59.33	59.33	120.61	
7	ea013_0251_MEDL01_1079	384158	397477	Modelled Water Level (m aodN)	29.66	30.10	30.70	31.38	31.89	32.33	33.27	33.32	33.56	33.10	33.72	32.33	32.33	33.72	
				Modelled Flow (cumecs)	31.34	36.59	43.21	50.23	55.16	59.33	75.57	78.25	98.26	70.97	120.61	59.33	59.33	120.61	
8	ea013_0251_MEDL01_1142	384179	397533	Modelled Water Level (m aodN)	29.69	30.14	30.73	31.41	31.92	32.36	33.30	33.35	33.60	33.13	33.79	32.36	32.36	33.79	
				Modelled Flow (cumecs)	31.11	36.32	42.89	49.85	54.74	58.88	74.99	77.65	97.23	70.45	119.90	58.88	58.88	119.90	
9	ea013_0251_MEDL01_1192	384202	397577	Modelled Water Level (m aodN)	29.71	30.15	30.75	31.43	31.94	32.37	33.31	33.36	33.62	33.15	33.82	32.37	32.37	33.82	
				Modelled Flow (cumecs)	30.92	36.10	42.63	49.55	54.42	58.53	74.54	77.18	96.36	70.03	119.31	58.53	58.53	119.31	
10	ea013_0251_MEDL01_1296	384284	397567	Modelled Water Level (m aodN)	29.74	30.18	30.77	31.44	31.95	32.38	33.32	33.37	33.62	33.15	33.84	32.38	32.38	33.84	
				Modelled Flow (cumecs)	30.54	35.65	42.10	48.93	53.74	57.80	73.59	76.20	94.39	69.16	118.05	57.80	57.80	118.05	

Model data taken from Manchester Ship Canal 2018

AEP - Annual Exceedence Probability

m aodN - metres above ordnance datum Newlyn

cumecs - cubic metres per second

Notes:

*Climate Change Scenario - 30%, 35% and 70% increases in flow calculated for the 2080's (2070 - 2115). Please see <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances> for more information regarding the new climate change guidance. The location of the site and the type (vulnerability) of development determine the climate change allowances to consider in any flood risk assessment.

For the Manchester Ship Canal Model, we provide the following three scenarios:

1. Normal Operation: All sluice gates operate automatically to maintain a navigable ponded water level upstream of each set of sluice gates. During times of high flow the gates are opened automatically to allow excess water pass downstream. During extreme conditions the sluice gates can be manually overridden to extend the opening heights.

2. Latchford 1 Gate Closed Scenario: This scenario represents a single operational sluice gate at Latchford Locks fixed closed. Therefore, only operational movements from 2 active sluice gates. The model setup removes the gate from PID controller setup and an IED file is used to define the sluice gate as fixed in the closed position.

3. Latchford 3 Gates Closed Scenario: This scenario has been defined as the removal of operational rules at all three sluice gates at Latchford Locks, thus, all gates are fixed in the closed position resulting in no regulation of upstream water levels. The model setup removes each of the gates from PID controller setup and an IED file is used to define sluice gates fixed in the closed position.



No defences exist modelled fluvial extent and height

Location (easting/northing)
384144/397420

Scale Created
1:500 18 Sep 2025

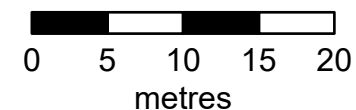
Model name
River Medlock 2011

-  Selected area
-  Main river

Modelled 2D grid
Water level in mAOD

-  0 - 4.375
-  4.375 - 8.75
-  8.75 - 13.125
-  13.125 - 17.5
-  17.5 - 21.875
-  21.875 - 26.25
-  26.25 - 30.625
-  30.625 - 35.0
-  35.0 - 39.375

This map shows the
0.1% AEP height data



Sample point data

No defences exist

Label	Easting	Northing	4% AEP	1% AEP	0.1% AEP	4% AEP	1% AEP	0.1% AEP
			Height	Height	Height	Depth	Depth	Depth
1	384114	397393	NoData	NoData	32.42	NoData	NoData	0.10
2	384123	397393	NoData	NoData	32.55	NoData	NoData	0.03
3	384132	397393	NoData	NoData	NoData	NoData	NoData	NoData
4	384114	397402	NoData	30.23	32.30	NoData	1.14	2.96
5	384123	397402	NoData	NoData	32.47	NoData	NoData	0.75
6	384132	397402	NoData	NoData	32.82	NoData	NoData	0.10
7	384141	397402	NoData	NoData	32.93	NoData	NoData	0.02
8	384150	397402	NoData	NoData	33.13	NoData	NoData	0.00
9	384123	397411	29.70	30.24	32.29	3.96	4.50	6.21
10	384132	397411	NoData	NoData	32.35	NoData	NoData	0.81
11	384141	397411	NoData	NoData	32.66	NoData	NoData	1.09
12	384150	397411	NoData	NoData	33.17	NoData	NoData	0.29

Label	Easting	Northing	4% AEP	1% AEP	0.1% AEP	4% AEP	1% AEP	0.1% AEP
			Height	Height	Height	Depth	Depth	Depth
13	384159	397411	NoData	NoData	33.40	NoData	NoData	0.14
14	384168	397411	NoData	NoData	33.56	NoData	NoData	0.08
15	384123	397420	29.72	30.26	32.28	1.66	1.85	2.25
16	384132	397420	29.73	30.27	32.28	0.33	0.38	0.58
17	384141	397420	NoData	NoData	32.43	NoData	NoData	1.05
18	384150	397420	NoData	NoData	32.85	NoData	NoData	1.29
19	384159	397420	NoData	NoData	33.41	NoData	NoData	0.10
20	384168	397420	NoData	NoData	33.59	NoData	NoData	0.17
21	384132	397429	29.74	30.28	32.28	3.84	4.25	5.02
22	384141	397429	NoData	NoData	32.36	NoData	NoData	1.07
23	384150	397429	NoData	NoData	32.86	NoData	NoData	1.30
24	384159	397429	NoData	NoData	33.47	NoData	NoData	0.16

Label	Easting	Northing	4% AEP	1% AEP	0.1% AEP	4% AEP	1% AEP	0.1% AEP
			Height	Height	Height	Depth	Depth	Depth
25	384168	397429	NoData	NoData	33.61	NoData	NoData	0.27
26	384141	397438	29.77	30.31	32.28	4.58	5.12	6.36
27	384150	397438	NoData	NoData	32.81	NoData	NoData	1.38
28	384159	397438	NoData	NoData	33.54	NoData	NoData	0.24
29	384141	397447	29.78	30.32	32.27	0.04	0.05	0.07
30	384150	397447	NoData	NoData	NoData	NoData	NoData	NoData
31	384159	397447	NoData	NoData	33.58	NoData	NoData	0.28
Max value in selected area:			NoData	NoData	33.47	NoData	NoData	1.45

Data in this table comes from the River Medlock 2011 model. Height values are shown in mAOD, and depth values are shown in metres.

Any blank cells show where a particular scenario has not been modelled for this location.

Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.

'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.



**No defences exist
climate change
modelled fluvial
extent and height**

Location (easting/northing)
384144/397420

Scale Created
1:500 18 Sep 2025

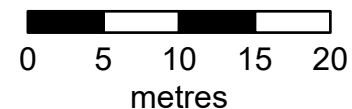
Model name
River Medlock 2011

-  Selected area
-  Main river

Modelled 2D grid
Water level in mAOD

-  0 - 4.25
-  4.25 - 8.5
-  8.5 - 12.75
-  12.75 - 17.0
-  17.0 - 21.25
-  21.25 - 25.5
-  25.5 - 29.75
-  29.75 - 34.0
-  34.0 - 38.25

This map shows the
1% AEP +70% height data



Sample point data

No defences exist climate change

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+35%)	1% AEP (+70%)	1% AEP (+20%)	1% AEP (+35%)	1% AEP (+70%)
			Height	Height	Height	Depth	Depth	Depth
1	384114	397393	NoData	NoData	NoData	NoData	NoData	NoData
2	384123	397393	NoData	NoData	NoData	NoData	NoData	NoData
3	384132	397393	NoData	NoData	NoData	NoData	NoData	NoData
4	384114	397402	30.80	31.33	31.77	1.53	2.29	2.67
5	384123	397402	NoData	NoData	NoData	NoData	NoData	NoData
6	384132	397402	NoData	NoData	NoData	NoData	NoData	NoData
7	384141	397402	NoData	NoData	NoData	NoData	NoData	NoData
8	384150	397402	NoData	NoData	NoData	NoData	NoData	NoData
9	384123	397411	30.81	31.34	31.78	4.73	5.78	6.22
10	384132	397411	NoData	NoData	31.77	NoData	NoData	0.28
11	384141	397411	NoData	NoData	NoData	NoData	NoData	NoData
12	384150	397411	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+35%)	1% AEP (+70%)	1% AEP (+20%)	1% AEP (+35%)	1% AEP (+70%)
			Height	Height	Height	Depth	Depth	Depth
13	384159	397411	NoData	NoData	NoData	NoData	NoData	NoData
14	384168	397411	NoData	NoData	NoData	NoData	NoData	NoData
15	384123	397420	30.82	31.34	31.78	1.72	2.31	2.49
16	384132	397420	30.83	31.35	31.77	0.44	1.26	1.36
17	384141	397420	NoData	NoData	31.77	NoData	NoData	0.28
18	384150	397420	NoData	NoData	31.77	NoData	NoData	0.21
19	384159	397420	NoData	NoData	NoData	NoData	NoData	NoData
20	384168	397420	NoData	NoData	NoData	NoData	NoData	NoData
21	384132	397429	30.84	31.35	31.77	3.91	6.12	6.54
22	384141	397429	NoData	31.36	31.77	NoData	0.09	0.50
23	384150	397429	NoData	NoData	31.77	NoData	NoData	0.21
24	384159	397429	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+35%)	1% AEP (+70%)	1% AEP (+20%)	1% AEP (+35%)	1% AEP (+70%)
			Height	Height	Height	Depth	Depth	Depth
25	384168	397429	NoData	NoData	NoData	NoData	NoData	NoData
26	384141	397438	30.86	31.37	31.77	4.94	6.29	6.70
27	384150	397438	NoData	NoData	NoData	NoData	NoData	NoData
28	384159	397438	NoData	NoData	NoData	NoData	NoData	NoData
29	384141	397447	30.87	31.37	31.77	0.05	3.25	3.52
30	384150	397447	NoData	NoData	NoData	NoData	NoData	NoData
31	384159	397447	NoData	NoData	NoData	NoData	NoData	NoData
Max value in selected area:			NoData	31.37	31.78	NoData	0.10	0.51

Data in this table comes from the River Medlock 2011 model. Height values are shown in mAOD, and depth values are shown in metres.

Any blank cells show where a particular scenario has not been modelled for this location.

Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.

'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.

Strategic flood risk assessments

We recommend that you check the relevant local authority's strategic flood risk assessment (SFRA) as part of your work to prepare a site specific flood risk assessment.

This should give you information about:

- the potential impacts of climate change in this catchment
- areas defined as functional floodplain
- flooding from other sources, such as surface water, ground water and reservoirs

Your Lead Local Flood Authority is Manchester District.

About this data

This data has been generated by strategic scale flood models and is not intended for use at the individual property scale. If you're intending to use this data as part of a flood risk assessment, please include an appropriate modelling tolerance as part of your assessment. The Environment Agency regularly updates its modelling. We recommend that you check the data provided is the most recent, before submitting your flood risk assessment.

Flood risk activity permits

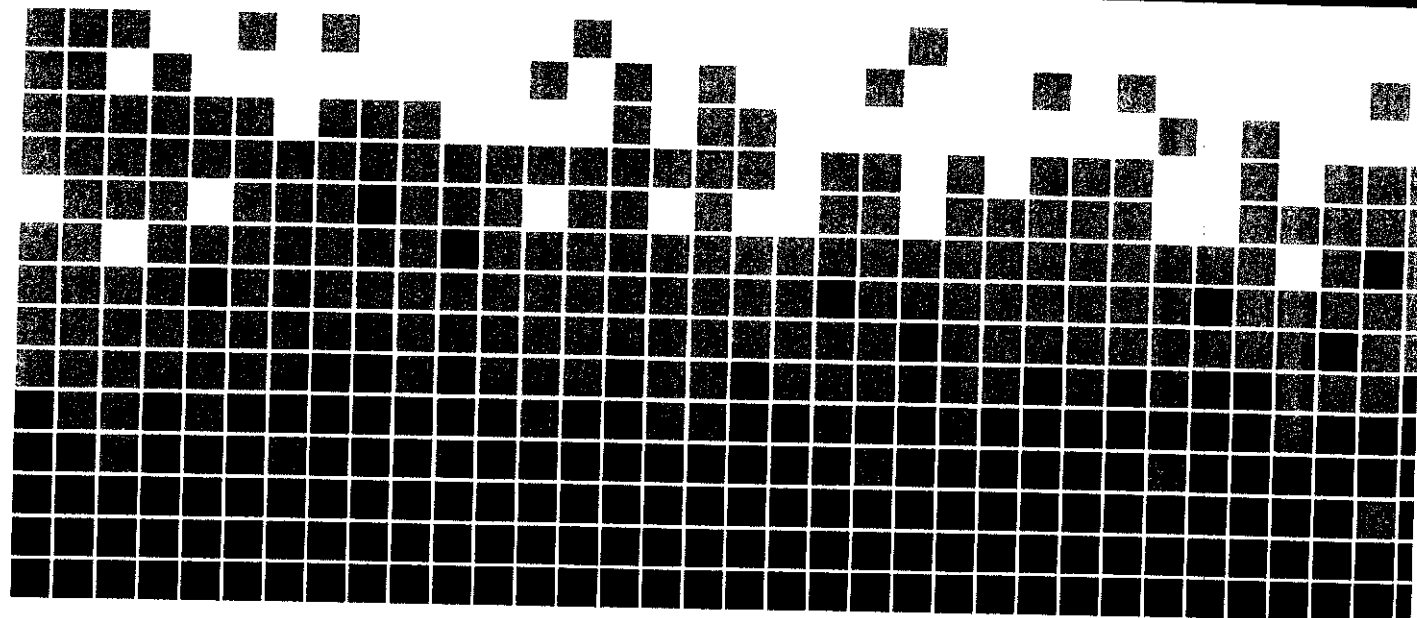
Under the Environmental Permitting (England and Wales) Regulations 2016 some developments may require an environmental permit for flood risk activities from the Environment Agency. This includes any permanent or temporary works that are in, over, under, or nearby a designated main river or flood defence structure.

[Find out more about flood risk activity permits](#)

Help and advice

Contact the Greater Manchester Merseyside and Cheshire Environment Agency team at inforequests.gmmc@environment-agency.gov.uk for:

- [more information about getting a product 5, 6, 7 or 8](#)
- general help and advice about the site you're requesting data for



Oxford Road, Manchester

Flood Risk Assessment

Property Solutions (Oxford Road) Limited

November 2007

PLANNING		
ACKD		
REPLIED		
RECD 16 NOV 2007		
M	INT RECD	DATE
M		
M		
FOIL ACTION		

QM

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks				
Date	November 2007			
Prepared by	J. Chesters			
Signature				
Checked by	D. Kearney			
Signature				
Authorised by	T. Morley			
Signature				
Project number	11190819			
File reference	S:\Oxford Road, Manchester\T EXT\REPORTS\071 022Flood Risk Assessment.doc			

WSP Development and
Transportation
Three White Rose Office Park
Millshaw Park Lane
Leeds
LS11 0DL

Tel: +44 (0)113 395 6200
Fax: +44 (0)113 395 6201
<http://www.wspgroup.com>

Reg. No: 2382309

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Summary

The purpose of this report is to provide an assessment, in accordance with PPS 25, of the potential increase in flood risk to and caused by a proposed redevelopment off Oxford Road, Manchester. For those elements which potentially increase flood risk, mitigation measures are provided.

This report is a detailed study into the drainage and flooding issues associated with the development and has been prepared as supplementary documentation to accompany a planning application.

The site is shown entirely within Flood Zone 3 (High Risk) on the Environment Agency Flood Zone Map.

A hydraulic modelling study of the River Medlock was undertaken as part of the flood risk assessment. This model calculated the 1 in 100 year flood water level at the development site to be 29.43m AOD and showed that flows remained in bank in the vicinity of the site.

It has been determined that due to the local topography, and the levels along Oxford Road, there are no flood routes to the development from the River Medlock upstream of the site up to, and including, a 1 in 200 year flood event.

The model has predicted that the development site is outside the 1 in 100 year flood plain, and so at a risk of flooding of less than 1% per year.

Surface water run off from the site currently drains from the roof directly to the River Medlock. Surface water run-off from the development will not increase from that of the existing site.

Due to the nature of the site the scope for using SUDS is limited. The technical feasibility of source control options would be considered at the detailed design stage.

Foul flows from the development should be calculated at the detailed design stage. Formal agreement with United Utilities should be secured for the discharge of foul flows from the site to the public sewer system. Requirements for any additional infrastructure should be determined at the detailed design stage.

The potential for overland flow from surrounding sites is minimal. Due to the topography of the site any water that accumulated would be short term and relatively shallow in depth.

It is considered that the proposed development would not increase flood risk providing that the suggested mitigation measures are implemented.

1 Introduction

1.1 APPOINTMENT AND BRIEF

1.1.1 WSP Development and Transportation (WSP) have been commissioned by Property Solutions (Oxford Road) Limited to provide a Flood Risk Assessment in support of a planning application for the proposed redevelopment of No.2-4 Oxford Road, Manchester.

1.1.2 The appraisal process consists of a desk study, data research and site visit to ascertain the extent of the existing information available and identify the flood risk features which may affect the site.

1.1.3 This report also includes a hydraulic flood study which predicts the 1 in 100 year flood level, taking in to account climate change, for the site.

1.1.4 This assessment is a holistic risk based assessment of potential flooding from all possible sources, including fluvial flooding, groundwater and surface water run-off. The assessment also identifies and examines the residual flood risk to the site and neighbouring properties. The aim of this report primarily is to consider flood risk and satisfy requirements under Planning Policy Statement 25 for Development and Flood Risk.

1.1.5 Whilst completing the assessment, consideration has been given to the consultation paper of 'A Practice Guide Companion to PPS 25' which has been released as a 'Living Draft'. The assessment has been undertaken in accordance with CIRIA C624, 'Development and Flood Risk - Guidance for the Construction Industry' (2004) and Flood Risk Assessment Guidance for New Development, Phase 2, R & D Technical Report FD2320/TR2 (2005).

1.1.6 This report also provides an outline drainage strategy for the foul and surface water flows from the proposed development, based on currently available information.

1.2 LIMITATIONS

1.2.1 The Flood Risk Assessment has been prepared to support the outline planning application. Detailed design information for the proposed buildings and drainage systems was not available at the time of undertaking this study.

1.2.2 Any statements relating to flood levels and flood probability are subject to uncertainties inherent with the flood modelling process.

2 Existing Conditions

2.1 TOPOGRAPHY AND SETTING

2.1.1 The site is located at the junction of Hulme Street and Oxford Road (NGR SJ841974), to the south east of Oxford Road Train Station in Manchester city centre. A site location plan is shown in Appendix A.

2.1.2 Hulme Street forms the southern boundary of the site while Oxford Road bounds the site to the east.

2.1.3 To the north the site is bounded by the River Medlock and to the west by further development along Hulme Street and Marlborough Street.

2.1.4 The site covers an area of approximately 0.051 hectares. The site currently comprises a 2 storey building used for commercial purposes. The building footprint utilises the total area of the site.

2.1.5 A topographic land survey has been undertaken and is presented in Appendix B. Level information shows that Oxford Road is situated at approximately 33.24mAOD. Hulme Street is situated at approximately 33.21mAOD with levels dropping to 32.38mAOD to the west.

2.1.6 Levels across the site fall from approximately 33.23mAOD to the east to 32.59mAOD to the west following the gradient of Hulme Street. The ground floor level within the building is approximately 33.26mAOD and the basement is located at approximately 29.41mAOD.

2.1.7 The high point of the site is located around the road junction of Hulme Street and Oxford Road, and the low point is at the south east of the site along Hulme Street.

2.2 EXISTING SITE DRAINAGE

2.2.1 The site is currently developed with private foul and surface water drainage systems.

2.2.2 Drainage plans have been obtained from United Utilities and are shown in Appendix C.

2.2.3 There is a 900mm x 520mm brick surface water sewer running west to east along Oxford Road. This sewer discharges surface water directly into the River Medlock underneath the road bridge.

2.2.4 The existing private drainage of the site is currently unknown, however, following a site visit it appears that the existing surface water from the roof is discharged directly to the River Medlock.

2.2.5 The private foul drainage system for the site is currently unknown. There is a 225mm vitrified clay combined sewer within Hulme Street. This sewer discharges into the main foul sewer within Oxford Road. It is assumed that the public foul drainage from the site discharges to the sewer in Hulme Street.

2.2.6 United Utilities have been consulted with regard to any records of sewer flooding at the site and within the vicinity of Hulme Street and Oxford Road. At the time of writing the report no response had been received.

2.3 EXISTING FLOOD RECORDS

2.3.1 The Chronology of British Hydrological Events website was used to research historical flood events on the River Medlock. (Ref: www.dundee.ac.uk/geography/cbhe)

2.3.2 Early records exist of flooding in the area of the River Medlock at various locations and possibly adjacent to the site in the years 1852, 1857, 1860, 1866 and 1872. These floods are thought to be the result of heavy rainfall in the region.

2.3.3 The record of 13 July 1872 states this flood to be the most disastrous flood which ever visited Manchester. The flood was a result of prolonged heavy rainfall with a months expected rainfall falling on 12 and 13 July.

2.3.4 The historical flood records do not indicate clearly the exact location of the floods along the River Medlock; however the junction of the River Irwell and the River Medlock was reported as being flooded, therefore, it has been assumed that flooding would have occurred in the vicinity of the site.

2.3.5 Anecdotal evidence suggests there are no known flooding events for the basement of the building from the river. This information, provided for a previous flood study undertaken at the site, was given by a Surveyor who has been involved with the building for the past 20 years.

2.3.6 Previous work undertaken at the site by the Denis Wilson Partnership (January 2007) states that the Environment Agency is not aware of any flooding problems affecting this site and holds no records to indicate that the site has previously been subject to flooding.

2.3.7 We are currently awaiting a consultation response from the EA with regard to the redevelopment of the site.

2.3.8 The Environment Agency is unable to provide 1 in 100 year flood levels for the site and so a detailed river modelling study has been undertaken to assess the risk of fluvial flooding.

2.3.9 Previous work undertaken by Denis Wilson Partnership (January 2007) states Manchester City Council do not have any records of flooding of the highway at this location. We are still awaiting a consultation response from Manchester City Council.

3 Planning Context

- 3.1.1 The site is currently located entirely within Flood Zone 3 (High Risk) as defined on the Environment Agency Flood Zone maps (refer to Appendix D). This is land designated as having a 1.0 % or greater annual probability of flooding from rivers in any year.
- 3.1.2 The existing 2 storey building, including the basement, will be demolished and a new 13 storey building with a basement will be constructed on the existing building footprint.
- 3.1.3 Upon completion the proposed development will provide commercial/retail facilities at both the ground floor and basement level, with the first through to thirteenth floor providing hotel facilities.
- 3.1.4 The ground floor level for the building will not change, however the basement level is to be raised from 29.41mAOD to 29.75mAOD, an increase of 0.34m.
- 3.1.5 Buildings used for shops, restaurants, cafés and offices are classed as less vulnerable development, as defined in Table D2 of PPS 25. Table D3 in PPS 25 shows that less vulnerable development is classed as appropriate development in Flood Zone 3. The development proposals include these less vulnerable uses in the basement area and ground floor of the building.
- 3.1.6 Buildings used for hotels are classed as more vulnerable development, as defined in Table D2 of PPS 25. It is proposed that floors 1 to 13 within the proposed development are used as hotel accommodation. This places the more vulnerable hotel facilities above the less vulnerable ground floor and basement retail/commercial development.
- 3.1.7 Standing advice for development in Flood Zone 3a states that developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage techniques.
- 3.1.8 For the development at 2-4 Oxford Road this has been achieved by placing less vulnerable retail and commercial development on the basement and ground floor level with the more vulnerable hotel facilities on the higher stories.
- 3.1.9 Developers and local authorities should also create space for flooding to occur by restoring functional floodplain and flood flow pathways and by identifying, allocating and safeguarding open space for flood storage.
- 3.1.10 A Strategic Flood Risk Assessment (SFRA) for the Greater Manchester area is currently being undertaken and, therefore, was not available for this study.

4 Hydraulic Modelling of the River Medlock

4.1 RIVER MEDLOCK

4.1.1 The River Medlock flows through the city centre of Manchester primarily through canalised sections and culverts. The proposed development site is on the south or 'left' bank of the River Medlock when looking downstream.

4.1.2 The River Medlock flows adjacent to the north of the building in a south easterly direction and outfalls to the Bridgewater Canal, approximately 1 mile to the east.

4.1.3 The Bridgewater Canal flows from north to south in an easterly direction. At the location of the River Medlock and the Bridgewater Canal confluence, the River Irwell also joins the Bridgewater Canal.

4.1.4 Directly adjacent to the northern corner of the building, upstream of the site, there is a road bridge across the River Medlock. Downstream of the building, the River Medlock becomes culverted.

4.1.5 No reliable flood level information was available for the site, so a hydraulic river modelling study was undertaken to establish the fluvial flood risk to the site.

4.1.6 The InfoWorks model used for this study was previously used as part of a flood risk assessment study for a proposed development on Owen Street in the Castlefields area of Manchester.

4.1.7 This model has been amended for the Oxford Street study to include a car park off Charles Street that would act as a flood storage area should the River Medlock flood and to establish any overland flow routes from upstream of the proposed development site.

4.2 RIVER SURVEY DATA

4.2.1 An additional topographical survey, to include the car park and Charles Street, was commissioned by WSP and undertaken by Formby Surveys in November 2007.

4.2.2 The survey consisted of spot levels throughout the car park and the centreline levels along Charles Street and York Street. Details of the survey are shown in Appendix B.

4.3 HYDROLOGY

4.3.1 The 1 in 100 year flow was taken from the Environment Agency River Irwell Catchment Flood Management Plan (CFMP), as calculated at the London Road gauging station approximately 1 km upstream of the site.

4.3.2 The critical storm duration for the River Medlock catchment was calculated using the Flood Estimation Handbook (FEH) to be 2.35 hours. The critical storm duration and hydrograph were generated using the Rainfall-Runoff method. Details of the hydrology can be seen in Appendix E.

4.3.3 To account for the additional surface water run-off from the catchment between London Road and the development site, modelled surface water outfall flows were obtained from United Utilities. The storm duration used for the sewer flows was 2 hours (winter profile); to most closely match the critical storm duration for the River Medlock catchment. The United Utilities flow data are shown in Appendix F.

4.3.4 The peak flows at the London Road gauging station for the 1 in 100 year event, with and without the effects of climate change are as shown in Table 1 below. The 10 and 100 year return period flows are taken from the Environment Agency River Irwell CFMP.

Table 1 Peak flows and levels

Return Period (1/Year)	Peak Flow (m ³ /s)	Peak Water Level (m AOD)		
		Upstream Car Park	Upstream of site (Section 13A)	Downstream of site (Section 14A)
5	28.5	Model not run		
10	34.7	Model not run		
100	46.5	31.32	29.51	29.43
100 + 20%	55.8	31.97	29.99	29.93
200	57.6	31.97	30.00	29.95

4.3.5 The 5 year flow was estimated from the FEH Rainfall-Runoff method, then applying a factor derived from the ratio of the 1 in 10 year return period flow, as published in the CFMP, to the 1 in 10 year from as estimated from the FEH Rainfall-Runoff method.

4.4 MODEL DETAILS

4.4.1 The model was constructed using InfoWorks RS version 7.5 river modelling software. The model consisted of:

- 44 no. river cross sections
- 4 no. rectangular culverts
- 1 no. sprung arch culvert
- 4 no. bridges

4.4.2 A plan of the river model is shown Appendix G.

4.4.3 The upstream boundary of the model was located at London Road. The downstream boundary was a normal depth boundary at the confluence with the River Irwell.

4.4.4 The River Medlock channel consists mainly of brick lined rectangular channels. Any flood plain flow is over roads and paved areas. Therefore Manning's roughness coefficients selected for use in the model were 0.03 for the main channel and 0.04 for the flood plain.

4.5 SENSITIVITY ANALYSIS

4.5.1 In accordance with the Environment Agency's Best Practice Guidance on computer river modelling, the sensitivity of several model parameters were tested, including Manning's number, flow, and the blockage of the downstream culvert.

4.5.2 The results of the sensitivity analysis are shown in Table 2 below.

Table 2 Sensitivity Analysis

	Level at Section 14A (m AOD)	Difference compared to 1 in 100 Year level (m)
1 in 100 Year Flow	29.43	N/A
1 in 100 Year Flow including climate change	29.93	+0.5
Manning's +20%	29.65	+0.22
Manning's -20%	29.17	-0.26
Downstream Culvert Blockage	30.32	+0.89

4.5.3 There is 0.50m increase in peak level due to climate change, which includes a 20% increase in fluvial flow and a 30% increase on rainfall in the surface water sewer discharges.

4.5.4 The increase in level due to a 20% increase in Manning's roughness coefficient is 220mm. This increase is not significant to jeopardise the main findings of the model.

4.5.5 If the downstream culvert were to become 50% blocked, the model has predicted an increase in 890mm in the 1 in 100 year level at the site.

4.5.6 A sensitivity test was not undertaken on the downstream boundary in this instance as it is considered that the location of the boundary is too far downstream from the site to have any impact on flood water levels.

4.6 MODEL RESULTS

4.6.1 A complete set of model results for the 1 in 100 year event and 1 in 100 year event including climate change can be found in Appendix H.

4.6.2 The peak 1 in 100 year water level at the development site is 29.43m AOD and the model shows that the river stays within bank as it passes the development site. This flood level is below the proposed basement floor level of 29.75m AOD.

4.6.3 The peak 1 in 100 year water level, taking into account climate change, at the development site is 180mm above the proposed basement floor level of 29.75m AOD. The peak 1 in 200 year water level is 200mm above the proposed basement level.

4.6.4 The 1 in 100 year water level, taking into account climate change, in the car park off Charles Street is 31.97mAOD. Looking at the topography of the area, especially levels along Oxford Road, there are no overland flow routes to the development site. This is also true for the 1 in 200 year flood event.

4.6.5 The model hydrograph indicates that, based on the critical storm duration for the catchment, the time to peak for river flow is approximately 3.45hours.

4.6.6 The model has predicted that the development site is outside the 1 in 100 year flood plain, and so at a risk of flooding of less than 1% per year.

5 Sources and Assessment of Flooding

5.1 FLUVIAL FLOOD RISK

5.1.1 The site is currently located entirely within Flood Zone 3 (High Risk) as defined on the Environment Agency Flood Zone maps (refer to Appendix D). This is land designated as having a 1.0 % or greater annual probability of flooding from rivers in any year.

5.1.2 The Flood Study undertaken for the site (Section 4) shows that the River Medlock stays within bank for a 1 in 100 year flood event as it passes the development site.

5.1.3 Upstream at the Charles Street car park flood water comes out of bank for a 1 in 100 year flood event, flooding the car park to a level of 31.32m AOD.

5.1.4 The topography along Charles Street (approximately 32.06m AOD) and Oxford Road (approximately 33.24m AOD), suggests that there are no flow routes to the site from upstream from a 1 in 100 year event.

5.1.5 The 1 in 200 year flood level within the car park is calculated as 31.97m AOD. This water level remains below the road levels along Charles Street and Oxford Road. There is, therefore, no residual risk of flooding to the site from an extreme event when the River Medlock floods upstream of the site.

5.1.6 The model has predicted that the development site is outside the 1 in 100 year flood plain, and so at a risk of flooding of less than 1% per year.

5.2 TIDAL FLOOD RISK

5.2.1 The site is not in a coastal location therefore the risk of tidal flooding is negligible.

5.3 GROUNDWATER FLOODING

5.3.1 Geological information for the area indicates that the underlying geology comprises Brown Clay earth and Gravel. A borehole drilled at the road junction of Oxford Road and Hulme Street show clay and running sand beneath the Brown Clay and Gravel.

5.3.2 The site does not lie within a currently defined Groundwater Source Protection Zone.

5.3.3 Previous work undertaken at the site by the Denis Wilson Partnership (January 2007) states the Environment Agency has reported that there are no known problems with groundwater flooding at the site.

5.3.4 It is considered, based on the available data, that the risk of groundwater flooding to the site is negligible.

5.4 OVERLAND FLOW

5.4.1 The land uses surrounding the site will be served by a system of sewers and highway gullies and will reduce the possibility of overland flow to the development site from the surrounding land.

5.4.2 Currently the site is 100% impermeable with the total site area utilized by the building footprint. Given the topography of the site, sloping away from the existing building, water would not pond around the development.

5.4.3 Due to the nature of the site levels and the location of the building in relation to the existing road layout if overland flow did occur, during extreme rainfall events, it would be expected to discharge into the existing road gullies and drainage system.

5.4.4 Surrounding buildings are expected to drain into the existing drainage system and therefore the flood risk from the surrounding area is considered to be low.

5.4.5 There are no known existing problems on the site or in the surrounding area relating to flooding from overland flow.

5.4.6 Based on current available information it is considered that the flood risk to the site from overland flow is negligible.

5.5 SURCHARGED SEWER FLOODING

5.5.1 The outfall from the private foul drainage within the site is unknown; however it is assumed that the system discharges to the foul sewer in Hulme Street.

5.5.2 The site is surrounded by commercial and residential buildings that will all have associated surface and foul water/combined drainage systems. These systems may surcharge under extreme storm conditions and this has the potential to lead to flooding of the site.

5.5.3 Gradients on the surrounding sites are such that any flows resulting from surcharging of the drainage system during extreme rainfall events would be short term and relatively shallow in depth, therefore no water accumulation would occur on site.

5.5.4 United Utilities have been consulted with regard to any records of sewer flooding at the site and within the vicinity of Hulme Street and Oxford Road. At the time of writing the report no response had been received.

5.5.5 Based on the information available at the time of writing this report it is considered that the risk of flooding from surcharging sewers is considered to be low.

5.6 FLOODING FROM OTHER SOURCES

5.6.1 Non- natural or artificial sources of flooding can include reservoirs, lakes, canals etc. The potential effects of flood risk management infrastructure and other structures also needs to be considered. Flooding from a canal may occur as a result of the facility being overwhelmed, i.e. failure of a lock mechanism etc. Flooding from canals is possible, but only in exceptional circumstances.

5.6.2 Bridgewater Canal is located approximately 1 mile to the east of the development site.

5.6.3 British Waterways Guidance Note for Flood Risk Assessments states that if an assessment involves land that is above the canal level or separated by a significant area of low lying land, then flooding from the canal is practically impossible.

5.6.4 Based on the local topography of the site and the Bridgewater canal it is considered that the flood risk from the canal is negligible.

6 Development and Flood Risk Management

6.1 OUTLINE SURFACE WATER DRAINAGE STRATEGY

6.1.1 The Environment Agency recommendations for the management of surface water are that; "Surface water run-off should be controlled as near to its source as possible through a sustainable drainage approach to surface water management. This approach involves using a range of techniques including soakaways, infiltration trenches, permeable pavements, grassed swales, ponds and wetlands to reduce flood risk by attenuating the rate and quantity of surface water run-off from a site. This approach can also offer other benefits in terms of promoting groundwater recharge, water quality improvement and amenity enhancements. Approved Document Part H of the Building Regulations 2000 sets out a hierarchy for surface water disposal which encourages a SUDs approach" (Environment Agency, 2004).

6.1.2 The site extends to 0.051ha and is occupied by one building therefore the site is 100% impermeable. 'Greenfield' run-off rates, therefore, have not been considered in this instance.

6.1.3 Surface water run off from the site currently drains from the roof directly to the River Medlock.

6.1.4 Preliminary calculations for the existing surface water run-off have been calculated using WINDES. For an urbanised area using a 1 in 100 year storm the existing surface water run-off is calculated to be approximately 17.7l/s.

Estimated existing surface water discharge (l/s)

QBAR	11.2
1 in 30 year storm event	16.8
1 in 100 year storm event	17.7
1 in 100 year plus climate change	21.2

6.1.5 The area of the proposed development is not expected to change from the existing building therefore surface water run-off rates would not be expected to increase post development.

6.1.6 Due to the nature of the site the scope for using SUDS is very limited.

6.1.7 The technical feasibility and economic viability of source control options would be assessed at the detailed design stage once more information is available.

6.2 OUTLINE FOUL WATER DRAINAGE STRATEGY

6.2.1 It is assumed that the public foul drainage from the site discharges to the 225mm vitrified clay combined sewer in Hulme Street.

6.2.2 It is assumed that the development will utilize the existing connection to sewer. The exact location of the connection point would be determined during the detailed design stage.

6.2.3 The proposed foul drainage design for the basement facilities should be such that the surcharge of public sewers or increased river flows cannot 'back flow' and enter the basement area.

6.2.4 United Utilities have been contacted to ascertain if there is sufficient capacity within the combined sewer system to receive flows from the proposed development. At the time of writing the report no response had been received.

6.3 OVERLAND FLOWS - MITIGATION

6.3.1 Surface water drainage systems have the potential to flood under extreme conditions - design standards generally require sewers to be designed for no flooding from a 1 in 30 year storm.

6.3.2 The ground floor level for the building will not change. Along Oxford Road the ground floor levels are approximately 190mm above existing ground level. This provides some freeboard protection from overland flow.

6.3.3 The difference between finished ground floor levels and the existing ground level increases along Hulme Street as the topography drops away to the west, protecting the building against flooding from overland flow.

6.4 ACCESS AND EGRESS

6.4.1 The proposed development includes a basement that has internal access to a higher floor within the building. This internal access will be maintained providing evacuation routes for occupants to a safe place of refuge on the higher floors within the hotel should internal flooding occur.

6.4.2 The relevant information regarding 'What to do in the event of a flood' will be included in the site health and safety plan. Site notices will include methods of evacuation and notification of dry refuge areas.

6.4.3 It is recommended that a designated flood safety officer be appointed for the site to take responsibility for implementing and coordinating flood management procedures including flood warning and emergency and evacuation planning.

6.4.4 The model predicts a time to peak for the maximum flood level at the development site of 3.45 hours. This time to peak gives some indication of the time available to evacuate the basement should an extreme flood event occur.

6.5 FLOOD RESILIENCE MEASURES

6.5.1 Sleeping accommodation will not be included as part of development plans for the basement. It is proposed that the basement will be used as a restaurant for the hotel complex and for staff offices, washrooms and changing areas.

6.5.2 It is recommended that features such as windows, vents and pipes entering the building are sited above the 100 year plus climate change water level to limit possible water access points to the building.

6.5.3 Flood proofing measures should be adopted to minimise risk to people and property in the event of a flood. These can include:

- A waterproof membrane laid in the foundations,
- Anti-backflow valves to drains and sewers,
- Solid rather than suspended floors,
- Waterproof sealant on exterior walls and water resistant paint for internal basement and ground floor decoration.
- Raising all electrics and services to at least 900mm above floor level.

6.5.4 Consideration should be given to the following guidance:

- CIRIA Report 139 (1995): Water Resisting Basement Construction, Safeguarding new and existing basements against water and dampness,
- NHBC Standards 2006,
- Communities and Local Government (2007) Improving the Flood Performance of New Buildings – Flood Resilient Construction.

6.6 RESIDUAL RISK

6.6.1 Both the 1 in 100 year, taking into account climate change (29.93m AOD), and 1 in 200 year (29.95m AOD) modelled water levels are above the proposed level of the basement floor (29.75m AOD) creating a residual flood risk to the building during extreme events due to the potential associated increase in the groundwater table.

6.6.2 This residual flood risk to the development can be mitigated against by building flood resilience measures in to the construction of the basement.

7 Conclusions

- 7.1.1 WSP has undertaken a Flood Risk Assessment in accordance with Planning Policy Statement 25 (PPS 25) including a hydraulic river modelling Flood Study for the River Medlock.
- 7.1.2 The modelling has shown that the site is not at risk from flooding in the 1 in 100 year (or 1% annual probability) event and therefore is located in Flood Zone 2, having between a 1 in 100 and 1 in 1000 annual probability of river flooding in any year.
- 7.1.3 The Flood Study has shown that the effect of climate change on fluvial flows will not be sufficient to cause flooding to the site
- 7.1.4 With regard to the Sequential Test described in Annex D of PPS25, the site is reclassified to Flood Zone 2, which has a medium risk of flooding.
- 7.1.5 Table D.1 in Annex D of PPS 25 classifies residential development as "more vulnerable". In Flood Zone 2, more vulnerable development is permitted.
- 7.1.6 Consequently, the site satisfies the Sequential Test and there is no requirement for an Exception Test.
- 7.1.7 Due to the topography of the site the risk of flooding from groundwater or overland flows from adjacent land is considered to be negligible.
- 7.1.8 Surface water run off from the site currently drains from the roof directly to the River Medlock. The area of the proposed development is not expected to change from the existing building therefore surface water run-off rates would not be expected to increase post development.
- 7.1.9 The proposed foul drainage design for the basement facilities should be such that the surcharge of public sewers or increased river flows cannot 'back flow' and enter the basement area.
- 7.1.10 Due to the nature of the site the scope for using SUDS is limited. There are, however a number of source control options available to minimise the run-off from the site. These include green roofs and rainwater recycling.
- 7.1.11 This flood risk assessment and outline drainage strategy is based on the review of currently available information and is considered to be appropriate to the scale and nature of the development. The recommendations stated above should be integrated into the detailed design of the proposed development and the appropriate regulatory approvals obtained.

8 Recommendations for Further Work

8.1.1 As the result of work undertaken as part of the Flood Risk Assessment the following recommendations are given.

8.1.2 The technical feasibility of source control options for surface water run-off should be assessed at the detailed design stage.

8.1.3 Detailed design of the foul and surface water drainage should be undertaken based on the final development layout and impermeable area and agreed with the relevant authorities.

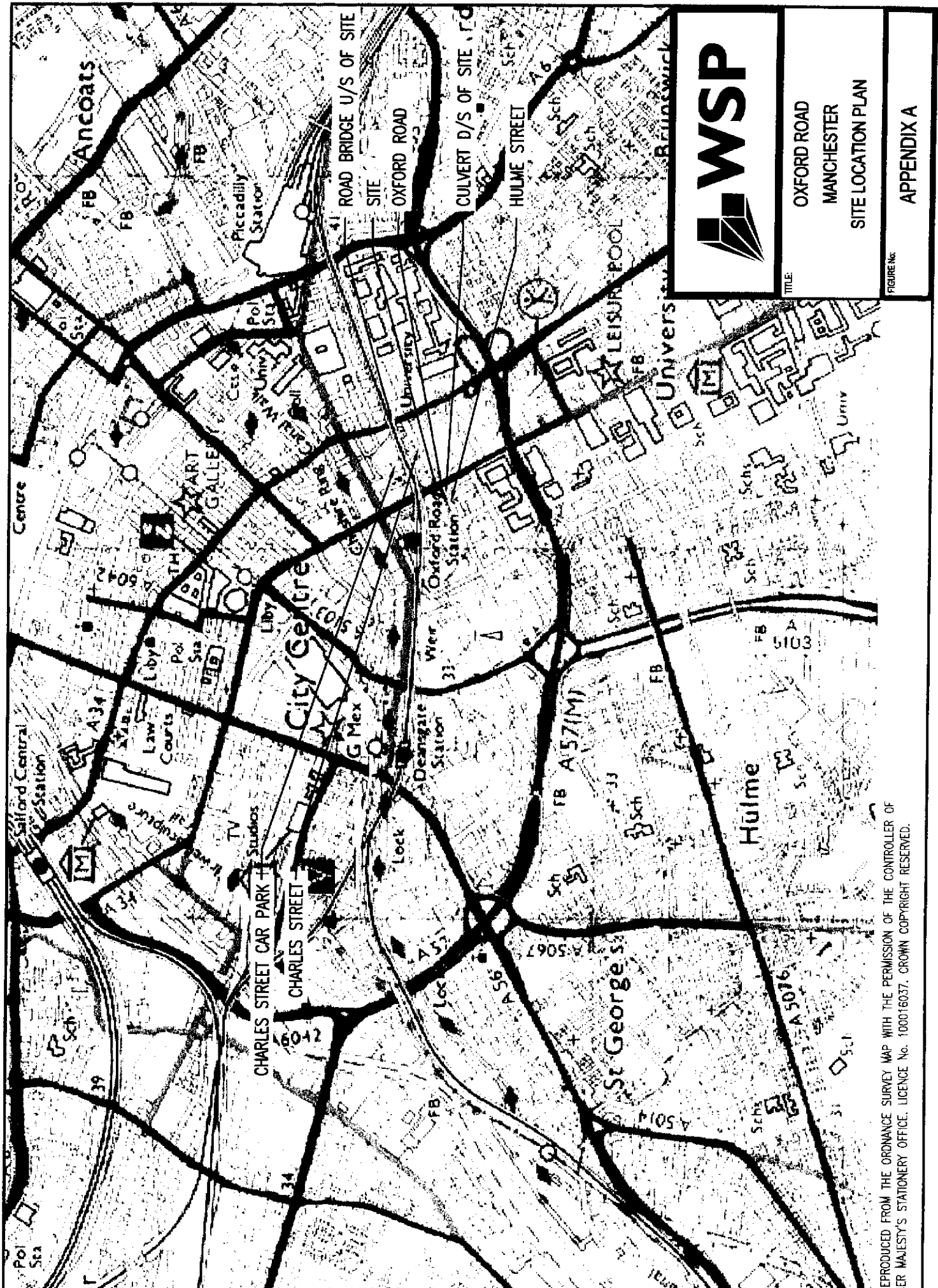
8.1.4 Formal agreement with United Utilities should be secured for the discharge of foul flows from the site to the public sewer system. Requirements for any additional infrastructure should be determined at the detailed design stage and should allow designs for the prevention of 'backflow' to the basement area from surcharged sewers and increased river levels.

8.1.5 The existing connection to sewer from the development and the levels of the existing public drainage infrastructure should be verified.

8.1.6 The technical feasibility of flood resilient construction should be assessed at the detailed design stage.

8.1.7 It is recommended that a designated flood safety officer be appointed for the site to take responsibility for implementing and coordinating flood management procedures including flood warning and emergency and evacuation planning.

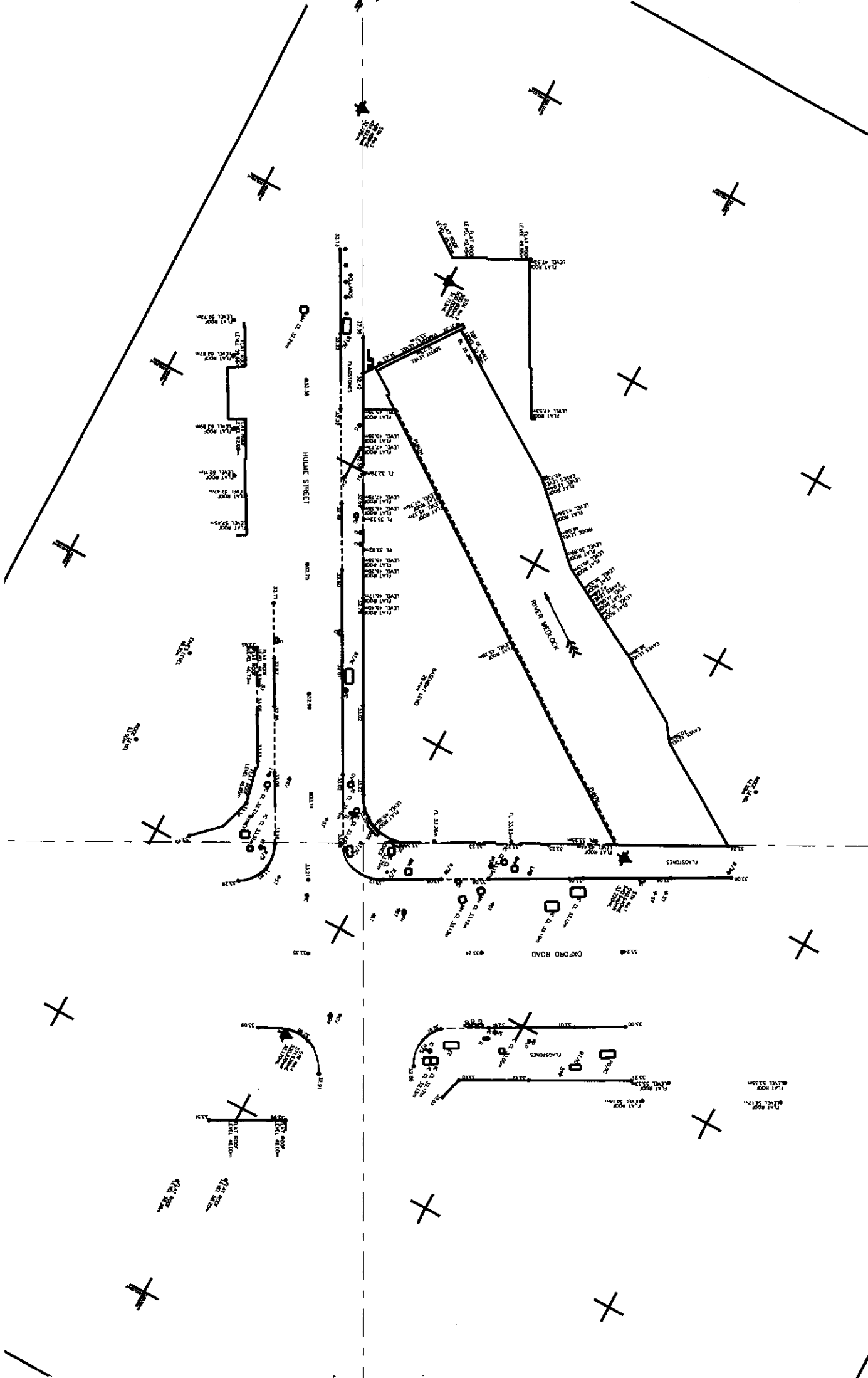
Appendix A Site Location Plan



 WSP	
OXFORD ROAD MANCHESTER SITE LOCATION PLAN	
APPENDIX A	

REPRODUCED FROM THE ORDNANCE SURVEY MAP WITH THE PERMISSION OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE. LICENCE No. 100016037. CROWN COPYRIGHT RESERVED.

Appendix B Topographical Survey





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Additional Works
River Medlock
Manchester

BRIDGE MARK INFORMATION

MANUFACTURER'S

DATE

TIME

LOCATION

STATUS

REMARKS

Appendix C Existing Drainage Records

Printed by: ANI

Scale 1:1250 Date: 7-Nov-2007



Global Customer Portfolio Overview - Q3 2024										Regional Performance Analysis - Q3 2024									
Customer Identification					Product Engagement					North America					Europe				
ID	Name	Email	Phone	Address	Product Line	Usage Score	Feedback Rating	Churn Risk	Support Tickets	Region	Country	City	Sales Rep	Revenue	Region	Country	City	Sales Rep	Revenue
0001	John Doe	j.doe@corp.com	+1 555 123 4567	123 Main St, New York, NY 10001	Software	95	4.8	Low	2	North America	USA	New York	Alice Smith	\$120,000	Europe	Germany	Berlin	Bob Müller	\$85,000
0002	Jane Smith	j.smith@corp.com	+1 555 234 5678	456 Oak Ave, Los Angeles, CA 90001	Hardware	88	4.5	Medium	5	North America	USA	Los Angeles	Charlie Brown	\$95,000	Europe	France	Paris	Diana Dubois	\$70,000
0003	Michael Chen	m.chen@corp.com	+1 555 345 6789	789 Pine St, San Francisco, CA 94102	Services	92	4.9	Low	1	North America	USA	San Francisco	Eve Davis	\$110,000	Europe	UK	London	Frank White	\$90,000
0004	Sarah Johnson	s.johnson@corp.com	+1 555 456 7890	321 Elm St, Chicago, IL 60601	Software	80	4.2	Medium	8	North America	USA	Chicago	Grace Lee	\$75,000	Europe	Italy	Rome	Henry Black	\$60,000
0005	David Wilson	d.wilson@corp.com	+1 555 567 8901	654 Maple St, Houston, TX 77001	Hardware	75	4.0	High	12	North America	USA	Houston	Ivan King	\$60,000	Europe	Spain	Madrid	Julia Garcia	\$50,000
0006	Emily Brown	e.brown@corp.com	+1 555 678 9012	987 Cedar St, Phoenix, AZ 85001	Services	85	4.6	Medium	4	North America	USA	Phoenix	Karen Green	\$80,000	Europe	Netherlands	Amsterdam	Leo van der Berg	\$65,000
0007	Robert Taylor	r.taylor@corp.com	+1 555 789 0123	147 Birch St, Philadelphia, PA 19101	Software	70	3.8	High	15	North America	USA	Philadelphia	Mike Red	\$55,000	Europe	Sweden	Stockholm	Nina Johansson	\$45,000
0008	Lisa Anderson	l.anderson@corp.com	+1 555 890 1234	258 Spruce St, San Diego, CA 92101	Hardware	90	4.7	Low	3	North America	USA	San Diego	Olivia Blue	\$100,000	Europe	Belgium	Brussels	Peter De Vries	\$75,000
0009	James Miller	j.miller@corp.com	+1 555 901 2345	369 Willow St, Austin, TX 78701	Services	82	4.3	Medium	6	North America	USA	Austin	Quinn Yellow	\$70,000	Europe	Austria	Vienna	Rachel Huber	\$55,000
0010	Amanda Clark	a.clark@corp.com	+1 555 012 3456	470 Ash St, Portland, OR 97201	Software	78	4.1	Medium	9	North America	USA	Portland	Sam Purple	\$65,000	Europe	Switzerland	Zurich	Thomas Kuster	\$50,000
0011	Christopher Lee	c.lee@corp.com	+1 555 123 4567	581 Hickory St, San Jose, CA 95131	Hardware	85	4.4	Medium	7	North America	USA	San Jose	Tina Silver	\$85,000	Europe	Denmark	Copenhagen	Uwe Andersen	\$70,000
0012	Nicole White	n.white@corp.com	+1 555 234 5678	692 Poplar St, Dallas, TX 75201	Services	72	3.9	High	14	North America	USA	Dallas	Victor Bronze	\$50,000	Europe	Poland	Warsaw	Wendolína Kowalski	\$40,000
0013	Kevin Harris	k.harris@corp.com	+1 555 345 6789	703 Sycamore St, San Antonio, TX 78201	Software	88	4.6	Medium	5	North America	USA	San Antonio	Xavier Gold	\$90,000	Europe	Czech Republic	Prague	Yvonne Novakova	\$60,000
0014	Michelle King	m.king@corp.com	+1 555 456 7890	814 Dogwood St, Fort Worth, TX 76101	Hardware	75	4.0	High	13	North America	USA	Fort Worth	Zoe Platinum	\$60,000	Europe	Slovakia	Bratislava	Adam Kovacs	\$45,000
0015	Gregory Scott	g.scott@corp.com	+1 555 567 8901	925 Magnolia St, Jacksonville, FL 32201	Services	80	4.3	Medium	8	North America	USA	Jacksonville	Ben Copper	\$70,000	Europe	Slovenia	Ljubljana	Chloe Novak	\$55,000
0016	Hannah Green	h.green@corp.com	+1 555 678 9012	036 Redwood St, San Luis Obispo, CA 93401	Software	70	3.7	High	16	North America	USA	San Luis Obispo	Dan Nickel	\$45,000	Europe	Croatia	Zagreb	Eva Horvath	\$35,000
0017	Isaac Adams	i.adams@corp.com	+1 555 789 0123	147 Cypress St, Meriden, CT 06460	Hardware	85	4.5	Medium	6	North America	USA	Meriden	Fiona Iron	\$80,000	Europe	Hungary	Budapest	Georg Szabo	\$65,000
0018	Julia Baker	j.baker@corp.com	+1 555 890 1234	258 Fir St, Bridgeport, CT 06610	Services	78	4.2	Medium	10	North America	USA	Bridgeport	Gavin Tin	\$65,000	Europe	Romania	Bucharest	Helen Popescu	\$50,000
0019	Samuel Nelson	s.nelson@corp.com	+1 555 901 2345	369 Gum St, Waterbury, CT 06706	Software	72	3.9	High	14	North America	USA	Waterbury	Hannah Lead	\$50,000	Europe	Bulgaria	Sofia	Ivan Petrov	\$40,000
0020	Victoria Hill	v.hill@corp.com	+1 555 012 3456	470 Hawthorn St, Danbury, CT 06810	Hardware	80	4.4	Medium	7	North America	USA	Danbury	Isaac Silver	\$70,000	Europe	Serbia	Belgrade	Jana Petrovic	\$55,000
0021	William Evans	w.evans@corp.com	+1 555 123 4567	581 Sycamore St, Hartford, CT 06103	Services	85	4.5	Medium	5	North America	USA	Hartford	Julia Bronze	\$85,000	Europe	Cyprus	Nicosia	Kostas Christou	\$60,000
0022	Olivia King	o.king@corp.com	+1 555 234 5678	692 Elm St, Springfield, MA 01103	Software	75	4.1	Medium	9	North America	USA	Springfield	Leo Gold	\$65,000	Europe	Latvia	Riga	Andris Kalvins	\$45,000
0023	Benjamin Lee	b.lee@corp.com	+1 555 345 6789	703 Maple St, Worcester, MA 01601	Hardware	82	4.3	Medium	6	North America	USA	Worcester	Mia Silver	\$75,000	Europe	Lithuania	Vilnius	Jonas Petraitis	\$55,000
0024	Charlotte Brown	c.brown@corp.com	+1 555 456 7890	814 Birch St, Lowell, MA 01850	Services	70	3.8	High	15	North America	USA	Lowell	Noah Copper	\$55,000	Europe	Slovenia	Ljubljana	Chloe Novak	\$55,000
0025	Lucas White	l.white@corp.com	+1 555 567 8901	925 Oak St, Haverhill, MA 01830	Software	88	4.6	Medium	5	North America	USA	Haverhill	Aria Gold	\$90,000	Europe	Poland	Warsaw	Wendolína Kowalski	\$60,000
0026	Amelia Green	a.green@corp.com	+1 555 678 9012	036 Pine St, Andover, MA 01810	Hardware	78	4.2	Medium	10	North America	USA	Andover	Ethan Silver	\$65,000	Europe	Czech Republic	Prague	Yvonne Novakova	\$55,000
0027	Sebastian Adams	s.adams@corp.com	+1 555 789 0123	147 Cedar St, Methuen, MA 01844	Services	72	3.9	High	14	North America	USA	Methuen	Oliver Bronze	\$50,000	Europe	Slovakia	Bratislava	Adam Kovacs	\$45,000
0028	Harper Brown	h.brown@corp.com	+1 555 890 1234	258 Elm St, Salem, MA 01970	Software	85	4.5	Medium	6	North America	USA	Salem	Charlotte Gold	\$80,000	Europe	Hungary	Budapest	Georg Szabo	\$65,000
0029	Elijah White	e.white@corp.com	+1 555 901 2345	369 Maple St, Lynn, MA 01901	Hardware	75	4.1	Medium	9	North America	USA	Lynn	Benjamin Silver	\$65,000	Europe	Romania	Bucharest	Helen Popescu	\$50,000
0030	Avery Hill	a.hill@corp.com	+1 555 012 3456	470 Birch St, Boston, MA 02101	Services	80	4.3	Medium	8	North America	USA	Boston	Lucas Copper	\$70,000	Europe	Bulgaria	Sofia	Ivan Petrov	\$40,000
0031	Grayson King	g.king@corp.com	+1 555 123 4567	581 Oak St, Cambridge, MA 02142	Software	90	4.7	Low	3	North America	USA	Cambridge	Amelia Gold	\$100,000	Europe	Serbia	Belgrade	Jana Petrovic	\$55,000
0032	Isabella Lee	i.lee@corp.com	+1 555 234 5678	692 Pine St, Somerville, MA 02143	Hardware	82	4.3	Medium	6	North America	USA	Somerville	Grayson Silver	\$75,000	Europe	Cyprus	Nicosia	Kostas Christou	\$60,000
0033	Wyatt Brown	w.brown@corp.com	+1 555 345 6789	703 Elm St, Boston, MA 02101	Services	75	4.0	Medium	10	North America	USA	Boston	Isabella Bronze	\$65,000	Europe	Latvia	Riga	Andris Kalvins	\$45,000
0034	Madison Green	m.green@corp.com	+1 555 456 7890	814 Maple St, Boston, MA 02101	Software	88	4.6	Medium	5	North America	USA	Boston	Wyatt Gold	\$90,000	Europe	Lithuania	Vilnius	Jonas Petraitis	\$55,000
0035	Christopher Hill	c.hill@corp.com	+1 555 567 8901	925 Birch St, Boston, MA 02101	Hardware	78	4.2	Medium	10	North America	USA	Boston	Madison Silver	\$65,000	Europe	Slovenia	Ljubljana	Chloe Novak	\$55,000
0036	Isabella King	i.king@corp.com	+1 555 678 9012	036 Elm St, Boston, MA 02101	Services	72	3.9	High	14	North America	USA	Boston	Christopher Bronze	\$50,000	Europe	Poland	Warsaw	Wendolína Kowalski	\$60,000
0037	Grayson Lee	g.lee@corp.com	+1 555 789 0123	147 Maple St, Boston, MA 02101	Software	85	4.5	Medium	6	North America	USA	Boston	Isabella Gold	\$80,000	Europe	Hungary	Budapest	Georg Szabo	\$65,000
0038	Wyatt Brown	w.brown@corp.com	+1 555 890 1234	258 Birch St, Boston, MA 02101	Hardware	75	4.1	Medium	9	North America	USA	Boston	Grayson Silver	\$65,000	Europe	Romania	Bucharest	Helen Popescu	\$50,000
0039	Madison Green	m.green@corp.com	+1 555 901 2345	369 Elm St, Boston, MA 02101	Services	80	4.3	Medium	8	North America	USA	Boston	Wyatt Copper	\$70,000	Europe	Bulgaria	Sofia	Ivan Petrov	\$40,000
0040	Christopher Hill	c.hill@corp.com	+1 555 012 3456	470 Maple St, Boston, MA 02101	Software	90	4.7	Low	3	North America	USA	Boston	Isabella Gold	\$100,000	Europe	Serbia	Belgrade	Jana Petrovic	\$55,000
0041	Isabella King	i.king@corp.com	+1 555 123 4567	581 Elm St, Boston, MA 02101	Hardware	82	4.3	Medium	6	North America	USA	Boston	Grayson Silver	\$75,000	Europe	Cyprus	Nicosia	Kostas Christou	\$60,000
0042	Wyatt Brown	w.brown@corp.com	+1 555 234 5678	692 Maple St, Boston, MA 02101	Services	75	4.0	Medium	10	North America	USA	Boston	Isabella Bronze	\$65,000	Europe	Latvia	Riga	Andris Kalvins	\$45,000
0043	Madison Green	m.green@corp.com	+1 555 345 6789	703 Birch St, Boston, MA 02101	Software	88	4.6	Medium	5	North America	USA	Boston	Wyatt Gold	\$90,000	Europe	Lithuania	Vilnius	Jonas Petraitis	\$55,000
0044	Christopher Hill	c.hill@corp.com	+1 555 456 7890	814 Elm St, Boston, MA 02101	Hardware	78	4.2	Medium	10	North America	USA	Boston	Madison Silver	\$65,000	Europe	Slovenia	Ljubljana	Chloe Novak	\$55,000
0045	Isabella King	i.king@corp.com	+1 555 567 8901	925 Maple St, Boston, MA 02101	Services	72	3.9	High	14	North America	USA	Boston	Christopher Bronze	\$50,000	Europe	Poland	Warsaw	Wendolína Kowalski	\$60,000
0046	Grayson Lee	g.lee@corp.com	+1 555 678 9012	036 Elm St, Boston, MA 02101	Software	85	4.5	Medium	6	North America	USA	Boston	Isabella Gold	\$80,000	Europe	Hungary	Budapest	Georg Szabo	\$65,000
0047	Wyatt Brown	w.brown@corp.com	+1 555 789 0123	147 Maple St, Boston, MA 02101	Hardware	75	4.1	Medium	9	North America	USA	Boston	Grayson Silver	\$65,000	Europe	Romania	Bucharest	Helen Popescu	\$50,000
0048	Madison Green	m.green@corp.com	+1 555 890 1234	258 Birch St, Boston, MA 02101	Services	80	4.3	Medium	8	North America	USA	Boston	Wyatt Copper	\$70,000	Europe	Bulgaria	Sofia	Ivan Petrov	\$40,000
0049	Christopher Hill	c.hill@corp.com	+1 555 901 2345	369 Elm St, Boston, MA 02101	Software	90	4.7	Low	3	North America	USA	Boston	Isabella Gold	\$100,000	Europe	Serbia	Belgrade	Jana Petrovic	\$55,000
0050	Isabella King	i.king@corp.com	+1 555 012 3456	470 Maple St, Boston, MA 02101	Hardware	82	4.3	Medium	6	North America	USA	Boston	Grayson Silver	\$75,000	Europe	Cyprus	Nicosia	Kostas Christou	\$60,000
0051	Wyatt Brown	w.brown@corp.com	+1 555 123 4567	581 Elm St, Boston, MA 02101	Services	75	4.0	Medium	10	North America	USA	Boston	Isabella Bronze	\$65,000	Europe	Latvia	Riga	Andris Kalvins	\$45,000
0052	Madison Green	m.green@corp.com	+1 555 234 5678	692 Maple St, Boston, MA 02101	Software	88	4.6	Medium	5	North America	USA	Boston	Wyatt Gold	\$90,000	Europe	Lithuania	Vilnius	Jonas Petraitis	\$55,000
0053	Christopher Hill	c.hill@corp.com	+1 555 345 6789	703 Birch St, Boston, MA 02101	Hardware	78	4.2	Medium	10	North America	USA	Boston	Madison Silver	\$65,000	Europe	Slovenia	Ljubljana	Chloe Novak	\$55,000
0054	Isabella King	i.king@corp.com	+1 555 456 7890	814 Elm St, Boston, MA 02101	Services	72	3.9	High	14	North America	USA	Boston	Christopher Bronze	\$50,000	Europe	Poland	Warsaw	Wendolína Kowalski	\$60,000
0055	Grayson Lee	g.lee@corp.com	+1 555 567 8901	925 Maple St, Boston, MA 02101	Software	85	4.5	Medium	6	North America	USA	Boston	Isabella Gold	\$80,000	Europe	Hungary	Budapest	Georg Szabo	\$65,000
0056	Wyatt Brown	w.brown@corp.com	+1 555 678 9012	036 Elm St, Boston, MA 02101	Hardware	75	4.1	Medium	9	North America	USA	Boston	Grayson Silver	\$65,000	Europe	Romania	Bucharest	Helen Popescu	\$50,000
0057	Madison Green	m.green@corp.com	+1 555 789 0123	147 Maple St, Boston, MA 02101	Services	80	4.3	Medium	8	North America	USA	Boston	Wyatt Copper	\$70,000	Europe	Bulgaria	Sofia	Ivan Petrov	\$40,000
0058	Christopher Hill	c.hill@corp.com	+1 555 890 1234	258 Birch St, Boston, MA 02101	Software	90	4.7	Low	3	North America	USA	Boston	Isabella Gold	\$100,000	Europe	Serbia	Belgrade	Jana Petrovic	\$55,000
0059	Isabella King	i.king@corp.com	+1 555 901 2345	369 Elm St, Boston, MA 02101	Hardware	82	4.3	Medium	6	North America	USA	Boston	Grayson Silver	\$75,000	Europe	Cyprus	Nicosia	Kostas Christou	\$60,000
0060	Wyatt Brown	w.brown@corp.com	+1 555 012 3456	470 Maple St, Boston, MA 02101	Services	75	4.0	Medium	10	North America	USA	Boston	Isabella Bronze	\$65,000	Europe	Latvia	Riga	Andris Kalvins	\$45,000
0061	Madison Green	m.green@corp.com	+1 555 123 4567	581 Elm St, Boston, MA 02101	Software	88	4.6	Medium	5	North America	USA	Boston	Wyatt Gold	\$90,000	Europe	Lithuania	Vilnius	Jonas Petraitis	\$55,000
0062	Christopher Hill	c.hill@corp.com	+1 555 234 5678	692 Maple St, Boston, MA 02101	Hardware	78	4.2	Medium	10	North America	USA	Boston	Madison Silver	\$65,000	Europe	Slovenia	Ljubljana	Chloe Novak	\$55,000
0063	Isabella King	i.king@corp.com	+1 555 345 6789	703 Birch St, Boston, MA 02101	Services	72	3.9	High	14	North America	USA	Boston	Christopher Bronze	\$50,000	Europe	Poland	Warsaw	Wendolína Kowalski	\$60,000
0064	Grayson Lee	g.lee@corp.com	+1 555 456 7890	814 Elm St, Boston, MA 02101	Software	85	4.5	Medium	6	North America	USA	Boston	Isabella Gold	\$80,000	Europe	Hungary	Budapest	Georg Szabo	\$65,000
0065	Wyatt Brown	w.brown@corp.com	+1 555 567 8901	925 Maple St, Boston, MA 02101	Hardware	75	4.1	Medium	9	North America	USA	Boston	Grayson Silver	\$65,000	Europe	Romania	Bucharest	Helen Popescu	\$50,000
0066	Madison Green	m.green@corp.com	+1 555 678 9012	036 Elm St, Boston, MA 02101	Services	80	4.3	Medium	8	North America	USA	Boston	Wyatt Copper	\$70,000	Europe	Bulgaria	Sofia	Ivan Petrov	\$40,000
0067	Christopher Hill	c.hill@corp.com	+1 555 789 0123	147 Maple St, Boston, MA 02101	Software	90	4.7	Low	3	North America	USA	Boston	Isabella Gold	\$100,000	Europe	Serbia	Belgrade	Jana Petrovic	\$55,000
0068																			

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MATHHOLE FUNCTION

MANHOLE / NODE TYPE	
F Flood	T Transitions
S Surface	D Overflow
C Combined	U Unspecified

M	Marchbox	E	Elmwood
R	Rodding Eye	O	Oil Injector

F	Outfall	I	Inlet
V	Combined Sewer Overflow	B	Hydrobater
P	Pumping Station	T	Test Column
S	Seakway	X	Valve
D	Dual Function Manhole	U	Unspecified
W	Treatment Works	C	Expenditure N
		G	Obst
			(no above pipe)

E Egg	A Arch
O Oval	B Barrel

P Flat Top	H Harshness
R Reestablishment	U Unperforated
S Square	
SEWER MATERIAL	
AC Asbestos Cement	
BR Brick	
CI Cast Iron	
CU Copper (Green)	

- EC Composite Box Culvert
- DI Ductile Iron
- GR Glass Reinforced Concrete

- GR Glass Reinforced Concrete
- GR Glass Reinforced Plastic
- PS Plastic / Steel Composite
- PV Polyvinyl Chloride
- PE Polythene
- RP Reinforced Plastic Matrix
- ST Steel
- VC Vitrified Clay (All Clayware)
- PP Polypropylene
- PF Pitch Fibre
- MA Masonry - In Regular Courses
- MA Masonry - Randomly Coursed
- U Unspecified

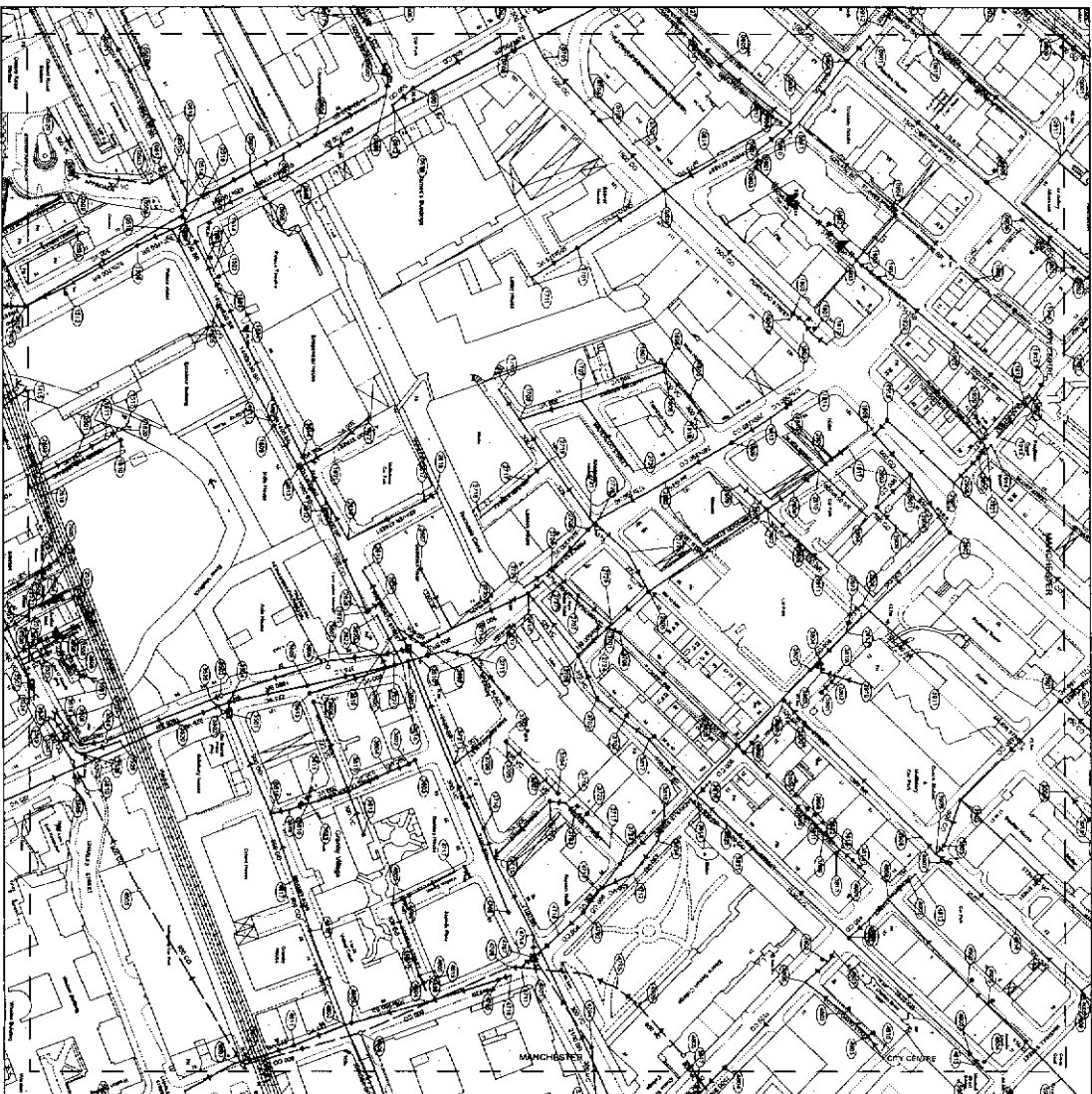
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1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	1222	1223	1224	1225	1226	1227	1228	1229	1230	1231	1232	1233	1234	1235	1236	1237	1238	1239	1240	1241	1242	1243	1244	1245	1246	1247	1248	1249	1250	1251	1252	1253	1254	1255	1256	1257	1258	1259	1260	1261	1262	1263	1264	1265	1266	1267	1268	1269	1270	1271	1272	1273	1274	1275	1276	1277	1278	1279	1280	1281	1282	1283	1284	1285	1286	1287	1288	1289	1290	1291	1292	1293	1294	1295	1296	1297	1298	1299	1300	1301	1302	1303	1304	1305	1306	1307	1308	1309	1310	1311	1312	1313	1314	1315	1316	1317	1318	1319	1320	1321	1322	1323	1324	1325	1326	1327	1328	1329	1330	1331	1332	1333	1334	1335	1336	1337	1338	1339	1340	1341	1342	1343	1344	1345	1346	1347	1348	1349	1350	1351	1352	1353	1354	1355	1356	1357	1358	1359	1360	1361	1362	1363	1364	1365	1366	1367	1368	1369	1370	1371	1372	1373	1374	1375	1376	1377	1378	1379	1380	1381	1382	1383	1384	1385	1386	1387	1388	1389	1390	1391	1392	1393	1394	1395	1396	1397	1398	1399	1400	1401	1402	1403	1404	1405	1406	1407	1408	1409	1410	1411	1412	1413	1414	1415	1416	1417	1418	1419	1420	1421	1422	1423	1424	1425	1426	1427	1428	1429	1430	1431	1432	1433	1434	1435	1436	1437	1438	1439	1440	1441	1442	1443	1444	1445	1446	1447	1448	1449	1450	1451	1452	1453	1454	1455	1456	1457	1458	1459	1460	1461	1462	1463	1464	1465	1466	1467	1468	1469	1470	1471	1472	1473	1474	1475	1476	1477	1478	1479	1480	1481	1482	1483	1484	1485	1486	1487	1488	1489	1490	1491	1492	1493	1494	1495	1496	1497	1498	1499	1500	1501	1502	1503	1504	1505	1506	1507	1508	1509	1510	1511	1512	1513	1514	1515	1516	1517	1518	1519	1520	1521	1522	1523	1524	1525	1526	1527	1528	1529	1530	1531	1532	1533	1534	1535	1536	1537	1538	1539	1540	1541	1542	1543	1544	1545	1546	1547	1548	1549	1550	1551	1552	1553	1554	1555	1556	1557	1558	1559	1560	1561	1562	1563	1564	1565	1566	1567	1568	1569	1570	1571	1572	1573	1574	1575	1576	1577	1578	1579	1580	1581	1582	1583	1584	1585	1586	1587	1588	1589	1590	1591	1592	1593	1594	1595	1596	1597	1598	1599	1600	1601	1602	1603	1604	1605	1606	1607	1608	1609	1610	1611	1612	1613	1614	1615	1616	1617	1618	1619	1620	1621	1622	1623	1624	1625	1626	1627	1628	1629	1630	1631	1632	1633	1634	1635	1636	1637	1638	1639	1640	1641	1642	1643	1644	1645	1646	1647	1648	1649	1650	1651	1652	1653	1654	1655	1656	1657	1658	1659	1660	1661	1662	1663	1664	1665	1666	1667	1668	1669	1670	1671	1672	1673	1674	1675	1676	1677	1678	1679	1680	1681	1682	1683	1684	1685	1686	1687	1688	1689	1690	1691	1692	1693	1694	1695	1696	1697	1698	1699	1700	1701	1702	1703	1704	1705	1706	1707	1708	1709	1710	1711	1712	1713	1714	1715	1716	1717	1718	1719	1720	1721	1722	1723	1724	1725	1726	1727	1728	1729	1730	1731	1732	1733	1734	1735	1736	1737	1738	1739	1740	1741	1742	1743	1744	1745	1746	1747	1748	1749	1750	1751	1752	1753	1754	1755	1756	1757	1758	1759	1760	1761	1762	1763	1764	1765	1766	1767	1768	1769	1770	1771	1772	1773	1774	1775	1776	1777	1778	1779	1780	1781	1782	1783	1784	1785	1786	1787	1788	1789	1790	1791	1792	1793	1794	1795	1796	1797	1798	1799	1800	1801	1802	1803	1804	1805	1806	1807	1808	1809	1810	1811	1812	1813	1814	1815	1816	1817	1818	1819	1820	1821	1822	1823	1824	1825	1826	1827	1828	1829	1830	1831	1832	1833	1834	1835	1836	1837	1838	1839	1840	1841	1842	1843	1844	1845	1846	1847	1848	1849	1850	1851	1852	1853	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866	1867	1868	1869	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
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WASTE WATER SYMBOLS

	SEWER MANHOLE
	SEWER CATCH BASIN
	SEWER VENT
	SEWER INLET
	SEWER OUTLET
	SEWER JUNCTION
	SEWER TURN
	SEWER ELBOW
	SEWER TEE
	SEWER CROSS
	SEWER Y
	SEWER Z
	SEWER W
	SEWER V
	SEWER U
	SEWER T
	SEWER S
	SEWER R
	SEWER Q
	SEWER P
	SEWER O
	SEWER N
	SEWER M
	SEWER L
	SEWER K
	SEWER J
	SEWER I
	SEWER H
	SEWER G
	SEWER F
	SEWER E
	SEWER D
	SEWER C
	SEWER B
	SEWER A

Note: All flow direction arrows are BLUE, color not significant

MANHOLE FUNCTION

	Manhole Function
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MANHOLE TYPE

	Manhole Type
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SEWER MATERIAL

	Sewer Material
--	----------------

SEWER SIZE

	Sewer Size
--	------------

SEWER COLOR

	Sewer Color
--	-------------

SEWER JOINT

	Sewer Joint
--	-------------

SEWER FITTING

	Sewer Fitting
--	---------------

SEWER VALVE

	Sewer Valve
--	-------------

SEWER CHECK VALVE

	Sewer Check Valve
--	-------------------

SEWER AIR VALVE

	Sewer Air Valve
--	-----------------

SEWER CLEANOUT

	Sewer Cleanout
--	----------------

SEWER TIE-IN

	Sewer Tie-In
--	--------------

SEWER BRANCH

	Sewer Branch
--	--------------

SEWER JUNCTION

	Sewer Junction
--	----------------

SEWER TURN

	Sewer Turn
--	------------

SEWER ELBOW

	Sewer Elbow
--	-------------

SEWER TEE

	Sewer Tee
--	-----------

SEWER CROSS

	Sewer Cross
--	-------------

SEWER Y

	Sewer Y
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SEWER Z

	Sewer Z
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SEWER W

	Sewer W
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SEWER V

	Sewer V
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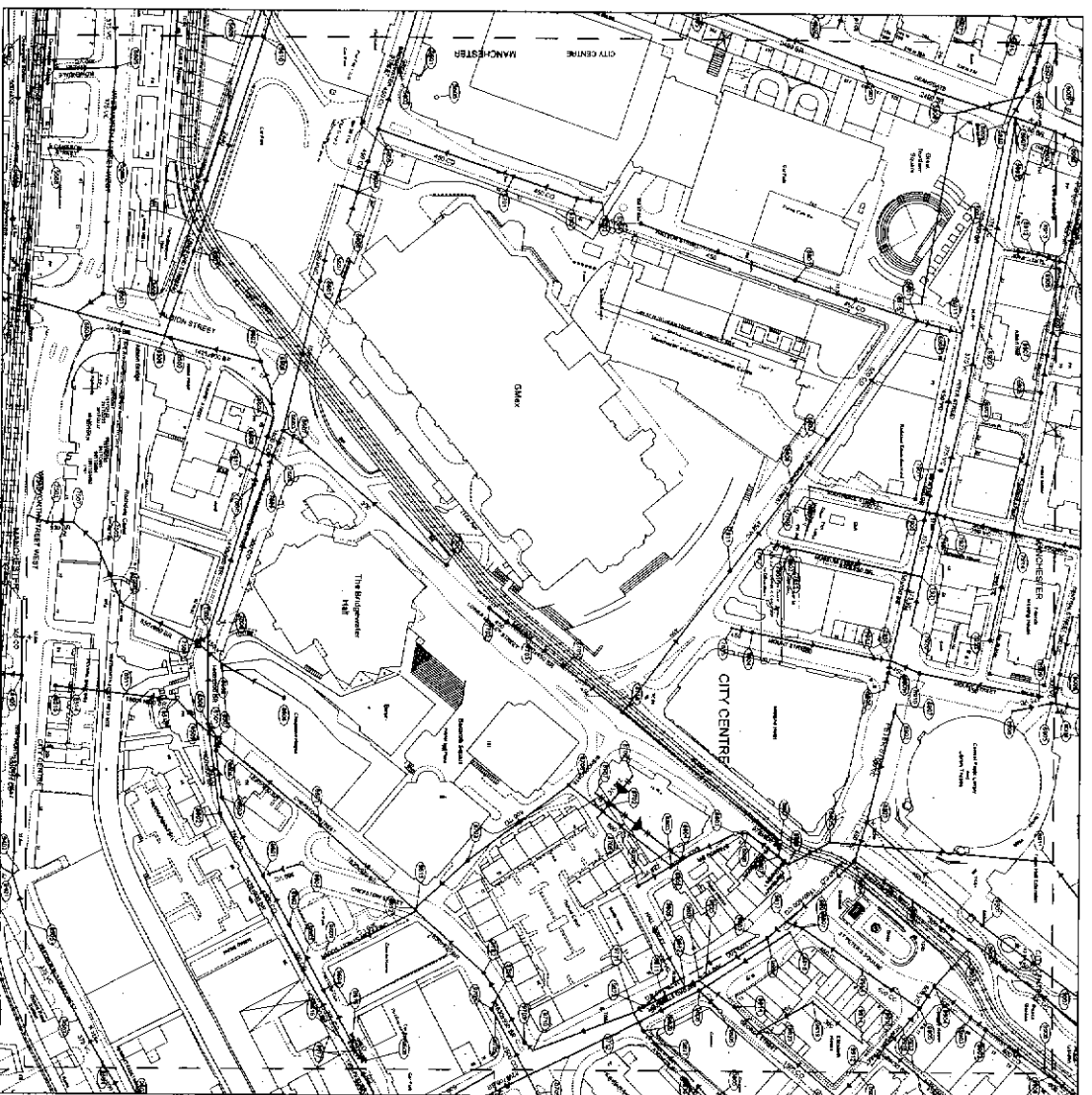
SEWER U

	Sewer U
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Scale 1:1250 Date: 7-Nov-2007

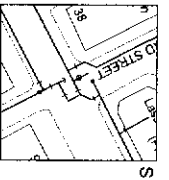
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Table 1: Project Overview and Key Metrics										Table 2: Detailed Financial Performance										Table 3: Operational Efficiency and Resource Allocation														
Project Details					Key Metrics					Revenue Breakdown					Expense Breakdown					Profitability Analysis					Resource Utilization					Performance Indicators				
ID	Name	Status	Start Date	End Date	Progress (%)	Completion Date	Actual Cost	Budgeted Cost	Variance	Revenue Type	Revenue Amount	Revenue Growth (%)	Revenue Forecast	Revenue Trend	Revenue Stability	Revenue Volatility	Revenue Risk	Revenue Opportunity	Revenue Challenge	Revenue Solution	Revenue Impact	Revenue Benefit	Revenue Drawback	Revenue Mitigation	Revenue Outcome	Revenue Conclusion	Revenue Recommendation	Revenue Action	Revenue Result	Revenue Status	Revenue Note			
1001	Project A	Completed	2023-01-01	2023-03-31	100%	2023-03-31	\$1,200,000	\$1,150,000	\$50,000	Revenue A	\$1,200,000	10%	\$1,250,000	Stable	High	Low	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	
1002	Project B	In Progress	2023-04-01	2023-06-30	75%	2023-06-30	\$800,000	\$780,000	\$20,000	Revenue B	\$800,000	8%	\$850,000	Stable	High	Low	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	
1003	Project C	On Hold	2023-07-01	2023-09-30	20%	2023-09-30	\$300,000	\$320,000	-\$20,000	Revenue C	\$300,000	5%	\$310,000	Stable	High	Low	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	
1004	Project D	Completed	2023-10-01	2023-12-31	100%	2023-12-31	\$900,000	\$880,000	\$20,000	Revenue D	\$900,000	12%	\$950,000	Stable	High	Low	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	
1005	Project E	In Progress	2024-01-01	2024-03-31	60%	2024-03-31	\$500,000	\$490,000	\$10,000	Revenue E	\$500,000	7%	\$530,000	Stable	High	Low	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	
1006	Project F	On Hold	2024-04-01	2024-06-30	10%	2024-06-30	\$200,000	\$210,000	-\$10,000	Revenue F	\$200,000	3%	\$205,000	Stable	High	Low	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	
1007	Project G	Completed	2024-07-01	2024-09-30	100%	2024-09-30	\$700,000	\$680,000	\$20,000	Revenue G	\$700,000	9%	\$730,000	Stable	High	Low	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	
1008	Project H	In Progress	2024-10-01	2024-12-31	80%	2024-12-31	\$600,000	\$590,000	\$10,000	Revenue H	\$600,000	11%	\$630,000	Stable	High	Low	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	
1009	Project I	On Hold	2025-01-01	2025-03-31	30%	2025-03-31	\$400,000	\$410,000	-\$10,000	Revenue I	\$400,000	6%	\$415,000	Stable	High	Low	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	
1010	Project J	Completed	2025-04-01	2025-06-30	100%	2025-06-30	\$1,100,000	\$1,080,000	\$20,000	Revenue J	\$1,100,000	13%	\$1,150,000	Stable	High	Low	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	

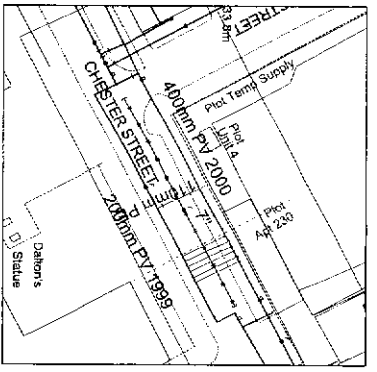
OS Sheet No: SJ8397SE
Scale 1:1250 Date: 7-Nov-2007
133 Nodes
Sheet 1 of 1

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WASTE WATER SYMBOLS	
	SEWAGE
	INDUSTRIAL WASTE
	HAZARDOUS WASTE
	RECYCLED WATER
	RAIN WATER
	GROUNDWATER
	SURFACE WATER
	TREATED WATER
	UNTREATED WATER
	WASTEWATER
	SEWAGE TREATMENT PLANT
	INDUSTRIAL WASTE TREATMENT PLANT
	HAZARDOUS WASTE TREATMENT PLANT
	RECYCLED WATER TREATMENT PLANT
	RAIN WATER TREATMENT PLANT
	GROUNDWATER TREATMENT PLANT
	SURFACE WATER TREATMENT PLANT
	TREATED WATER TREATMENT PLANT
	UNTREATED WATER TREATMENT PLANT
	WASTEWATER TREATMENT PLANT
	SEWAGE TREATMENT PLANT
	INDUSTRIAL WASTE TREATMENT PLANT
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	RAIN WATER TREATMENT PLANT
	GROUNDWATER TREATMENT PLANT
	SURFACE WATER TREATMENT PLANT
	TREATED WATER TREATMENT PLANT
	UNTREATED WATER TREATMENT PLANT
	WASTEWATER TREATMENT PLANT
	SEWAGE TREATMENT PLANT
	INDUSTRIAL WASTE TREATMENT PLANT
	HAZARDOUS WASTE TREATMENT PLANT
	RECYCLED WATER TREATMENT PLANT
	RAIN WATER TREATMENT PLANT



S1



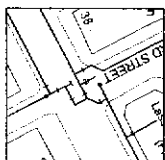
12

——— WATER MAIN
 ——— DIST. IN. MAIN
 ——— 150mm/6" MAIN
 ——— 100mm/4" MAIN
 ——— 75mm/3" MAIN
 ——— 50mm/2" MAIN
 ——— 40mm/1.5" MAIN
 ——— 30mm/1.25" MAIN
 ——— 25mm/1" MAIN
 ——— 20mm/0.75" MAIN
 ——— 15mm/0.5" MAIN
 ——— 10mm/0.375" MAIN
 ——— 8mm/0.315" MAIN
 ——— 6mm/0.25" MAIN
 ——— 5mm/0.2" MAIN
 ——— 4mm/0.15" MAIN
 ——— 3mm/0.125" MAIN
 ——— 2mm/0.075" MAIN
 ——— 1.5mm/0.0625" MAIN
 ——— 1mm/0.0375" MAIN
 ——— 0.75mm/0.0315" MAIN
 ——— 0.5mm/0.025" MAIN
 ——— 0.375mm/0.01875" MAIN
 ——— 0.25mm/0.0125" MAIN
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 ——— 0.0625mm/0.003125" MAIN
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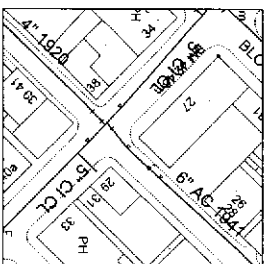


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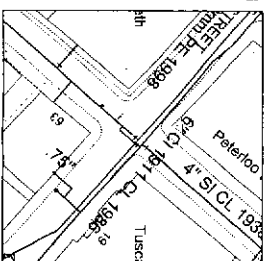
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S1



M1



M2

THIS PLAN IS BASED UPON THE OFFICIAL SURVEY MAP
SHEET NO. SJ8497NW, DATED 7 NOV 2007.
ALL INFORMATION IS SUBJECT TO THE TERMS AND
CONDITIONS OF THE SURVEY MAP.

THE PLAN IS BASED UPON THE OFFICIAL SURVEY MAP
SHEET NO. SJ8497NW, DATED 7 NOV 2007.
ALL INFORMATION IS SUBJECT TO THE TERMS AND
CONDITIONS OF THE SURVEY MAP.

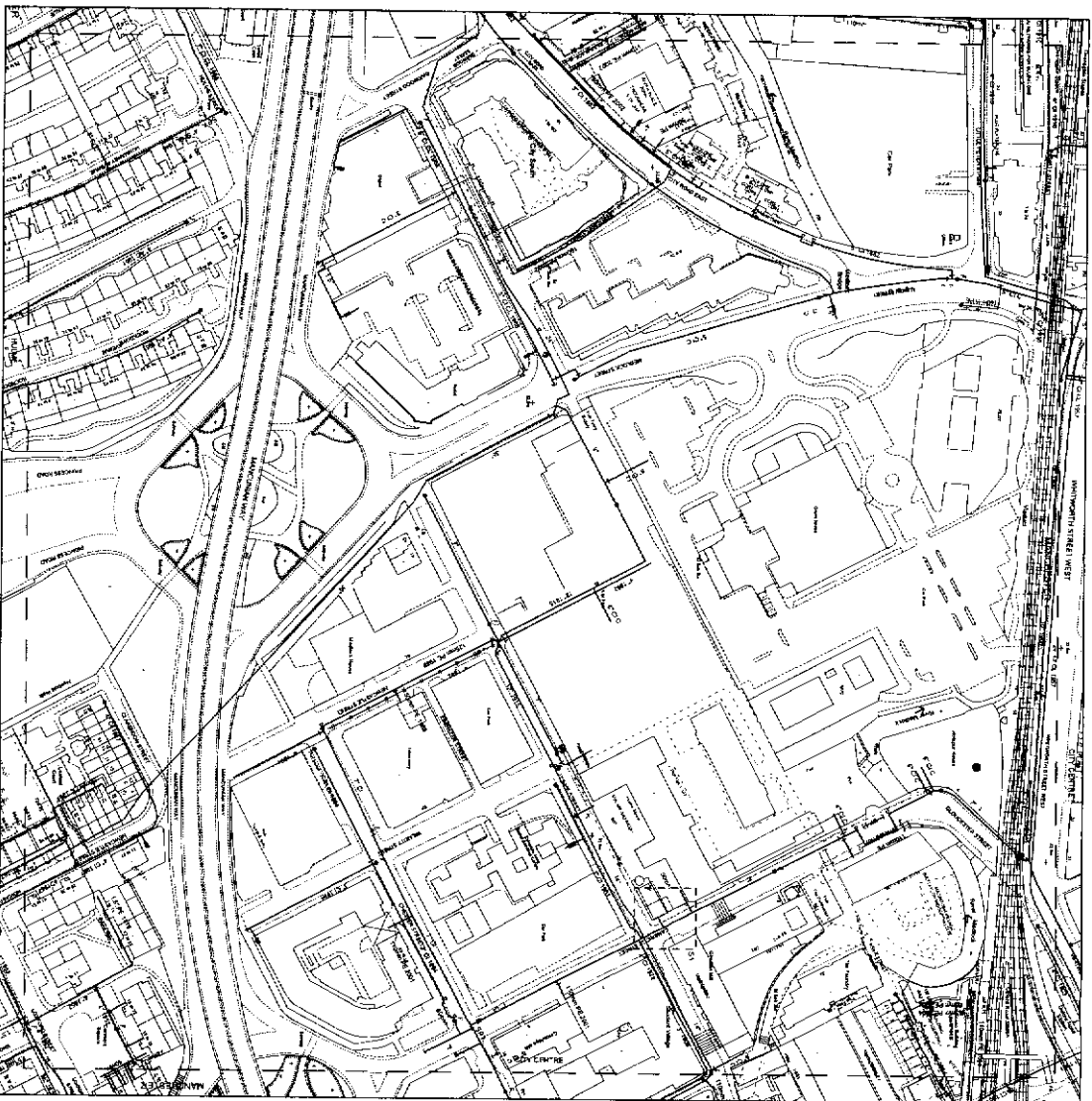
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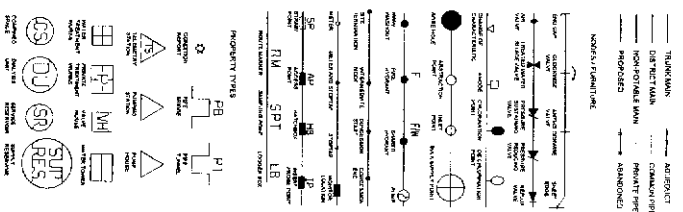
OS Sheet No: SJ8497NW
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Date: 7-Nov-2007

United
Utilities
WATER MAINS RECORDS

OS Sheet No: SJ8397SE
Scale 1:1250 Date: 7-Nov-2007



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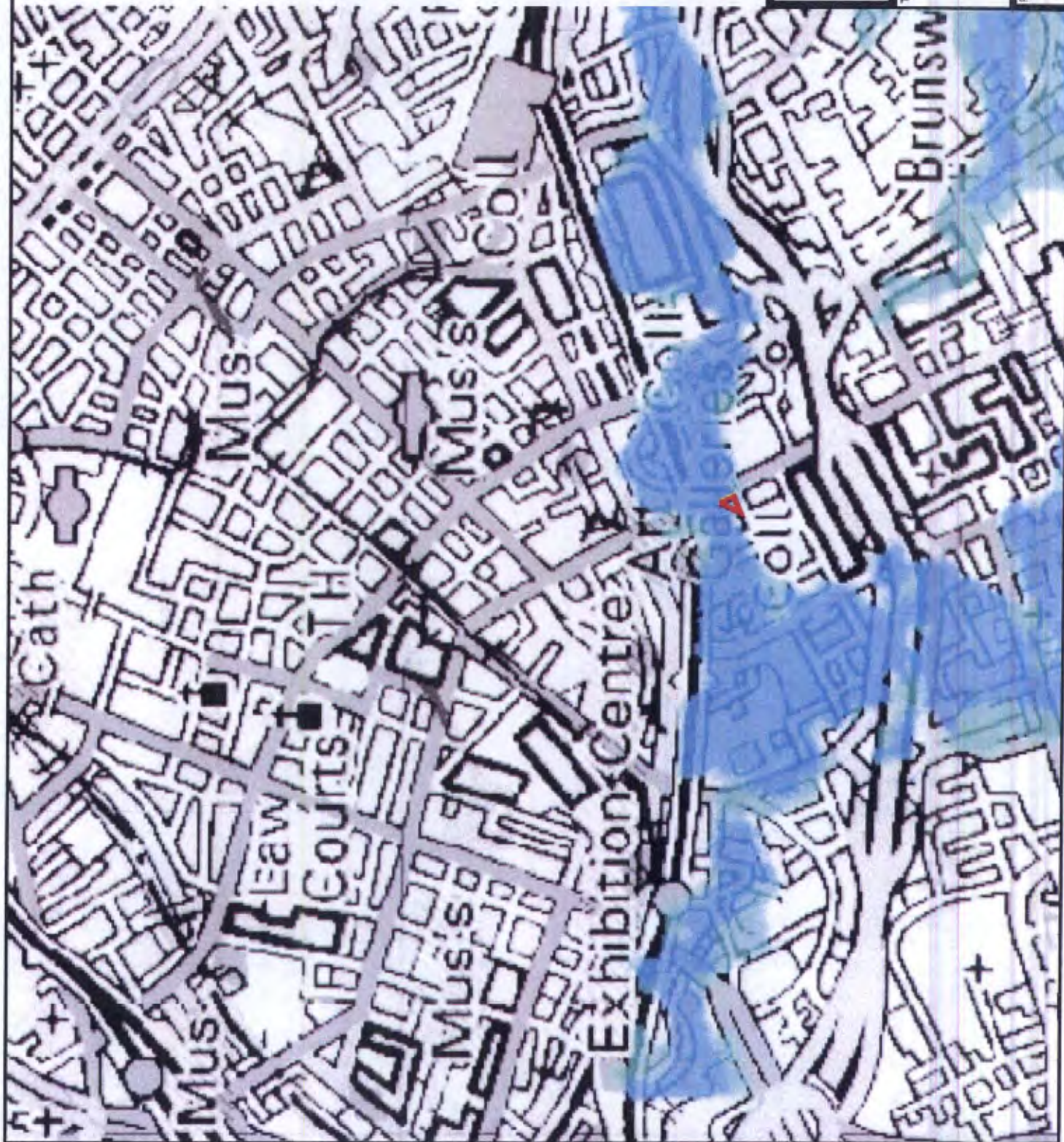


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OS Sheet No: SJ8397SE
Scale 1:1250
Date: 7-Nov-2007

Appendix D Environment Agency Flood Zone Map

THIS INFORMATION HAS BEEN TAKEN FROM THE
ENVIRONMENT AGENCY WEB SITE. THE MAP CAN
BE FREELY VIEWED AT THE FOLLOWING WEB
SITE: WWW.ENVIRONMENT-AGENCY.GOV.UK



SITE BOUNDARY



TITLE:

OXFORD ROAD
MANCHESTER
EA FLOOD ZONE MAP

FIGURE No:

APPENDIX B



Appendix E Hydrology

ISIS

HYDROLOGICAL DATA

Catchment: London Road

Catchment Characteristics

Easting : 0 Northing : 0
 Area : 53.660 km2
 DPLBAR : 12.080 km
 DPSBAR : 62.100 m/km
 PROPWET : 0.550
 SAAR : 1033.000 mm
 Urban Extent : 0.366
 c : -0.026
 d1 : 0.365
 d2 : 0.418
 d3 : 0.293
 e : 0.305
 f : 2.480
 SPR : 35.400 %

Summary of estimate using Flood Estimation Handbook rainfall-runoff method

Estimation of T-year flood

Unit hydrograph time to peak : 1.156 hours
 Instantaneous UH time to peak : 1.031 hours
 Data interval : 0.250 hours
 Design storm duration : 2.350 hours
 Critical storm duration : 2.350 hours
 Return period for design flood : 100.000 years
 requires rain return period : 100.000 years
 ** Return periods set equal due to urban catchment (URBEXT>=0.125) **
 ARF : 0.885
 Design storm depth : 53.026 mm
 CWI : 124.072
 Standard Percentage Runoff : 35.400 %
 Percentage runoff : 45.111 %
 Snowmelt rate : 0.000 mm/day
 Unit hydrograph peak : 190.287 (m3/s/cm/100km2)
 Quick response hydrograph peak : 184.890 m3/s
 Baseflow : 1.649 m3/s
 Baseflow adjustment : 2.000 m3/s
 Hydrograph peak : 46.500 m3/s
 Hydrograph adjustment factor : 0.249

Flags

Unit hydrograph flag : FSRUH
 Tp flag : FEHTP
 Event rainfall flag : FEHER
 Rainfall profile flag : WINRP
 Percentage Runoff flag : FEHPR
 Baseflow flag : F16BF
 CWI flag : FSRCW

Appendix F UU Flow Data

Time	Seconds	CHAM027	CFMANXX	MAN0157	MAN0162	MAN0165	MAN0166	MAN0181	MAN0183	MAN0187	MAN0189	MAN0251	MAN0279	MAN0285	MAN0318	MAN0343	MAN0354	MAN0356.2
24/01/2007 07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 07:02	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 07:04	240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 07:06	360	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 07:08	480	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 07:10	600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 07:12	720	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 07:14	840	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 07:16	960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 07:18	1080	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 07:20	1200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 07:22	1320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 07:24	1440	0.02733	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 07:26	1560	0.08968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 07:28	1680	0.10958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 07:30	1800	0.13223	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 07:32	1920	0.15886	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 07:34	2040	0.19074	0.09162	0.02454	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 07:36	2160	0.22935	0.24868	0.02936	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 07:38	2280	0.27662	0.35297	0.03533	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 07:40	2400	0.33397	0.46365	0.04258	0	0	0.04068	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 07:42	2520	0.40362	0.57398	0.05109	0	0.06033	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 07:44	2640	0.49165	0.71153	0.06048	0	0.07145	0	0.00492	0	0	0	0.00751	0	0	0	0	0.29441	0
24/01/2007 07:46	2760	0.61319	0.86865	0.0681	0.0015	0.07983	0	0.01683	0	0	0	0.01081	0	0	0	0	0.96652	0
24/01/2007 07:48	2880	0.71828	1.04392	0.09227	0.00455	0.08743	0	0.14981	0.01683	0	0	0.01447	0	0.00569	0	0.10366	1.69139	0
24/01/2007 07:50	3000	0.82381	1.20987	0.12045	0.00777	0.09456	0	0.10137	0.02753	0	0	0.01827	0	0	0	0	2.44366	0
24/01/2007 07:52	3120	0.91666	1.35648	0.16028	0.01092	0.10915	0	0.10137	0.21042	0.03848	0	0	0.02585	0	0	0	3.94829	0
24/01/2007 07:54	3240	0.99314	1.48212	0.18458	0.01387	0.11533	0	0.10915	0.26826	0.05016	0	0	0.02585	0	0	0	4.6902	0
24/01/2007 07:56	3360	1.06148	1.59566	0.2034	0.01661	0.1293	0	0.11533	0.33444	0.06187	0	0	0.02585	0	0	0	5.32278	0
24/01/2007 07:58	3480	1.1211	1.6974	0.21828	0.01914	0.12018	0	0.12018	0.37665	0.07332	0	0.27533	0.03247	1.23158	0.18776	0	5.32278	0
24/01/2007 08:00	3600	1.17248	1.83153	0.23259	0.02501	0.1245	0	0.1245	0.40303	0.08438	0.0002	0.45062	0.03529	1.32263	0.21014	0	5.84534	0
24/01/2007 08:02	3720	1.21423	1.93868	0.24309	0.04748	0.12799	0	0.12799	0.42312	0.09445	0.00502	0.54782	0.03762	1.40502	0.22473	0	6.29533	0
24/01/2007 08:04	3840	1.23842	2.04811	0.2495	0.07944	0.12962	0	0.12962	0.43886	0.10263	0.01029	0.62464	0.03911	1.46268	0.23683	0.01291	6.64095	0
24/01/2007 08:06	3960	1.2422	2.12387	0.25063	0.09906	0.1283	0	0.1283	0.44001	0.10651	0.01487	0.68274	0.03941	1.49006	0.2433	0.02602	6.88748	0
24/01/2007 08:08	4080	1.26544	2.16522	0.24679	0.10816	0.12781	0	0.12781	0.4367	0.10681	0.01869	0.72064	0.0385	1.49551	0.24339	0.03421	7.05782	0
24/01/2007 08:10	4200	1.19556	2.18524	0.23911	0.11067	0.12565	0	0.12565	0.42977	0.10559	0.02165	0.74253	0.03665	1.48301	0.23838	0.03628	7.15089	0
24/01/2007 08:12	4320	1.15478	2.18704	0.22908	0.10928	0.12313	0	0.12313	0.42042	0.10328	0.02351	0.75085	0.03423	1.45576	0.22916	0.03222	7.16789	0
24/01/2007 08:14	4440	1.10673	2.17581	0.21733	0.10525	0.11718	0	0.11718	0.40922	0.09583	0.02236	0.74913	0.03147	1.41655	0.21653	0.02361	7.11454	0
24/01/2007 08:16	4560	1.05269	2.15487	0.20397	0.08892	0.112031	0	0.112031	0.39648	0.09583	0.02236	0.73969	0.02846	1.36147	0.20115	0.01171	7.16789	0
24/01/2007 08:18	4680	0.99332	2.12551	0.18905	0.09027	0.11373	0	0.11373	0.38232	0.09085	0.01888	0.72447	0.02521	1.29173	0.18419	-0.00012	7.02831	0
24/01/2007 08:20	4800	0.92861	2.08825	0.1725	0.07973	0.10999	0	0.10999	0.36671	0.08512	0.01303	0.70352	0.02177	1.21853	0.16526	0	6.90501	0
24/01/2007 08:22	4920	0.86029	2.04381	0.15428	0.06747	0.10606	0	0.10606	0.34602	0.07886	0.00505	0.67719	0.01829	1.1358	0.14077	0	6.75586	0
24/01/2007 08:24	5040	0.79121	1.99454	0.13488	0.05192	0.10216	0	0.10216	0.31747	0.07247	0	0.64665	0.01494	1.03946	0.11718	0	6.58471	0
24/01/2007 08:26	5160	0.72391	1.94163	0.11434	0.02771	0.09845	0	0.09845	0.28634	0.06643	0	0.61282	0.01174	0.94108	0.09494	0	6.37658	0
24/01/2007 08:28	5280	0.66025	1.89721	0.09128	0.00806	0.095	0	0.095	0.25078	0.06118	0	0.57547	0.00882	0.84371	0.07561	0	6.10708	0
24/01/2007 08:30	5400	0.60286	1.82587	0.07381	0	0.09184	0	0.09184	0.20357	0.05608	0	0.53568	0.00625	0.75472	0.05889	0	5.79514	0
24/01/2007 08:32	5520	0.55072	1.74398	0.05336	0	0.089	0	0.089	0.17245	0.05101	0	0.49315	0.00406	0.67323	0.04323	0	5.45404	0
24/01/2007 08:34	5640	0.50438	1.65339	0.04691	0	0.08846	0	0.08846	0.15006	0.04605	0	0.44808	0.00226	0.59847	0.02924	0	5.07054	0
24/01/2007 08:36	5760	0.46441	1.57632	0.03642	0	0.0842	0	0.0842	0.13193	0.04141	0	0.4032	0.00087	0.53243	0.01781	0	4.60397	0
24/01/2007 08:38	5880	0.43009	1.50017	0.02771	0	0.08204	0	0.08204	0.11698	0.03697	0	0.36039	0.00001	0.47472	0.00862	0	4.03491	0
24/01/2007 08:40	6000	0.40063	1.44312	0.02042	0	0.07995	0	0.07995	0.1045	0.0328	0	0.32104	0	0.42459	0.00177	0	3.43256	0
24/01/2007 08:42	6120	0.37813	1.40027	0.01435	0	0.07798	0	0.07798	0.09407	0.02893	0	0.28289	0	0.38122	0	0	2.89037	0
24/01/2007 08:44	6240	0.35481	1.3638	0.00929	0	0.07615	0	0.07615	0.08524	0.02522	0	0.24425	0	0.34364	0	0	2.4318	0
24/01/2007 08:46	6360	0.33558	1.32884	0.00491	0	0.07442	0	0.07442	0.07764	0.0217	0	0.20924	0	0.30975	0	0	2.04472	0
24/01/2007 08:48	6480	0.31802	1.29322	0.00122	0	0.0728	0	0.0728	0.07112	0.01841	0	0.16507	0	0.27893	0	0	1.71846	0

Time	Seconds	CHAM027;CRM	MANXX	MAN0157;	MAN0162;	MAN0165;	MAN0166;	MAN0181;	MAN0183;	MAN0187;	MAN0189;	MAN0251;	MAN0279;	MAN0285;	MAN0318;	MAN0343;	MAN0354;	MAN0356.2;
24/01/2007 08:50	6600	0.30276	1.16343	0	0	0	0.0713	0.06549	0.01489	0	0.12316	0	0.2574	0	0	0	1.43081	0
24/01/2007 08:52	6720	0.28838	1.07756	0	0	0.06989	0.06064	0.01115	0	0.08912	0	0.2282	0	0	0	0	1.16476	0
24/01/2007 08:54	6840	0.2779	1.04778	0	0	0.06855	0.05627	0.00901	0	0.06206	0	0.2091	0	0	0	0	0.91388	0
24/01/2007 08:56	6960	0.26792	1.01792	0	0	0.06717	0.04172	0.00714	0	0.03796	0	0.19168	0	0	0	0	0.67299	0
24/01/2007 08:58	7080	0.25797	0.99108	0	0	0.06571	0.02313	0.00544	0	0.00897	0	0.1759	0	0	0	0	0.46004	0
24/01/2007 09:00	7200	0.24839	0.9645	0	0	0.0642	0.00714	0.00387	0	0	0	0.16062	0	0	0	0	0.27698	0
24/01/2007 09:02	7320	0.23262	0.93299	0	0	0.06206	0	0.00191	0	0	0	0.14245	0	0	0	0	0.1205	0
24/01/2007 09:04	7440	0.20689	0.89148	0	0	0.05875	0	0	0	0	0	0.11475	0	0	0	0	0.00077	0
24/01/2007 09:06	7560	0.17467	0.84038	0	0	0.05454	0	0	0	0	0	0.07712	0	0	0	0	0	0
24/01/2007 09:08	7680	0.14422	0.78412	0	0	0.04816	0	0	0	0	0	0.03727	0	0	0	0	0	0
24/01/2007 09:10	7800	0.11891	0.7326	0	0	0.02166	0	0	0	0	0	0.00554	0	0	0	0	0	0
24/01/2007 09:12	7920	0.09905	0.68755	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:14	8040	0.08526	0.64875	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:16	8160	0.07551	0.61128	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:18	8280	0.06841	0.57563	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:20	8400	0.06221	0.54088	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:22	8520	0.05685	0.50741	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:24	8640	0.05133	0.47757	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:26	8760	0.04559	0.44593	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:28	8880	0.03973	0.44218	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:30	9000	0.03374	0.38048	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:32	9120	0.02754	0.33551	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:34	9240	0.02083	0.27802	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:36	9360	0.01285	0.22108	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:38	9480	0.00231	0.16315	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:40	9600	0	0.11165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:42	9720	0.07023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:44	9840	0	0.0165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:46	9960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:48	10080	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:50	10200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:52	10320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:54	10440	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:56	10560	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 09:58	10680	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:00	10800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:02	10920	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:04	11040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:06	11160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:08	11280	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:10	11400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:12	11520	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:14	11640	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:16	11760	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:18	11880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:20	12000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:22	12120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:24	12240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:26	12360	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:28	12480	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:30	12600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:32	12720	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:34	12840	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:36	12960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:38	13080	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[illegible]

Time	Seconds	CHAM027;CRM	MAN0157;MAN0162;MAN0165;MAN0166;MAN0181;MAN0183;MAN0187;MAN0189;MAN0251;MAN0279;MAN0285;MAN0318;MAN0343;MAN0354;MAN0356;2
24/01/2007 12:30	19800	0	0
24/01/2007 12:32	19920	0	0
24/01/2007 12:34	20040	0	0
24/01/2007 12:36	20160	0	0
24/01/2007 12:38	20280	0	0
24/01/2007 12:40	20400	0	0
24/01/2007 12:42	20520	0	0
24/01/2007 12:44	20640	0	0
24/01/2007 12:46	20760	0	0
24/01/2007 12:48	20880	0	0
24/01/2007 12:50	21000	0	0
24/01/2007 12:52	21120	0	0
24/01/2007 12:54	21240	0	0
24/01/2007 12:56	21360	0	0
24/01/2007 12:58	21480	0	0
24/01/2007 13:00	21600	0	0
24/01/2007 13:02	21720	0	0
24/01/2007 13:04	21840	0	0
24/01/2007 13:06	21960	0	0
24/01/2007 13:08	22080	0	0
24/01/2007 13:10	22200	0	0
24/01/2007 13:12	22320	0	0
24/01/2007 13:14	22440	0	0
24/01/2007 13:16	22560	0	0
24/01/2007 13:18	22680	0	0
24/01/2007 13:20	22800	0	0
24/01/2007 13:22	22920	0	0
24/01/2007 13:24	23040	0	0
24/01/2007 13:26	23160	0	0
24/01/2007 13:28	23280	0	0
24/01/2007 13:30	23400	0	0
24/01/2007 13:32	23520	0	0
24/01/2007 13:34	23640	0	0
24/01/2007 13:36	23760	0	0
24/01/2007 13:38	23880	0	0
24/01/2007 13:40	24000	0	0
24/01/2007 13:42	24120	0	0
24/01/2007 13:44	24240	0	0
24/01/2007 13:46	24360	0	0
24/01/2007 13:48	24480	0	0
24/01/2007 13:50	24600	0	0
24/01/2007 13:52	24720	0	0
24/01/2007 13:54	24840	0	0
24/01/2007 13:56	24960	0	0
24/01/2007 13:58	25080	0	0
24/01/2007 14:00	25200	0	0
24/01/2007 14:02	25320	0	0
24/01/2007 14:04	25440	0	0
24/01/2007 14:06	25560	0	0
24/01/2007 14:08	25680	0	0
24/01/2007 14:10	25800	0	0
24/01/2007 14:12	25920	0	0
24/01/2007 14:14	26040	0	0
24/01/2007 14:16	26160	0	0
24/01/2007 14:18	26280	0	0

Time	Seconds	CHAM027;CRM	MANXX	MAN015;:	MAN0162;:	MAN0165;:	MAN0166;:	MAN018;:	MAN0183;:	MAN0187;:	MAN0189;:	MAN0251;:	MAN0279;:	MAN0285;:	MAN0318;:	MAN0343;:	MAN0354;:	MAN0356.2
24/01/2007 14:20	26400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:22	26520	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:24	26640	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:26	26760	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:28	26880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:30	27000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:32	27120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:34	27240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:36	27360	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:38	27480	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:40	27600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:42	27720	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:44	27840	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:46	27960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:48	28080	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:50	28200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:52	28320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:54	28440	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:56	28560	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:58	28680	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:00	28800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:02	28920	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:04	29040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:06	29160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:08	29280	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:10	29400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:12	29520	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:14	29640	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:16	29760	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:18	29880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:20	30000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:22	30120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:24	30240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:26	30360	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:28	30480	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:30	30600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:32	30720	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:34	30840	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:36	30960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:38	31080	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:40	31200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:42	31320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:44	31440	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:46	31560	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:48	31680	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:50	31800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:52	31920	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:54	32040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:56	32160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 15:58	32280	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:00	32400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:02	32520	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:04	32640	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:06	32760	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:08	32880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[illegible]

Time	Seconds	CHAM027C	GRMANXX	MAN0157.1	MAN0162.1	MAN0165.1	MAN0166.1	MAN0181.1	MAN0183.1	MAN0187.1	MAN0189.1	MAN0251.1	MAN0279.1	MAN0285.1	MAN0318.1	MAN0343.1	MAN0354.1	MAN0356.2
24/01/2007 18:00	39600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:02	39720	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:04	39840	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:06	39960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:08	40080	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:10	40200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:12	40320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:14	40440	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:16	40560	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:18	40680	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:20	40800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:22	40920	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:24	41040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:26	41160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:28	41280	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:30	41400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:32	41520	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:34	41640	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:36	41760	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:38	41880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:40	42000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:42	42120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:44	42240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:46	42360	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:48	42480	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:50	42600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:52	42720	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:54	42840	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:56	42960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 18:58	43080	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 19:00	43200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 19:02	43320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 19:04	43440	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Time	Seconds	CHAM027	CRMANNX	MAN0157	MAN0162	MAN0165	MAN0166	MAN0181	MAN0183	MAN0187	MAN0189	MAN0251	MAN0279	MAN0285	MAN0318	MAN0343	MAN0354	MAN0356	2
24/01/2007 07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:02	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:04	240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:06	360	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:08	480	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:10	600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:12	720	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:14	840	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:16	960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:18	1080	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:20	1200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:22	1320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:24	1440	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:26	1560	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:28	1680	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:30	1800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:32	1920	0.09138	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:34	2040	0.11575	0	0.00045	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:36	2160	0.14459	0	0.01746	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:38	2280	0.17951	0	0.02302	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:40	2400	0.22125	0.17943	0.02849	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:42	2520	0.27029	0.03037	0.03467	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:44	2640	0.32731	0.42184	0.04218	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24/01/2007 07:46	2760	0.39336	0.53911	0.05032	0	0.05319	0	0	0	0	0	0.00046	0	0	0	0	0	0	
24/01/2007 07:48	2880	0.47019	0.66911	0.0586	0	0.06756	0	0	0	0	0	0.00456	0	0	0	0	0	0	
24/01/2007 07:50	3000	0.57509	0.81287	0.06627	0.00039	0.07626	0	0	0.01043	0	0.00986	0	0	0	0	0	0.07728	0	
24/01/2007 07:52	3120	0.66493	0.97338	0.07771	0.00232	0.08279	0	0.0992	0.0187	0	0.01513	0	0.07279	0	0	0	0.07279	0	
24/01/2007 07:54	3240	0.74293	0.97338	0.09772	0.00427	0.0885	0.0992	0.16654	0.02679	0	0.01749	0.021535	0.10516	0	0	0	2.16099	0	
24/01/2007 07:56	3360	0.81895	1.125454	0.12186	0.00615	0.09366	0.21109	0.16654	0.29792	0.05201	0	0.01967	0.75225	0.1185	0	0	2.80841	0	
24/01/2007 07:58	3480	0.87129	1.3674	0.14925	0.00791	0.1052	0.25334	0.21109	0.03518	0	0.02171	0.94718	0.12327	0.1185	0	0	3.41139	0	
24/01/2007 08:00	3600	0.91662	1.4655	0.16408	0.00949	0.1086	0.29792	0.25334	0.04412	0.06459	0.02347	1.03692	0.12939	0.13861	0	0	4.01336	0	
24/01/2007 08:02	3720	0.95173	1.5506	0.17488	0.0107	0.1108	0.32826	0.33136	0.05201	0.27652	0.02467	1.09097	0.14569	0.13861	0	0	4.55324	0	
24/01/2007 08:04	3840	0.97291	1.62126	0.18133	0.01126	0.1194	0.34177	0.33904	0.06391	0.39507	0.02504	1.12327	0.14916	0.13861	0	0	5.00821	0	
24/01/2007 08:06	3960	0.97851	1.69268	0.18318	0.01103	0.1185	0.34177	0.33904	0.06391	0.46052	0.0245	1.13361	0.1494	0.13861	0	0	5.37174	0	
24/01/2007 08:08	4080	0.96794	1.763	0.18055	0.0101	0.11194	0.34177	0.33904	0.06391	0.50121	0.02324	1.12708	0.14573	0.13861	0	0	5.8186	0.08939	
24/01/2007 08:10	4200	0.947	1.81338	0.17489	0.01191	0.11132	0.33875	0.33875	0.07108	0.51982	0.01315	0.91053	0.09073	0.13861	0	0	5.92391	0.14913	
24/01/2007 08:12	4320	0.91715	1.81706	0.16708	0.01435	0.10989	0.33136	0.33136	0.07275	0.52536	0.02155	1.10484	0.13757	0.13861	0	0	5.96461	0.14444	
24/01/2007 08:14	4440	0.8811	1.82231	0.15739	0.0143	0.10788	0.32031	0.32031	0.07284	0.53828	0.01962	1.0701	0.12834	0.13861	0	0	5.94777	0.13008	
24/01/2007 08:16	4560	0.84026	1.812	0.14607	0.01166	0.10553	0.30588	0.30588	0.07108	0.54072	0.0176	1.02533	0.11715	0.13861	0	0	5.8787	0.11265	
24/01/2007 08:18	4680	0.79503	1.79321	0.13292	0.00695	0.1029	0.2878	0.2878	0.06794	0.53417	0.01544	0.97156	0.10457	0.13861	0	0	5.76177	0.09333	
24/01/2007 08:20	4800	0.74543	1.76459	0.117	0.00148	0.1	0.26509	0.26509	0.05392	0.51982	0.01315	0.91053	0.09073	0.13861	0	0	5.59593	0.07287	
24/01/2007 08:22	4920	0.69285	1.72653	0.09779	0	0.09691	0.23406	0.23406	0.05932	0.49817	0.01075	0.84434	0.07603	0.13861	0	0	5.3663	0.05225	
24/01/2007 08:24	5040	0.63951	1.66092	0.08191	0	0.09378	0.20577	0.20577	0.05441	0.47093	0.00834	0.77556	0.0617	0.13861	0	0	5.05182	0.03245	
24/01/2007 08:26	5160	0.58757	1.63012	0.06743	0	0.09071	0.18256	0.18256	0.04938	0.44029	0.00604	0.70516	0.048	0.13861	0	0	4.64888	0.01453	
24/01/2007 08:28	5280	0.53803	1.5755	0.05419	0	0.08776	0.16151	0.16151	0.04437	0.40754	0.00395	0.63482	0.03511	0.13861	0	0	4.18561	0.00083	
24/01/2007 08:30	5400	0.49206	1.51581	0.04227	0	0.08497	0.14241	0.14241	0.03941	0.372	0.00216	0.56884	0.02323	0.13861	0	0	3.69701	0	
24/01/2007 08:32	5520	0.45041	1.46074	0.03173	0	0.08235	0.12531	0.12531	0.03459	0.33177	0.00073	0.50301	0.01275	0.13861	0	0	3.22024	0	
24/01/2007 08:34	5640	0.41318	1.41328	0.02258	0	0.07991	0.1078	0.1078	0.03	0.28806	0	0.4444	0.00414	0.13861	0	0	2.77233	0	
24/01/2007 08:36	5760	0.38082	1.36865	0.0148	0	0.07769	0.08339	0.08339	0.02573	0.24193	0	0.3917	0	0.13861	0	0	2.35	0	
24/01/2007 08:38	5880	0.35301	1.31397	0.00834	0	0.07566	0.06087	0.06087	0.02173	0.16413	0	0.34484	0	0.13861	0	0	1.94536	0	
24/01/2007 08:40	6000	0.32934	1.16973	0.00314	0	0.07375	0.04106	0.04106	0.01706	0.03396	0	0.26718	0	0.13861	0	0	1.56342	0	
24/01/2007 08:42	6120	0.30878	1.12008	0	0	0.07188	0.02425	0.02425	0.01337	0.00468	0	0.23619	0	0.13861	0	0	1.2181	0	
24/01/2007 08:44	6240	0.29067	1.07944	0	0	0.07006	0.01038	0.01038	0.01055	0	0	0.20879	0	0.13861	0	0	0.90994	0	
24/01/2007 08:46	6360	0.27414	1.04159	0	0	0.06829	0.00051	0.00051	0.00809	0	0	0.18423	0	0.13861	0	0	0.63335	0	
24/01/2007 08:48	6480	0.25922	1.00583	0.0068	0	0.06656	0	0	0.00593	0	0	0.18423	0	0.13861	0	0	0.63335	0	

[illegible]

Time	Seconds	CHAM027	CRMANXX	MAN0157	MAN0162	MAN0165	MAN0166	MAN0181	MAN0183	MAN0187	MAN0189	MAN0251	MAN0279	MAN0285	MAN0318	MAN0343	MAN0354	MAN0356	2
24/01/2007 10:40	13200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:42	13320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:44	13440	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:46	13560	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:48	13680	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:50	13800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:52	13920	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:54	14040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:56	14160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 10:58	14280	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:00	14400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:02	14520	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:04	14640	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:06	14760	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:08	14880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:10	15000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:12	15120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:14	15240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:16	15360	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:18	15480	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:20	15600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:22	15720	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:24	15840	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:26	15960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:28	16080	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:30	16200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:32	16320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:34	16440	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:36	16560	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:38	16680	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:40	16800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:42	16920	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:44	17040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:46	17160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:48	17280	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:50	17400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:52	17520	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:54	17640	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:56	17760	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 11:58	17880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:00	18000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:02	18120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:04	18240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:06	18360	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:08	18480	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:10	18600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:12	18720	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:14	18840	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:16	18960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:18	19080	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:20	19200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:22	19320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:24	19440	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			

Time	Seconds	CHAM027	CRMANNX	MAN0157	MAN0162	MAN0165	MAN0166	MAN0181	MAN0183	MAN0187	MAN0189	MAN0251	MAN0279	MAN0285	MAN0318	MAN0343	MAN0354	MAN0366	MAN0367
24/01/2007 12:30	19800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:32	19920	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:34	20040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:36	20160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:38	20280	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:40	20400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:42	20520	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:44	20640	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:46	20760	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:48	20880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:50	21000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:52	21120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:54	21240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:56	21360	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 12:58	21480	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:00	21600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:02	21720	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:04	21840	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:06	21960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:08	22080	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:10	22200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:12	22320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:14	22440	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:16	22560	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:18	22680	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:20	22800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:22	22920	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:24	23040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:26	23160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:28	23280	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:30	23400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:32	23520	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:34	23640	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:36	23760	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:38	23880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:40	24000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:42	24120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:44	24240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:46	24360	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:48	24480	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:50	24600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:52	24720	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:54	24840	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:56	24960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 13:58	25080	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:00	25200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:02	25320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:04	25440	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:06	25560	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:08	25680	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:10	25800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:12	25920	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 14:14	26040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		

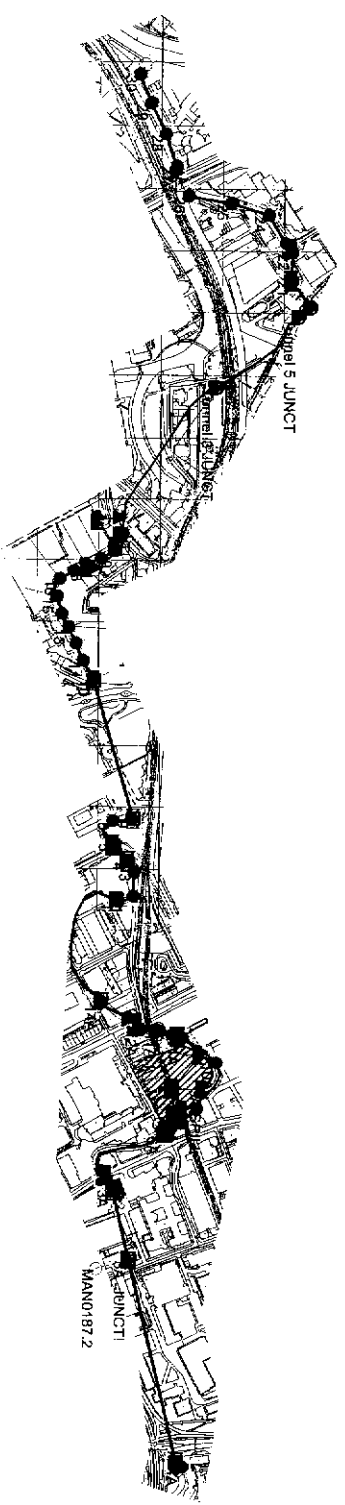
[illegible]

Time	Seconds	CHAM027	CRM	ANXX	MAN0157	MAN0152	MAN0165	MAN0166	MAN0181	MAN0183	MAN0187	MAN0189	MAN0251	MAN0279	MAN0285	MAN0318	MAN0343	MAN0354	MAN0366
24/01/2007 16:10	33000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:12	33120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:14	33240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:16	33360	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:18	33480	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:20	33600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:22	33720	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:24	33840	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:26	33960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:28	34080	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:30	34200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:32	34320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:34	34440	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:36	34560	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:38	34680	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:40	34800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:42	34920	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:44	35040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:46	35160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:48	35280	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:50	35400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:52	35520	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:54	35640	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:56	35760	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 16:58	35880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:00	36000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:02	36120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:04	36240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:06	36360	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:08	36480	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:10	36600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:12	36720	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:14	36840	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:16	36960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:18	37080	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:20	37200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:22	37320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:24	37440	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:26	37560	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:28	37680	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:30	37800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:32	37920	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:34	38040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:36	38160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:38	38280	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:40	38400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:42	38520	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:44	38640	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:46	38760	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:48	38880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:50	39000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:52	39120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:54	39240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:56	39360	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24/01/2007 17:58	39480	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

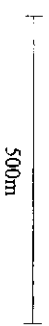
[illegible]

Appendix G River Model

Network - Medlock 1.37 Full 3A MSC 1.1.11_3.3
Run - Medlock 1.37 full 3A MSC 1.1.11_3.3
Simulation - 100 Year 1.11_1.6 120 Winter Full 1.5 MSC Level 1.1.11
2



Map Centre Coords
x: 383755, y: 397425
Date Printed: 12/11/2007
Scale 1:8700



Appendix H Model Results

River Section

Node	Total Energy (m)	Flow (m3/s)	Froude	Max Total Energy (m)	Max Flow (m3/s)	Max Froude	Max Stage (m AD)	Max State	Max Velocity (m/s)	Min Total Energy (m)	Min Flow (m3/s)	Min Froude No	Min Stage (m AD)	Min State	Min Velocity (m/s)	Stage (m AD)	State	Velocity (m/s)
1	27.624	1.999	0.925	29.754	51.697	0.925	29.680	0.000	2.051	26.995	1.979	0.063	26.993	0.000	0.186	27.410	0.000	2.051
10	26.113	1.999	0.138	28.788	51.684	0.528	28.721	0.000	1.993	26.112	1.942	0.126	26.107	0.000	0.313	26.107	0.000	0.336
10A	27.438	1.999	0.090	32.019	42.103	0.311	31.994	0.000	0.993	27.093	1.999	0.038	27.092	0.000	0.232	27.435	0.000	0.260
11	25.992	1.999	0.669	28.749	51.640	0.805	28.607	0.000	2.509	25.976	1.992	0.338	25.916	0.000	0.977	25.943	0.000	0.979
11A	27.432	1.999	0.078	31.983	52.224	0.283	31.927	0.000	1.046	27.057	1.996	0.078	27.049	0.000	0.234	27.429	0.000	0.234
11A.1	27.430	1.999	0.077	31.993	52.258	0.289	31.873	0.000	1.057	27.047	1.998	0.077	27.038	0.000	0.233	27.427	0.000	0.233
11A.2	27.430	1.999	0.077	31.993	52.224	0.283	31.873	0.000	1.056	27.057	1.996	0.078	27.049	0.000	0.234	27.429	0.000	0.234
11AD	27.432	1.999	0.078	31.935	52.224	0.283	31.873	0.000	2.553	27.057	1.967	0.299	25.654	0.000	0.623	25.656	0.000	1.156
12	25.724	1.999	0.835	28.712	51.608	0.934	28.560	0.000	2.553	25.723	1.967	0.299	25.654	0.000	0.623	25.656	0.000	1.156
12A	27.428	1.999	0.061	31.990	49.841	0.222	31.879	0.000	0.999	27.036	1.999	0.061	27.031	0.000	0.194	27.426	0.000	1.071
13	25.420	1.999	0.872	28.688	51.586	0.872	28.613	0.000	1.470	25.420	1.999	0.118	25.362	0.000	0.259	25.362	0.000	1.071
13A	27.424	1.999	0.056	30.071	49.960	0.241	29.995	0.000	1.319	27.033	1.999	0.056	27.029	0.000	0.177	27.422	0.000	0.177
14	25.249	1.999	0.359	28.676	51.573	0.480	28.589	0.000	1.502	25.249	1.999	0.084	25.229	0.000	0.245	25.229	0.000	0.520
14A	27.421	1.999	0.052	30.038	49.855	0.357	29.939	0.000	1.606	27.023	1.999	0.052	27.017	0.000	0.165	27.420	0.000	0.165
15	25.221	1.999	0.149	28.664	51.560	0.284	28.592	0.000	1.307	25.221	1.999	0.064	25.214	0.000	0.206	25.214	0.000	0.259
16	25.214	1.999	0.074	28.651	51.543	0.242	28.576	0.000	1.242	25.214	1.999	0.045	25.212	0.000	0.174	25.212	0.000	0.221
17	25.214	1.999	0.063	28.643	51.531	0.217	28.565	0.000	1.098	25.214	1.999	0.043	25.212	0.000	0.164	25.212	0.000	0.198
18	25.213	1.999	0.050	28.638	51.526	0.185	28.585	0.000	1.022	25.213	1.999	0.036	25.212	0.000	0.151	25.212	0.000	0.167
19	25.213	1.999	0.027	28.639	48.611	0.135	28.609	0.000	0.782	25.211	1.998	0.024	25.211	0.000	0.103	25.212	0.000	0.103
1A	31.469	2.000	3.761	33.469	55.800	3.763	33.049	0.000	4.945	31.469	2.000	0.821	30.952	0.000	2.835	30.952	0.000	3.184
2	27.008	1.999	0.069	29.741	51.666	0.245	29.657	0.000	1.331	26.994	1.977	0.066	26.991	0.000	0.196	27.006	0.000	0.204
20	25.213	1.998	0.030	28.635	48.630	0.136	28.609	0.000	0.743	25.210	1.998	0.027	25.209	0.000	0.110	25.212	0.000	0.110
21	23.100	1.998	0.082	23.376	14.425	0.104	23.366	0.000	0.441	23.100	1.998	0.082	23.095	0.000	0.325	23.095	0.000	0.325
22	23.095	1.997	0.131	23.367	14.427	0.172	23.336	0.000	0.775	23.095	1.997	0.131	23.079	0.000	0.557	23.079	0.000	0.557
23	23.103	1.997	0.173	23.380	14.427	0.221	23.336	0.000	0.932	23.103	1.997	0.173	23.079	0.000	0.683	23.079	0.000	0.683
24	22.964	1.997	0.846	23.273	14.429	0.861	22.994	0.000	2.855	22.964	1.997	0.846	22.733	0.000	2.130	22.733	0.000	2.130
25	22.497	1.997	0.408	22.799	14.431	0.483	22.665	0.000	1.643	22.497	1.997	0.406	22.413	0.000	1.281	22.413	0.000	1.281
26	22.510	1.997	0.526	22.621	14.439	0.526	22.527	0.000	1.432	22.510	1.997	0.526	22.426	0.000	1.283	22.426	0.000	1.283
27	22.204	1.997	0.616	22.511	16.328	0.617	22.378	0.000	1.619	22.204	1.997	0.585	22.107	0.000	1.380	22.107	0.000	1.380
28	22.023	1.997	0.449	22.334	16.328	0.507	22.209	0.000	1.567	22.023	1.997	0.449	21.951	0.000	1.189	21.951	0.000	1.189
29	21.771	1.997	0.778	22.087	16.328	0.784	21.877	0.000	2.031	21.771	1.997	0.748	21.621	0.000	1.716	21.621	0.000	1.716
2A	30.246	2.000	0.748	33.447	55.762	2.280	33.306	0.000	2.461	30.249	2.000	0.748	29.971	0.000	1.578	29.971	0.000	2.333
3	26.996	1.999	0.183	29.703	51.627	0.505	29.527	0.000	2.012	26.979	1.974	0.183	26.961	0.000	0.470	26.965	0.000	0.470
30	21.470	1.997	0.612	21.691	16.328	1.101	21.371	0.000	2.509	21.470	1.997	0.612	21.370	0.000	1.396	21.371	0.000	1.396
3A	27.705	2.000	0.213	32.807	54.950	0.295	32.755	0.000	1.326	27.668	2.000	0.120	27.655	0.000	0.453	27.655	0.000	0.453
4	26.680	1.999	0.247	29.641	51.585	2.150	29.457	0.000	2.242	26.675	1.976	0.244	26.502	0.000	0.276	26.505	0.000	1.854
4A	27.696	2.000	0.101	32.801	54.713	0.240	32.753	0.000	1.200	27.656	2.000	0.101	27.652	0.000	0.276	27.652	0.000	0.276
5	26.605	1.999	0.810	28.430	51.730	1.028	28.232	0.000	2.255	26.601	1.973	0.810	26.486	0.000	1.487	26.486	0.000	1.507
5A	27.725	2.000	0.469	32.023	54.713	0.577	31.839	0.000	1.594	27.695	2.000	0.469	27.650	0.000	0.811	27.691	0.000	0.811
6A	27.469	2.000	0.136	31.973	53.980	0.242	31.929	0.000	1.071	27.464	1.976	0.136	27.423	0.000	0.322	27.464	0.000	0.322
7A	27.477	2.000	0.223	32.033	53.980	0.545	31.826	0.000	1.680	27.469	1.976	0.223	27.423	0.000	0.511	27.464	0.000	0.511
8	26.197	1.999	0.128	29.556	51.572	0.279	29.254	0.000	1.480	26.197	1.977	0.121	26.192	0.000	0.307	26.192	0.000	0.320
8A	27.461	1.999	0.143	32.020	53.536	0.279	31.990	0.000	1.171	27.236	1.977	0.143	27.192	0.000	0.347	27.455	0.000	0.347
9	26.186	1.999	0.269	29.328	51.764	2.355	29.173	0.000	1.827	26.186	1.984	0.268	26.176	0.000	0.443	26.176	0.000	0.443
9A	27.454	1.999	0.145	32.007	55.991	0.424	31.938	0.000	1.289	27.198	1.979	0.126	27.177	0.000	0.355	27.448	0.000	0.355

River Section

Node	Total Energy (m)	Flow (m³/s)	Froude	Max Total Energy (m)	Max Flow (m³/s)	Max Froude	Max Stage (m AD)	Max State	Max Velocity (m/s)	Min Total Energy (m)	Min Flow (m³/s)	Min Froude No	Min Stage (m AD)	Min State	Min Velocity (m/s)	Stage (m AD)	State	Velocity (m/s)
1	27.624	1.999	0.925	29.247	43.972	0.925	29.176	0.000	2.051	26.995	1.981	0.052	26.993	0.000	0.184	27.410	0.000	2.051
10	26.113	1.999	0.138	28.221	43.232	0.442	28.074	0.000	1.883	26.111	1.908	0.126	26.105	0.000	0.311	26.107	0.000	0.336
10A	27.439	1.999	0.090	31.366	34.646	0.305	31.345	0.000	0.988	27.093	1.987	0.446	27.083	0.000	0.250	27.435	0.000	0.290
11	25.992	1.999	0.669	28.171	43.191	0.821	27.991	0.000	2.502	25.977	1.917	0.401	25.973	0.000	0.973	25.943	0.000	0.979
11A	27.439	1.999	0.078	31.295	42.132	0.272	31.280	0.000	1.005	27.057	1.999	0.078	27.049	0.000	0.234	27.429	0.000	0.234
11A.1	27.439	1.999	0.077	31.297	42.139	0.284	31.280	0.000	1.007	27.047	1.999	0.077	27.038	0.000	0.233	27.427	0.000	0.233
11A.2	27.439	1.999	0.077	31.297	42.139	0.284	31.257	0.000	1.005	27.047	1.999	0.077	27.038	0.000	0.233	27.427	0.000	0.233
11AD	27.432	1.999	0.078	31.304	42.132	0.277	31.257	0.000	1.007	27.052	1.999	0.078	27.049	0.000	0.234	27.429	0.000	0.234
12	25.724	1.999	0.655	28.119	43.151	0.834	27.940	0.000	2.546	25.721	1.967	0.501	25.649	0.000	0.944	27.426	0.000	0.944
12A	27.429	1.999	0.061	31.290	42.148	0.218	31.253	0.000	0.954	27.036	1.990	0.119	25.560	0.000	0.301	25.362	0.000	0.177
13	25.420	1.999	0.872	28.088	43.112	0.891	28.010	0.000	1.460	25.420	1.990	0.056	25.129	0.000	0.177	27.422	0.000	0.177
13A	27.424	1.999	0.056	29.508	42.148	0.239	29.508	0.000	1.252	27.033	1.997	0.084	25.214	0.000	0.246	25.229	0.000	0.820
14	25.249	1.999	0.359	28.073	43.076	0.480	27.985	0.000	1.550	25.236	1.999	0.052	25.195	0.000	0.165	27.420	0.000	0.165
14A	27.421	1.999	0.052	29.544	42.042	0.284	29.437	0.000	1.293	25.023	1.999	0.064	25.195	0.000	0.205	25.214	0.000	0.221
15	25.221	1.999	0.149	28.059	43.054	0.240	27.973	0.000	1.224	25.197	1.999	0.045	25.194	0.000	0.177	25.212	0.000	0.198
16	25.214	1.999	0.074	28.045	43.049	0.240	27.973	0.000	1.084	25.195	1.999	0.043	25.193	0.000	0.163	25.212	0.000	0.187
17	25.214	1.999	0.063	28.036	43.045	0.216	27.960	0.000	1.010	25.194	1.999	0.038	25.193	0.000	0.150	25.212	0.000	0.103
18	25.213	1.999	0.050	28.031	43.041	0.194	27.961	0.000	0.777	25.194	1.998	0.024	25.194	0.000	0.103	25.212	0.000	0.184
19	25.213	1.998	0.027	28.027	43.037	0.133	27.966	0.000	0.452	25.194	2.000	0.052	25.194	0.000	0.194	27.006	0.000	0.204
1A	31.469	2.000	3.761	33.099	46.500	3.763	32.311	0.000	1.275	26.994	1.979	0.066	26.991	0.000	0.110	26.212	0.000	0.110
2	27.008	1.999	0.069	29.232	43.364	0.243	29.151	0.000	0.427	25.194	1.998	0.027	25.193	0.000	0.325	23.095	0.000	0.325
20	25.213	1.998	0.030	28.022	43.030	0.135	27.939	0.000	0.743	25.194	1.998	0.082	23.095	0.000	0.557	23.079	0.000	0.557
21	23.100	1.998	0.082	23.328	13.619	0.101	23.319	0.000	0.748	23.095	1.997	0.131	23.079	0.000	0.683	23.079	0.000	0.683
22	23.095	1.997	0.181	23.320	13.617	0.167	23.291	0.000	0.902	23.103	1.997	0.173	22.733	0.000	2.138	22.733	0.000	2.138
23	23.103	1.997	0.173	23.333	13.617	0.215	23.291	0.000	0.902	23.103	1.997	0.173	22.733	0.000	2.138	22.733	0.000	2.138
24	22.964	1.997	0.846	23.229	13.617	0.860	22.954	0.000	2.328	22.964	1.997	0.406	22.213	0.000	1.281	22.213	0.000	1.281
25	22.497	1.997	0.406	22.748	13.617	0.470	22.619	0.000	1.596	22.497	1.997	0.467	22.226	0.000	1.283	22.226	0.000	1.283
26	22.310	1.997	0.526	22.476	13.628	0.526	22.476	0.000	1.411	22.310	1.997	0.406	22.213	0.000	1.283	22.213	0.000	1.283
27	22.204	1.997	0.618	22.459	15.035	0.617	22.330	0.000	1.598	22.204	1.997	0.591	22.107	0.000	1.380	22.107	0.000	1.380
28	22.023	1.997	0.449	22.280	15.031	0.501	22.164	0.000	1.513	22.023	1.997	0.449	21.951	0.000	1.189	21.951	0.000	1.189
29	21.771	1.997	0.778	22.032	15.026	0.761	21.829	0.000	1.996	21.771	1.997	0.760	21.621	0.000	1.716	21.621	0.000	1.716
2A	30.249	2.000	0.248	32.465	46.467	2.019	32.256	0.000	2.393	30.249	2.000	0.248	29.971	0.000	1.904	29.971	0.000	2.393
3	26.996	1.999	0.193	29.186	43.350	0.501	29.002	0.000	1.979	26.979	1.999	0.193	26.961	0.000	0.470	26.985	0.000	0.470
30	21.470	1.997	0.612	21.642	15.024	1.013	21.371	0.000	2.309	21.470	1.997	0.612	21.370	0.000	1.396	21.370	0.000	1.396
3A	27.705	2.000	0.213	31.818	43.334	1.914	28.908	0.000	1.375	27.668	2.000	0.135	27.655	0.000	0.453	27.655	0.000	0.453
4	26.680	1.999	0.247	29.107	43.334	0.263	28.666	0.000	1.212	27.656	2.000	0.101	27.651	0.000	0.276	27.652	0.000	0.276
4A	27.686	2.000	0.101	31.812	44.692	0.263	31.766	0.000	2.236	26.599	1.996	0.431	26.485	0.000	1.487	26.489	0.000	1.507
5	26.605	1.999	0.459	31.380	44.692	0.571	31.310	0.000	1.025	27.295	1.998	0.112	27.274	0.000	0.511	27.464	0.000	0.511
6A	27.469	2.000	0.136	31.335	44.163	0.536	31.299	0.000	1.608	27.306	1.998	0.173	27.274	0.000	0.307	26.192	0.000	0.307
7A	27.477	2.000	0.223	31.386	44.163	0.536	31.299	0.000	1.608	27.306	1.998	0.173	27.274	0.000	0.307	26.192	0.000	0.307
8	26.197	1.999	0.128	28.805	43.428	0.273	28.708	0.000	1.423	26.194	1.974	0.121	26.189	0.000	0.347	27.455	0.000	0.347
8A	27.461	1.999	0.143	31.374	43.408	0.273	31.338	0.000	1.558	27.237	1.999	0.121	26.189	0.000	0.347	27.455	0.000	0.347
9	26.186	1.999	0.289	28.774	43.410	2.094	28.624	0.000	1.779	26.184	1.978	0.267	26.174	0.000	0.423	26.176	0.000	0.443
9A	27.454	1.999	0.145	31.368	45.484	0.416	31.296	0.000	1.197	27.193	1.991	0.135	27.178	0.000	0.355	27.448	0.000	0.355

boothking

Booth King Partnership Ltd.
Company No. 06206269

Head Office (Ramsbottom)

Tollgate House 9C/D, Bridge
Street, Ramsbottom BL0 9AB
01706 822 022
office@booth-king.co.uk

Manchester Office

First Floor, Calico, 55 Mosley
Street, Manchester M2 3HQ
0161 694 7087
manchester@booth-king.co.uk

Edinburgh Office

54 Warrender Park Road,
Edinburgh EH9 1HH
0131 229 1547
edinburgh@booth-king.co.uk



Approved Body for
Certification of Design
under the SER Ltd. Scheme

