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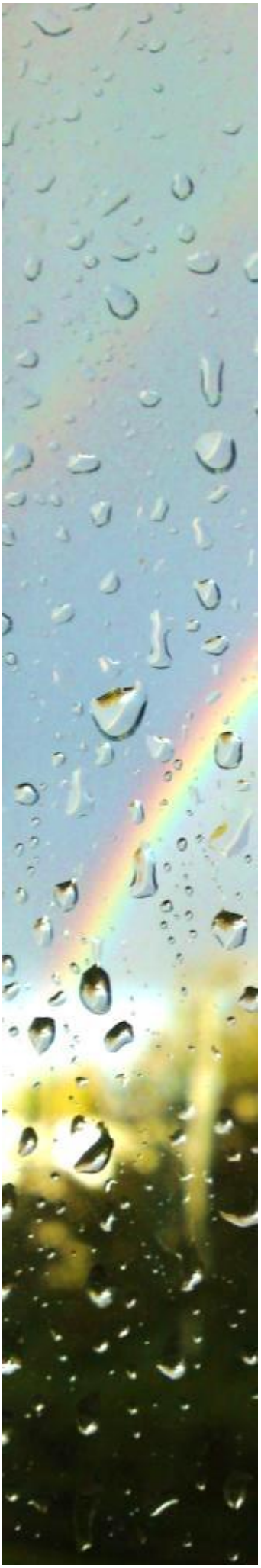
STAGE I FLOOD RISK ASSESSMENT

Proposed Residential Development
Church Inn
Church Road
Manchester
M22 4WL

REC Report: 45114FRp1r0
Issued: August 2013

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National Consultancy, Locally Delivered

QUALITY ASSURANCE

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TABLE OF CONTENTS

QUALITY ASSURANCE 1

EXECUTIVE SUMMARY 4

1.0 INTRODUCTION 5

1.1 Background 5
1.2 Objectives 5
1.3 Sources of Information 5
1.4 Approach to the Assessment 6
1.5 Sequential and Exceptions Test 6
1.6 Limitations of the Study 7

2.0 SITE SETTING 8

2.1 Site Details 8
2.2 Site Description 8
2.2.1 Current Layout 8
2.2.2 Surrounding Hydrology 8
2.2.3 Surrounding Area 8
2.3 Future Site Use 8

3.0 SOURCES OF FLOODING 10

3.1 Flooding from Rivers 10
3.1.1 Environment Agency Indicative Flood Plain Map 10
3.1.2 Manchester City, Salford City and Trafford Council's Strategic Flood Risk Assessment (2010) 10
3.1.3 National Flood Risk Assessment (NaFRA 2008) Flood Rating 10
3.2 Flooding from Groundwater 11
3.3 Flooding from Reservoirs, Canals and other Artificial Watercourse 11
3.4 Pluvial Flood Risk 11
3.5 Flooding from Sewers and Surface Water Drainage 11

4.0 FLOOD RISK ASSESSMENT 13

4.1 Flooding from Rivers 13
4.2 Flooding from Groundwater 13
4.3 Flooding from Sewers 13
4.4 Flooding from Reservoirs, Canals & Other Artificial Watercourse 13
4.5 Flood Zone Classification 13
4.6 Access and Egress 13
4.7 Flood Warning and Evacuation Plans 14
4.8 Attenuation of Surface Waters 14

5.0 PRELIMINARY SURFACE WATER DRAINAGE STRATEGY 15

5.1 Introduction 15
5.2 Current Site Conditions 15
5.3 Proposed Development 15
5.4 NPPF Technical Guidance Requirements 15
5.5 Sustainable Drainage Systems 15
5.6 Surface Water Run-off 15
5.7 Drainage Options Appraisal 16

6.0 CONCLUSIONS & RECOMMENDATIONS 17

APPENDICES

Appendix I	Figure 1 – Site Location Plan& Aerial Photograph
	Figure 2 – Proposed Development Plan
	Figure 3 – River and Coastal Flood Map
	Figure 4 – NaFRA (2008) Flood Map
	Figure 5 – JBA Surface Water (Pluvial) Flood Map
	Figure 6 – United Utilities Sewer Plan Extract
	Figure 7 – Groundwater Susceptibility Map
Appendix II	Glossary of Flood Risk Terms
Appendix III	CD Containing Supporting Information

EXECUTIVE SUMMARY

Site Address	Church Inn, Church Road, Northenden.
Grid Reference	E383125, N390131
Site Area	0.2 ha
Current Site Use	The site currently comprises the derelict Church Inn public house. The rear of the site comprises predominately areas of hard standing with small bands of vegetation along the boundaries. An earth mound is located in the northwest corner and is approximately 1m in height. There is also an outbuilding located to the rear of Church Inn. The site is bounded by a brick wall along the northern boundaries and by concentrate walls along the east and west.
Environmental Setting	The River Mersey is located approximately 100m from the north eastern boundary of the site and flows in a northwards direction before meandering and flowing west. Baguley Brook is located approximately 900m south west of the site. This is an extensively culverted watercourse and flows in a westwards direction. Chorlton Water Park is a surface water body located approximately 1.1km to the northwest of the site.
Sources of flooding and risk analysis – entire site	**River** Risk of river water flooding following a 1 in 75 year event - **Low** **Coastal** Risk of coastal flooding following a 1 in 75 year event - **Negligible** **Surface Water/Pluvial Flooding** Risk of surface water flooding following a 1 in 75 year event- **Negligible** **Groundwater** The potential risk of groundwater flooding – **Negligible** **Sewers** The potential risk of sewer flooding - **Low** **Canals, Reservoirs and Artificial Watercourses** The potential risk from these additional sources - **Low**
Recommendations	Due to a history of sewer flooding in the Northenden area, the sewer capacity should be calculated and consultation with United Utilities undertaken to ensure no further risk to the surrounding area. Due to perceived permeable sands and gravels underneath the site, infiltration testing in accordance with BRE 365 should be undertaken at the earliest opportunity to investigate the suitability of soakaways at the site.

1.0 INTRODUCTION

1.1 Background

Resource and Environmental Consultants Ltd (REC) have been commissioned by Hale Estates to undertake a preliminary Flood Risk Assessment (FRA) at a proposed residential development at Church Inn, Church Road, Northenden.

The report is required to support a planning application and planning policy in relation to flood risk is contained within the National Planning Policy Framework (NPPF) and the accompanying 'Technical Guidance to the NPPF'.

Annex 3 to the NPPF is a list of documents replaced by the NPPF, which includes Planning Policy Statement 25: Development and Flood Risk (PPS25), the previous planning policy setting out the requirements for proposed developments in terms of flood risk and drainage, but not the PPS25 Practice Guide.

Appendix II contains a glossary relating to the terms of the Flood Risk Assessments.

1.2 Objectives

This Flood Risk Assessment follows guidance set out in Planning Policy Statement 25 (PPS25) and follows Environment Agency Guidance Note 1 for developments greater than 1 hectare in Flood Zone 1.

The objectives of the preliminary FRA are to:

- Undertake a review of the Environment Agency (EA) Indicative Flood Mapping;
- Review United Utilities, National Flood Risk Assessment (NaFRA) and JBA Consulting information;
- Review of available Strategic Flood Risk Assessment information;
- Review of available development proposals and comparison with the existing development; and,
- Undertake an initial assessment of the flood risk and identify areas that need further investigation.

1.3 Sources of Information

Background information was sought from the following sources:

- Environment Agency Indicative Flood Mapping;
- Manchester City, Salford City and Trafford Council's Strategic Flood Risk Assessment (SFRA);
- United Utilities plc Sewer Plans;
- Ordnance Survey Landranger Map;
- British Geological Survey Solid and Drift Geological Map (Sheet 98, Stockport); and,
- Groundsure Flood Insight Report.

1.4 Approach to the Assessment

An initial assessment indicates that the primary flood risk at the proposed development is from a fluvial source associated with the River Mersey.

Consideration has also been given to the site flooding from secondary sources such as groundwater; artificial water bodies; infrastructure failure; overland flow and ponding of localised rainfall within the site.

The requirements for flood risk assessments are generally as set out in the 'Technical Guidance to the NPPF, published in March 2012; and in more detail from the Environment Agency's 'Standing Advice on Flood Risk' available from: http://www.environment-agency.gov.uk/research/planning/82584.aspx.

1.5 Sequential and Exceptions Test

As set out in the NPPF, the aim of the Sequential Test is to steer new development to areas at the lowest probability of flooding.

The Flood Zones are the starting point for the sequential approach.

The Environment Agency Flood Map shows the south of the development site to be within Zone 1 of the Environment Agency Flood Map, which is defined as land assessed as having less than a 1 in 1000 (<0.1% AEP) annual probability of river flooding or the sea in any one year. The north of the site is located within Zone 2 of the Environment Agency Flood Map which is defined as land assessed as having between a 1 in 1000 and 1 in 100 (0.1%-1% AEP) annual probability of river flooding or the sea in any one year.

Proposals for the application site involve a residential re-development of the land at the former Church Inn in Northenden.

In accordance with Table 1.1 'Flood Risk Vulnerability Classification' of the Technical Guidance to the NPPF, residential sites are defined as 'more vulnerable'. As such, Table 1.1 below indicates that residential re-development proposed for the site is considered both acceptable and appropriate for the site.

Table 1.1: Flood Risk Vulnerability and Flood Zone 'Compatibility'[1]

Flood Risk Vulnerability Classification		Essential Infrastructure	Water compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	1	✓	✓	✓	✓	✓
	2	✓	✓	Exception Test required	✓	✓
	3a	Exception Test required	✓	×	Exception Test required	✓
	3b	Exception Test required	✓	×	×	×

✓ Development is appropriate
× Development should not be permitted

[1] Extracted from Table 3 of the Technical Guidance to the National Planning Policy Framework Document (March 2012)

1.6 Limitations of the Study

Reliance has been placed on factual and anecdotal data obtained from the sources identified. REC Ltd cannot be held responsible for the scope of work, or any omissions, misrepresentation, errors or inaccuracies with the supplied information. The initial Flood Risk Assessment information is not necessarily exhaustive and further information relevant to the site may be available. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.

2.0 SITE SETTING

2.1 Site Details

Site Address	Church Inn, Church Road, Northenden
National Grid Reference	383125E, 390131N
Site Area	0.2 ha

2.2 Site Description

2.2.1 Current Layout

The site currently comprises the derelict Church Inn public house. The rear of the site comprises predominately areas of hard standing with small bands of vegetation along the boundaries. An earth mound is located in the northwest corner and is approximately 1m in height. There is also an outbuilding located to the rear of Church Inn. The site is bounded by a brick wall along the northern boundaries and by concentrate walls along the east and west.

A topographic survey of the site has been completed and it appears that the site slopes to the north within an elevation difference of circa 2.50 -3.00m. The highest point on the site is identified as being in the southeast corner with an elevation of 32.98mAOD and the site's low point, to the north, is at 29.87mAOD.

A Site Location Map and Aerial Photograph are presented as Figure 1 in Appendix I.

2.2.2 Surrounding Hydrology

The River Mersey is located approximately 100m from the north eastern boundary of the site and flows in a northwards direction before meandering and flowing west. Baguley Brook is located approximately 900m south west of the site. This is an extensively culverted watercourse and flows in a westwards direction. Chorlton Water Park is a surface water body located approximately 1.1km to the northwest of the site.

2.2.3 Surrounding Area

The surrounding area is described in the table below:

Direction	Description
North	Residential properties with the associated garden space
East	Residential properties with wooded area beyond
South	Residential and commercial properties
West	Residential properties with the associated garden space

2.3 Future Site Use

REC has been provided with a Proposed Development Plan and it is understood that the site will comprise 12No low rise residential units with associated gardens to the rear. There will

be a small access road located to the north of the site with car parking facilities along the east and towards the south of the site.

The Proposed Development Plan is presented as Figure 2 within Appendix I.

3.0 SOURCES OF FLOODING

3.1 Flooding from Rivers

3.1.1 Environment Agency Indicative Flood Plain Map

The Environment Agency River and Coastal Flood Plain Map shows that the southern area of the site is located within an area defined as Flood Zone 1 whilst the north of the site is located within a Flood Zone 2. Furthermore, the EA maps indicate that there is an area within a 500m radius of the site which is used for flood storage and there are flood defences located within a 250m radius of the site. Despite this, the EA has no records of any historical flooding events within a 250m radius of the subject site.

The River and Coastal Flood Risk Map is presented as Figure 3 in Appendix I.

3.1.2 Manchester City, Salford City and Trafford Council's Strategic Flood Risk Assessment (2010)

The subject site has been assessed as part of the Manchester City, Salford City and Trafford Council's Hybrid Strategic Flood Risk Assessment. The Strategic Flood Risk Assessment was completed by JBA Consulting and the salient findings are presented below:

- A significant source of flood risk across the region is from a fluvial source;
- There are two flood storage areas at Didsbury and Sale Ees Water Park which provide protection up to a 1 in 50 year event;
- Northenden is identified as an area at the highest risk of surface water flooding;
- Information from Manchester City, Salford City and Trafford Council indicate that that sewer flooding problems are present throughout the urban areas;
- Sewer and drainage issues have been identified during rainfall events in Northenden;
- There are no historical reports of groundwater flooding;
- Northenden is at risk of reservoir flooding from the Didsbury Flood Storage Reservoir; and,
- Surface water flooding is a major source of flood risk but the impacts can be mitigated through the implementation of drainage techniques, including SuDS at the planning application stage.

3.1.3 National Flood Risk Assessment (NaFRA 2008) Flood Rating

The Environment Agency NaFRA database provides an indication of river and coastal flood risk. The data considers the probability that flood defences will overtop or breach and the distance from the river or the sea.

For the south of the subject site the highest risk of flooding is considered to be negligible. For the north of the subject site no NaFRA data is available.

The NaFRA Flood Rating Map is presented as Figure 4 in Appendix I.

3.2 Flooding from Groundwater

The BGS geological map shows the following formations are present beneath the site:

Geological Unit	Classification	Description	Aquifer Classification
Drift	Glaciofluvial Sheet Deposits	Sands and Gravels	Secondary A
Solid - northeast	Helsby Sandstone Formation	Sandstone	Principal
Solid – southwest, northwest & central	Tarporley Siltstone Formation	Siltstone and Sandstone	Secondary B

The BGS has assessed the subject site as being of a low susceptibility to groundwater flooding. The assessment by the BGS is given a low confidence rating based on the information they have for this area.

3.3 Flooding from Reservoirs, Canals and other Artificial Watercourse

The Didsbury Flood Storage Area is located within a 500m radius of the site.

3.4 Pluvial Flood Risk

Pluvial Flooding is defined as flooding caused by rainwater generated overland flow before run-off enters a watercourse or sewer and is modelled on a 1 in 200 year rainfall event. In such events sewerage and drainage systems and surface watercourses may be overwhelmed.

The Pluvial Flood Risk mapping indicates that there is a small area central to the northern sector of the site which is considered at significant risk of pluvial flooding. This is defined as being greater than 0.1m flood depth in a 1 in 75 year rainfall event. The remainder of the site is considered at a negligible risk.

The risk is associated with a minor topographic depression relative to the surrounding land thus any overland flows will be preferentially directed and therefore pond in this area. As the remainder of the site is considered at a negligible risk from pluvial flooding, it is considered that this depression can be engineered out during development and therefore pluvial flooding presents a negligible risk to the proposed development.

The JBA Pluvial Flood Risk Map is presented as Figure 5 in Appendix I.

3.5 Flooding from Sewers and Surface Water Drainage

A review of United Utilities plc sewer plans indicates that there is an extensive sewer network associated with the residential area surrounding the subject site.

There are two combined sewers located on Church Road to the south of the site comprising 900mmØ and 300mmØ sewers. These sewers flow west along Church Road before discharging into a 1000mmØ sewer network on Palatine Road.

There is a 75mmØ cast iron surface water sewer located on Consul Street to the west of the site. This discharges into a 100mmØ cast iron surface water sewer on Church Road. This system flows west and discharges into an extensive and complex network on Palatine Road.

The Manchester City, Salford City and Trafford Council SFRA details that sewer flooding is known to be a problem in this area, however the exact location is unavailable for the report. It is considered likely that a detailed drainage design and drainage calculations will be required as part of a future planning application and should be done so with consultation with United Utilities.

An extract of the United Utilities plc sewer plan is presented as Figure 6 in Appendix I.

4.0 FLOOD RISK ASSESSMENT

4.1 Flooding from Rivers

The north of the site is currently located within an area defined as Flood Zone 2 whilst the south of the site is located within a Flood Zone 1 area. There is also the Didsbury Flood Storage Area located to the north east of the site and flood defences along a short section of the River Mersey to the east of the site.

The combination of flood defences and flood storage area are designed to provide protection against a 1 in 50 year flood event and there have been no recorded historical flooding incidences at the subject site. The defences comprise a series of sluice gates along the River Mersey which, if water levels raise too high, open and allow water to spill onto Didsbury Golf Course.

It is therefore considered that the risk of fluvial flooding to the site is low given the presence of flood defences and flood storage areas.

4.2 Flooding from Groundwater

The majority of the site is considered to be at a negligible risk of groundwater flooding. The north corner only is considered to be at a low susceptibility. The risk is confined to this corner and follows the contour of the Helsby Sandstone Formation.

This assessment by the BGS is given a low confidence level due to the amount of information they have on this area. There have been no reported incidences of groundwater flooding in this area.

The Groundwater Susceptibility Map is presented as Figure 7 in Appendix I.

4.3 Flooding from Sewers

REC considers that a detailed drainage design and drainage calculations should be undertaken once the plans are finalised. This should be conducted along with formal consultation with United Utilities plc. As there is previous history of sewer flooding in the area, sewer capacity calculations will be required to ensure that no additional risk is being posed to the surrounding areas.

4.4 Flooding from Reservoirs, Canals & Other Artificial Watercourse

The Didsbury Flood Storage Area is designed to provide protection to Northenden for a 1 in 50 year flood event. The EA Reservoir Flood Mapping indicates that the site is not at risk of flooding from reservoirs. A low risk still remains to the area of Northenden in the event that the Flood Storage Area does not provide sufficient capacity.

4.5 Flood Zone Classification

The south of the site is located within a Flood Zone 1 area whilst the north is located within Flood Zone 2.

4.6 Access and Egress

There are no access and egress issues as the south of the site and the surrounding area are located in Flood Zone 1.

4.7 Flood Warning and Evacuation Plans

There are no flood warning issues with regards to immediate danger to the site.

4.8 Attenuation of Surface Waters

It is recommended that the drainage design, which will be undertaken post planning, should incorporate suitable attenuation to meet the requirements of the Environment Agency and water utility company. Given the presence of perceived permeable sands and gravels underneath the site, the use of soakaways may be suitable for the proposed development and requires further investigation in line with BRE 365 guidance.

5.0 PRELIMINARY SURFACE WATER DRAINAGE STRATEGY

5.1 Introduction

The preliminary surface water drainage strategy has been developed to assess the viability of effectively draining the proposed residential development. The outline strategy is designed to inform a sustainable approach and will be supplemented with a detailed drainage strategy.

5.2 Current Site Conditions

The site currently comprises the derelict Church Inn public house. The rear of the site comprises predominately areas of hard standing with small bands of vegetated areas along the boundaries. An earth mound is located in the northwest corner and is approximately 1m in height. There is also an outbuilding located to the rear of Church Inn. The site is bounded by a brick wall along the northern boundaries and by concentrate walls along the east and west.

5.3 Proposed Development

REC has been provided with a Proposed Development Plan and it is understood that the site will comprise 12No low rise residential units with associated garden space to the rear. There will be a small access road located to the north of the site with car parking facilities along the east and towards the south of the site.

5.4 NPPF Technical Guidance Requirements

The Local Planning Authority will make the final decision with regard to any planning permission. The NPPF Technical Guidance advises that a Local Planning Authority should consult with the Environment Agency (EA) who are a statutory consultee and provide advice on flooding issues at a strategic level and in relation to planning applications.

The NPPF Technical Guidance states that surface water arising from a developed site should, as far as practicable, be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, while reducing the flood risk to the site itself and elsewhere, taking climate change into account.

5.5 Sustainable Drainage Systems

In accordance with NPPF, Sustainable Drainage Systems (SuDS) should be specified wherever possible to manage surface water. The principals outlined within PPS25 Practice Guidance have been developed to improve the impact of flooding in the UK and as such provide pivotal assessment criteria for any proposed redevelopment.

The NPPF dictates that where at all possible, preference should be given to adoption of a SuDS system over more conventional systems such as foul sewer.

The exact type of SuDS will be determined at the detailed design stage.

5.6 Surface Water Run-off

The site area of 0.2 hectares is at present considered to consist of 75% impermeable area equating to 0.15 hectares.

The proposed impermeable area of the residential development will be approximately 50% of the total development area equating to 0.1 hectares.

The proposed impermeable area will therefore decrease surface run-off and increase infiltration volumes compared to the site currently.

5.7 Drainage Options Appraisal

Due to the fact that there will be a decrease overall in the impermeable area within the proposed residential development, it is considered that there will be a negligible flood risk from surface water run-off to the development or to others.

It is recommended that the detailed drainage design consider the installation of soak away drainage systems prior to considering other options as a sustainable method of surface water disposal in accordance with the principals outlined within BRE365. The site is underlain by perceived permeable sands and gravels and therefore the investigation into the suitability of soakaways is recommended.

If percolation test results are favourable then a permeable paving solution should be considered.

If percolation tests are unfavourable then the consideration of discharge into a sewer system could be considered, however a detailed assessment will be required to model anticipated drainage rates. This model will inform the design of a comprehensive attenuation system to ensure that no undue risk is generated downstream of the subject site.

Alternative methods of on-site storage could include:

- Infiltration basin (open / closed with porous fill); and,
- Infiltration trenches.

6.0 CONCLUSIONS & RECOMMENDATIONS

Conclusions

This Flood Risk Assessment follows guidance set out in the NPPF and the accompanying NPPF Technical Guidance. Annex 3 to the NPPF is a list of documents replaced by the NPPF and includes PPS25 and follows Environment Agency Guidance Note 1 for developments greater than 1 hectare in Flood Zone 1.

A review of the EA indicative flood mapping and other relevant data indicates that the south of the site is located within an area defined as Flood Zone 1 whilst the north is located within a Flood Zone 2. Furthermore, there are flood defences and a flood storage area located to the east of the site.

In accordance with the NPPF, residential sites are defined as 'more vulnerable' in the Sequential and Exceptions test. This indicates that the residential re-development proposed for the site is considered both acceptable and appropriate for the site.

There is a low risk of flooding from the sewers in addition to artificial watercourses associated with the Didsbury Flood Storage Area located to the east of the site.

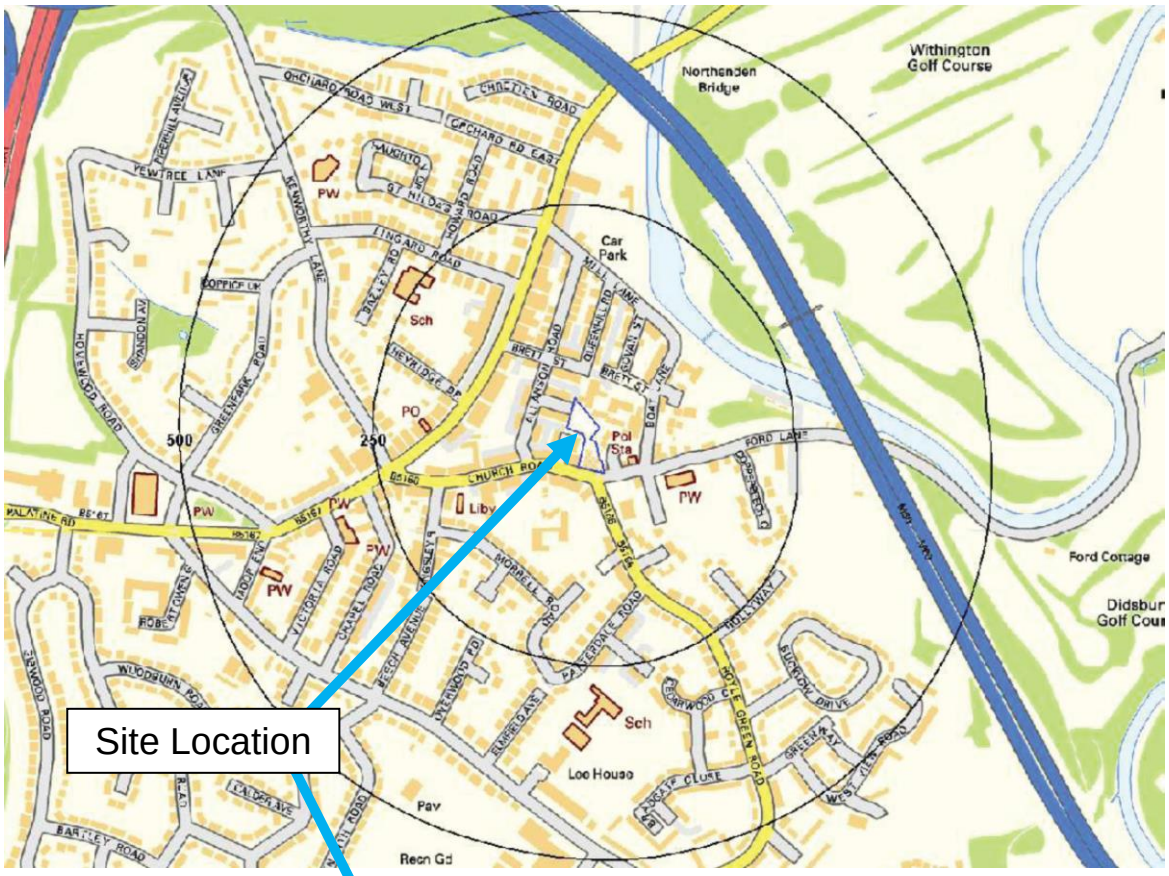
Recommendation

- Due to a history of sewer flooding in the Northenden area, the sewer capacity should be calculated and consultation with United Utilities undertaken to ensure no further risk to the surrounding area.

- Due to perceived permeable sands and gravels underneath the site, infiltration testing in accordance with BRE 365 should be undertaken at the earliest opportunity to investigate the suitability of soakaways at the site.

APPENDIX I

FIGURES



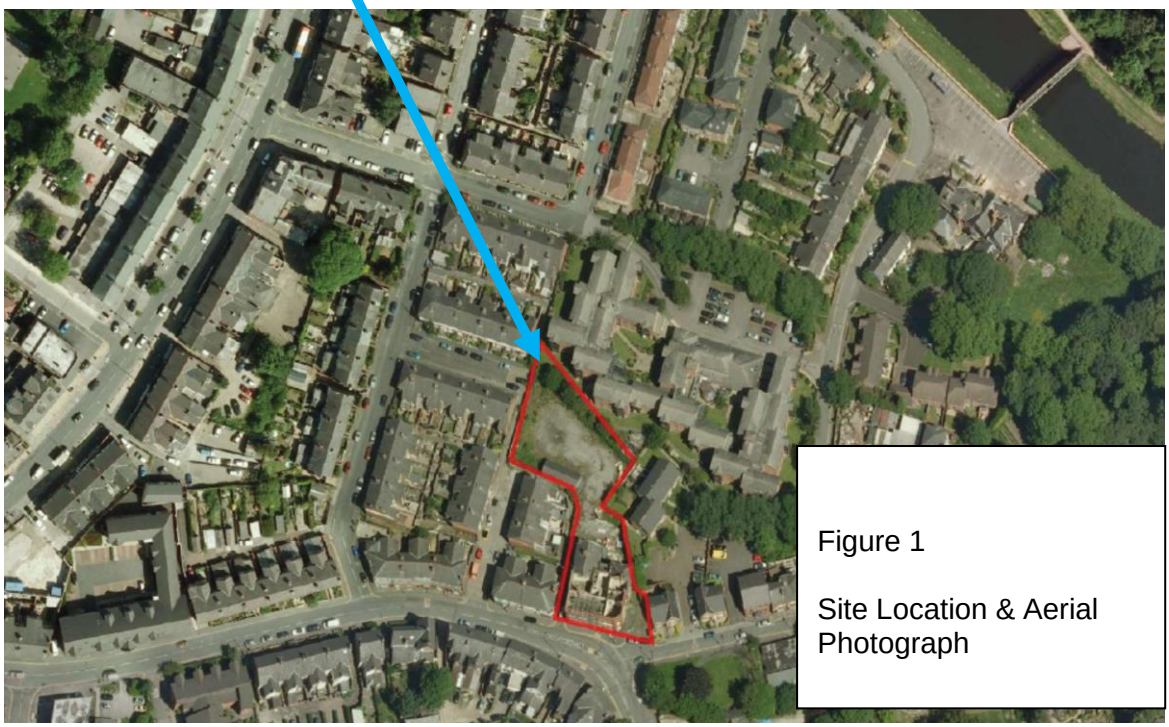


Figure 1

Site Location & Aerial Photograph



Figure 2

Proposed Site Layout



Figure 3

River & Coastal Flood Map

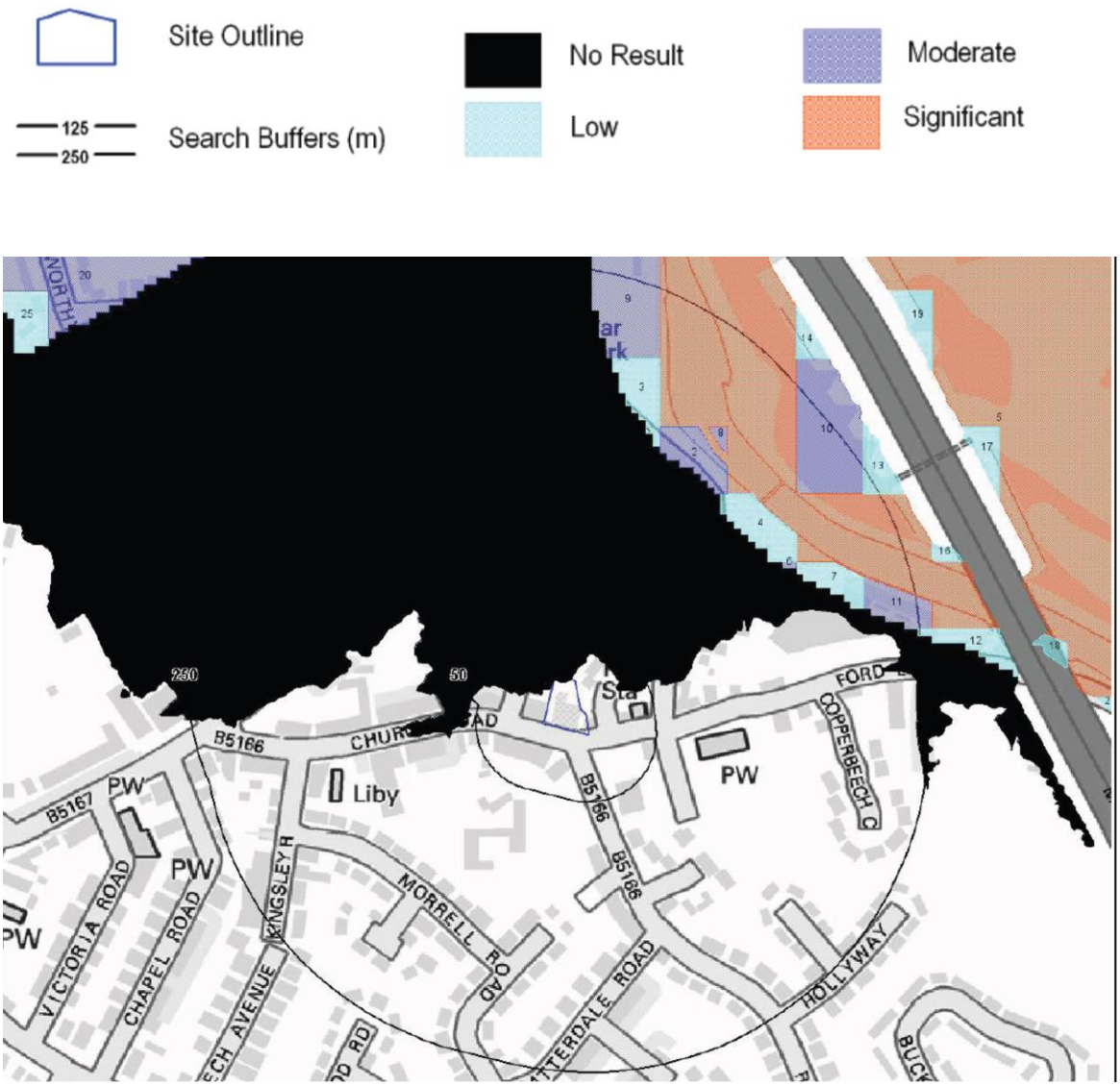


Figure 4

NaFRA (2008) Flood Rating



Figure 5

Pluvial Flood Map



Extract from maps of United Utilities' Underground Assets

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. The actual positions may be different from those shown on the plan and private service pipes may be shown by a blue broken line. United Utilities Water will not accept liability for any damage caused by the actual position being different from those shown.

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Figure 6

United Utilities Sewer Maps

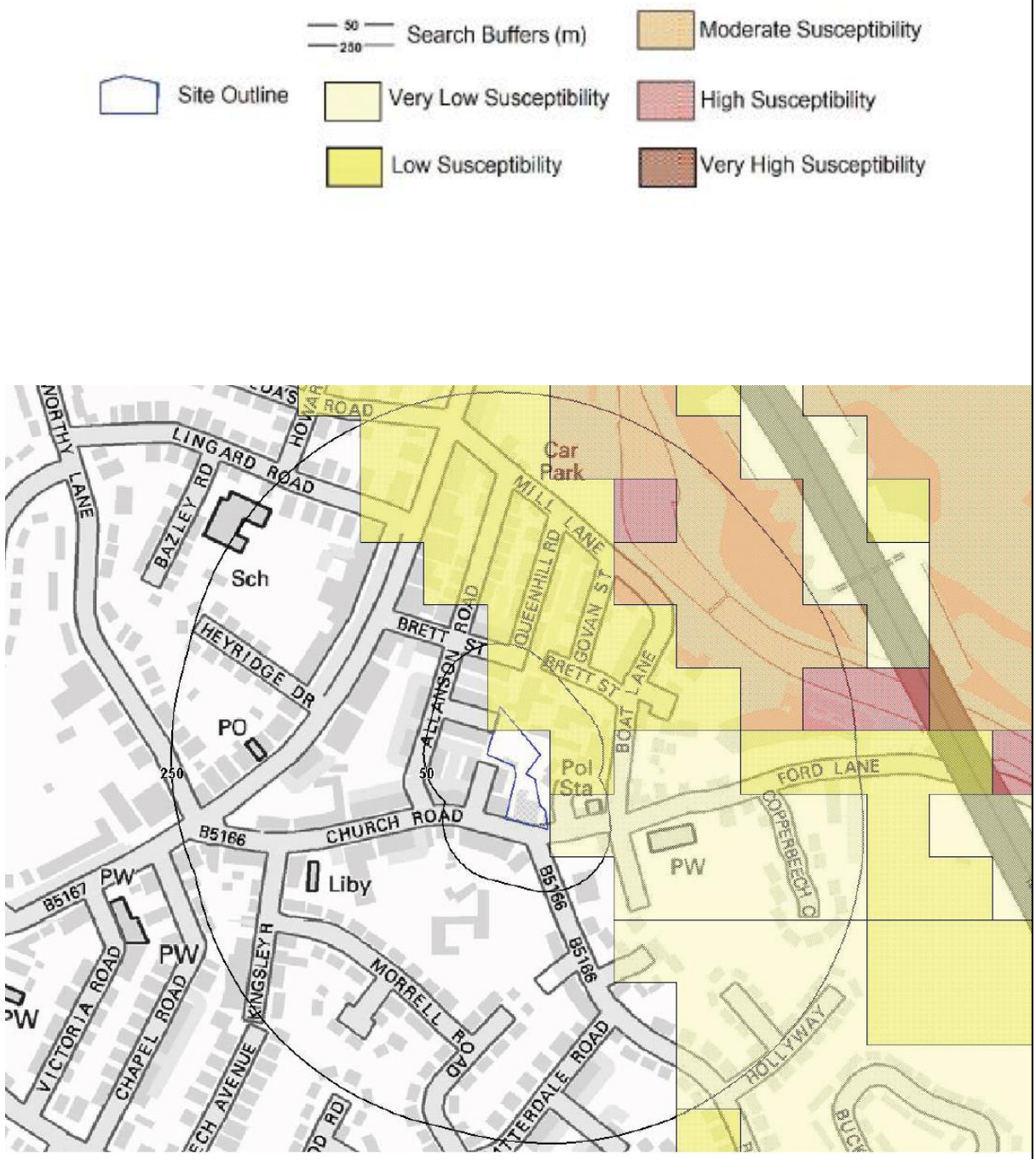


Figure 7

Groundwater
Susceptibility Map

APPENDIX II

GLOSSARY OF FLOOD RISK TERMS

Notes on Flood Risk

Flood data has been modelled assuming an 'undefended' scenario where no defences are present. However, where flood defences are identified this will be reflected in the overall risk assessment. The risk is classified by JBA into four categories:

- Negligible
- Low – more than 0.1m
- Medium – more than 0.3m
- High – more than 1m

which reflect varying depths of river flooding.

Notes on Flood Zone Data

Technical Guidance Note to the NPPF defines the flood zones as:

- Zone 1 – little or no risk with an annual probability of flooding from rivers and the sea of less than 0.1%
- Zone 2 – low to medium risk with an annual probability of flooding of 0.1 – 1% from rivers and 0.1 – 0.5% from the sea
- Zone 3 – high risk with an annual probability of flooding of 1.0% or greater from rivers, and 0.5% or greater from the sea
- Zone 3b/Flood Storage Areas – very high risk with the site being used as part of the functional flood plain or as a Flood Storage Area

Notes on NaFRA

The probability estimates for NaFRA risk bands are as follows:

- Negligible – the chance of flooding from rivers or the sea is considered to be less than 0.1% (1 in 1000)
- Low – the chance of flooding from rivers or the sea is greater than 0.1% (1 in 1000) but less than 0.5% (1 in 200)
- Moderate – the chance of flooding from rivers or sea is greater than 0.5% (1 in 200) but less than 1.3% (1 in 75)
- Significant – the chance of flooding from rivers or the sea is greater than 1.3% (1 in 75)

Additionally, a site may fall within an area not yet fully assessed within the NaFRA – noted as 'no data available' or 'no result'. These areas tend to fall within existing floodplains, and hence a cautionary approach is taken and these areas are treated as though they have the potential to lie within areas considered to be at a significant risk of flooding.

Notes on Pluvial Flooding

The maps are banded into 5 bands indicating areas of increasing natural vulnerability:

- Low – 0.1m or greater in a 1 in 1000 year rainfall event
- Low to Moderate – between 0.1m and 0.3m in a 1 in 200 year rainfall event
- Moderate – between 0.3m and 1.0m in a 1 in 200 year rainfall event
- High – greater than 1.0m in a 1 in 200 year rainfall event
- Significant – greater than 0.1m in a 1 in 75 year rainfall event

APPENDIX III

CD CONTAINING SUPPORTING INFORMATION