

**Mulbury Homes Limited
Derwent Lodge Estates Limited
Riverside Group
Aldi Stores Limited**

Flood Risk Assessment





Land at Former Walton Hospital Site Rice Lane, Liverpool

**Ironside Farrar Limited
3 Worsley Court
High Street
Worsley
Manchester
M28 3NJ**

30131/SRG

March 2015

Prepared By: S.R. Gough	
Checked By: S.A. Pope	

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DEVELOPMENT AT RICE LANE
LIVERPOOL
FLOOD RISK ASSESSMENT
&
DRAINAGE STRATEGY

1.0 Introduction

This Flood Risk Assessment and Drainage Strategy have been prepared by Ironside Farrar Limited on behalf of joint applicants Mulbury Homes Limited; Derwent Lodge Estates Limited; Riverside Group and Aldi Stores Limited in connection with a planning application for a mixed use residential and retail foodstore development of land at the former Walton Hospital site, Rice Lane, Liverpool.

In accordance with National Planning Policy Framework (NPPF) and the associated Technical Guidance document, flood risk must be assessed for all sources including tidal (from the sea), fluvial (from rivers), pluvial (from land), groundwater, sewer and artificial water bodies (e.g reservoirs, canals, major water supply infrastructure etc.).

More specifically, the development of any site must be carried out in such a way as to mitigate any potential flood risk, both on and off site from all sources of flooding.

2.0 Site Description

The application site comprises a parcel of land, measuring approximately 5.12ha in area. It is situated to the west of the A59 Rice Lane and is located within the built up area of Walton in Liverpool (grid reference SJ 35836 95439). The extent of the area to which the application relates is shown on the enclosed site location plan (see Appendix A and B) and is identified by the redline boundary.

At present, the site is divided into two distinct parcels by a recently completed hospital development and the converted former hospital buildings that are now a residential development. The two halves are joined by the existing access road that has a signalised junction with Rice Lane. To the south west this road has a good surface and adjoining footpath but to the north east of the junction the road is the original hospital access road and has no footpath and poor surface.

The western boundary of the site is formed by the railway that is in cutting; between the two development parcels there is the existing residential development around Clocktower Drive. This development is a combination of the converted former hospital buildings and new infill development and is understood to have been undertaken approximately 13 years ago. Immediately to the south of this development there is a new hospital development that has only recently been completed.

Rice Lane runs along the eastern boundary of the site and between the site access road and Rice Lane there are two narrow portions of land that are presently hard surfaced and used as car parks. The southern boundary is formed by a wall and beyond there is generally existing residential development; to the south west of the access road there is a large, tarmac surfaced car park and beyond this to the north there is open, rough grass that has the remains of the former hospital building bases still present across a large proportion of the area. On the western boundary there is a bridge access across the railway to a further portion of the site that does not form part of this application.

To the east side of the site access from Rice Lane the existing road remains in place through the site round towards Clocktower Drive in the north but it is not presently connected to the newer highway. Beyond the northern boundary there is existing residential development and the south western boundary of this portion is formed by the new hospital development. This portion of the site is generally rough grass with the remains of former hospital buildings and hard standings present; generally there are few trees within the site but there are some that line the existing access roads.

Topographically, the site has a significant fall to the east, the lowest point of the site being on the eastern boundary with Rice Lane.

Along the eastern boundary, the levels rise from 28.30m in the south to 26.83m at the northern corner. The northern boundary continues to rise to the north west from 27.50m in the north east corner to 33.40m in the west adjacent to the railway cutting. The western portion of the eastern portion of the site falls from 32.92m at the end of Clocktower Drive to 27.40m at the Rice Lane junction. The southern boundary rises to the west to the highest level on the site of 40.00m in the south west corner adjacent to the railway cutting. The level at the crossing over the railway is 38.30m but there is a sharp level change to the east down to 33.20m at the boundary with Clocktower Drive. The western end of the existing site access road is at a level of 33.50m and directly in front of the former hospital building the level of the road is at 32.50m.

The topographical survey is included in Appendix C and a selection of photographs, together with an aerial photo is included in Appendix D to illustrate the site at the present day.

3.0 Proposed Development

The proposals for the site comprise the erection of up to 195 dwellings (Use Class C3), retail foodstore (Use Class A1) with access and associated areas of car parking and landscaping. An indicative layout of the development is shown on the Proposed Development and Drainage Layout attached at Appendix H.

4.0 Planning Policy

The National Planning Policy Framework (NPPF) sets out the Government's policy on meeting the challenges of climate change, flooding and coastal change. The NPPF states that:

"Planning plays a key role in helping shape places to secure radical reductions in greenhouse gas emissions, minimising vulnerability and providing resilience to the impact of climate change, and supporting the delivery of renewable and low carbon energy and associated infrastructure. This is central to the economic, social and environmental dimensions of sustainable development.

Local planning authorities should adopt proactive strategies to mitigate and adapt to climate change taking full account of flood risk, coastal change and water supply and demand consideration."

This Flood Risk Assessment proposes recommendations to facilitate the proposed development so that it takes into account flood risk at all stages of the development.

4.1 Sequential and Exception Test

Based on the location of the site in Flood Zone 1 all development (including 'More Vulnerable') is deemed appropriate according to NPPF, therefore the development is appropriately situated and the Sequential Test is not required.

4.2 Exception Test

NPPF classifies the majority of the development as 'More Vulnerable', however as the site is located within Flood Zone 1 the Exception Test is not required.

5.0 Forms of Flooding

The Technical Guidance to the National Planning Policy Framework requires all forms of flooding to be considered.

5.1 Flooding from Rivers

The Environment Agency Flood Risk map is included as Appendix E.

It can be seen from the map that the site is located in Flood Zone 1 with a chance of flooding of less than 0.1% (or 1 in 1000). The nearest watercourse is the Lower Tue Brook culverted watercourse, located approximately 350m to the east of the site.

The site is therefore not considered to be at risk of flooding from rivers.

5.2 Flooding from the Sea

See 5.1 above.

5.3 Flooding from Land

Intense rainfall, often of short duration, that is unable to soak into the ground or enter drainage systems can run quickly off land and result in local flooding.

Reference should be made to the Envirocheck Flood Data included in Appendix I and the consultation with Liverpool CC in Appendix J. Liverpool CC confirm the site has no history of flooding and is subject to no notable flooding from the predicted 1 in 30year and 1 in 200year flooding models. The RMS (Risk Management Solutions) flood data indicates the site to only be at potential risk of surface flooding in the 1000 year return period.

As described above, the site has the railway cutting on the western boundary that will intercept run-off from land that may be higher than the development. Other areas fall away and the site is therefore considered to be at low risk of flooding from run-off from adjacent land.

The finished floor levels of the development will ensure any overland flows are directed away from the development through the site.

Reference should also be made to section 6 relating to the site drainage.

5.4 Flooding from Groundwater

During the walkover survey there was no evidence of standing water on the site.

A full site investigation has been undertaken and reference should be made to the E3P Report reference 10-216-2c for the full details. The report confirms limited water strikes were encountered between 1.10m and 2.70m below ground level. The BGS (British Geological Society) data included in Appendix I show the site to be located in an area with limited potential for groundwater flooding to occur at the surface.

Site levels will ensure finished floor levels are set above existing ground levels.

The site is therefore not considered to be at risk of flooding from groundwater.

5.5 Flooding from Sewers

The record of Public Sewers has been obtained from United Utilities and is included in Appendix F.

The records indicate there are no public sewers crossing the site. The nearest public sewers are the 375mm dia. surface water sewer running north in Rice Lane together with a 450mm dia. and 1075mm x 700mm combined sewers.

There is a comprehensive existing drainage system present on the site that served the former hospital site and the records are included in Appendix F. It is understood this system also serves the Clocktower Drive development and the new hospital development has an attenuation system for surface water and connects to the existing drains close to the Rice Lane junction.

United Utilities have been consulted with regards to flooding from the public sewerage system in Appendix G and the response is awaited. The existing sewerage system is such that the site is at low risk of flooding from sewers.

The site itself is therefore considered to be at very low risk of flooding from sewers but the final drainage proposals for the site will need to be agreed with United Utilities.

5.6 Flooding from Reservoirs, Canals and Other Artificial Sources

There are no artificial sources of flooding in the vicinity of the site that could pose a flood risk to the development.

6.0 Development and Drainage

In line with common practice, it is proposed the surface water discharge from the proposed development should mimic that from the existing site. United Utilities have been consulted with a view to connecting foul and surface water from the development to the existing combined drains on the present site. A full investigation of the existing sewers will be undertaken to determine the full areas served, the existing discharge rates from the site and the condition.

Advice on the discharge rates from former use sites has been provided by Liverpool CC and is included in Appendix J. The advice confirms the following:

- *If the site has previously been developed it should be demonstrated that the drainage system is still operational for it to be classed as brownfield. Information should be obtained on the system, e.g. pipe diameters, levels, gradients, lengths, hydraulic controls, etc. These details should be used, along with the contributing area characteristics of the site, to set up a drainage model (or to inform another assessment method) in order to evaluate the peak flow rates at the outfalls from the existing site for the design return period events.*
- *The maximum allowed flow from the site should then be derived using the 1:2yr critical rainfall event with a 30% reduction applied to offer improvement.*
- *The limiting discharge figure for the proposed development should be used in the design of the drainage system for the minimum requirement that flows for up to the 1:30yr critical rainfall event are retained within the system and that for the 1:100yr+30% climate change allowance, critical rainfall event there will be no flooding to any buildings and any excess volumes of water will be retained on site.*

A connection to the existing drainage system is possible and the Sketch Drainage Layout included in Appendix H has been prepared to demonstrate the proposed drainage design. The full details of the system will be added following the drainage investigation and hydraulic analysis outlined above. Attenuation will be included in the system where required in the form of oversized pipes and flow controls introduced to limit the flows. Any small volumes of flooding from the system in the extreme event will be adequately accommodated on the proposed highways.

Further details of the proposed drainage system will need to be agreed with United Utilities.

The site investigation confirms:

Made Ground

Made Ground was encountered within all exploratory trial pit locations to significantly varying depths of between 0.30m and >2.70m bgl. Made Ground was generally deeper in the eastern sector of the site. Made Ground deposits generally comprised either sandy clayey topsoil or black brown slightly sandy gravel of brick, concrete and sandstone overlying further grey brown sandy gravel of concrete, brick, plastic, timber, glass and rebar with occasional cobbles of concrete and brick.

Below ground obstructions were frequent within the exploratory hole locations, particularly within the eastern sector of the site, where many of the trial pits were terminated on deep concrete slab (circa 1.00m bgl).

Drift

Drift deposits were only encountered in seven of the exploratory hole locations from depths of between 0.30m and 1.90m bgl. Drift deposits were not encountered within all exploratory trial holes due to the inability to penetrate the full depth of Made Ground within six of the locations due to obstructions and trial pit instability.

Drift deposits were generally consistent across the site, comprising firm to stiff brown, occasionally mottled grey, sandy CLAY with occasional lenses of fine to coarse SAND.

Permeability Characteristics

The underlying clay drift deposits are unlikely to provide a sufficient level of permeability facilitate infiltration drainage systems, it is therefore considered that soakaway drainage would not be suitable for the proposed development.

The ground conditions will therefore not be suitable for infiltration SUDS techniques.

A foul drainage connection can be made to the existing combined drains crossing the site.

7.0 Conclusions

- The site is located within Flood Zone 1 with a low probability of flooding.
- The site is at a low risk of flooding from other sources.
- The site is presently brownfield and flows from the site should therefore be discharged to the existing sewerage system at the existing 1 in 2 year flows with a 30% reduction as detailed in the Liverpool CC advice.
- Attenuation will be provided in the form of oversized underground pipes.

- Infiltration SUDS techniques are not considered to be suitable on the site due to the underlying strata.
- Foul drainage may be connected to the existing combined sewers crossing the site.

8.0 Recommendations

- Suitable tried and tested planning conditions shall be agreed to address the drainage of the site in accordance with the flood risk assessment & drainage strategy.
- Following initial consultation, further discussions should take place with United Utilities and Liverpool CC with regard to connecting the development to the existing combined sewers.
- Attenuation will need to be incorporated into the surface water drainage to ensure flows are limited to the specified discharge rate.
- The existing drainage layout should be investigated and the system analysed to enable the existing run-off rates to be determined.
- The external levels shall be adjusted locally to ensure overland flood routes exist through the development for use in exceptional circumstances.

APPENDIX A

Site Location Plan

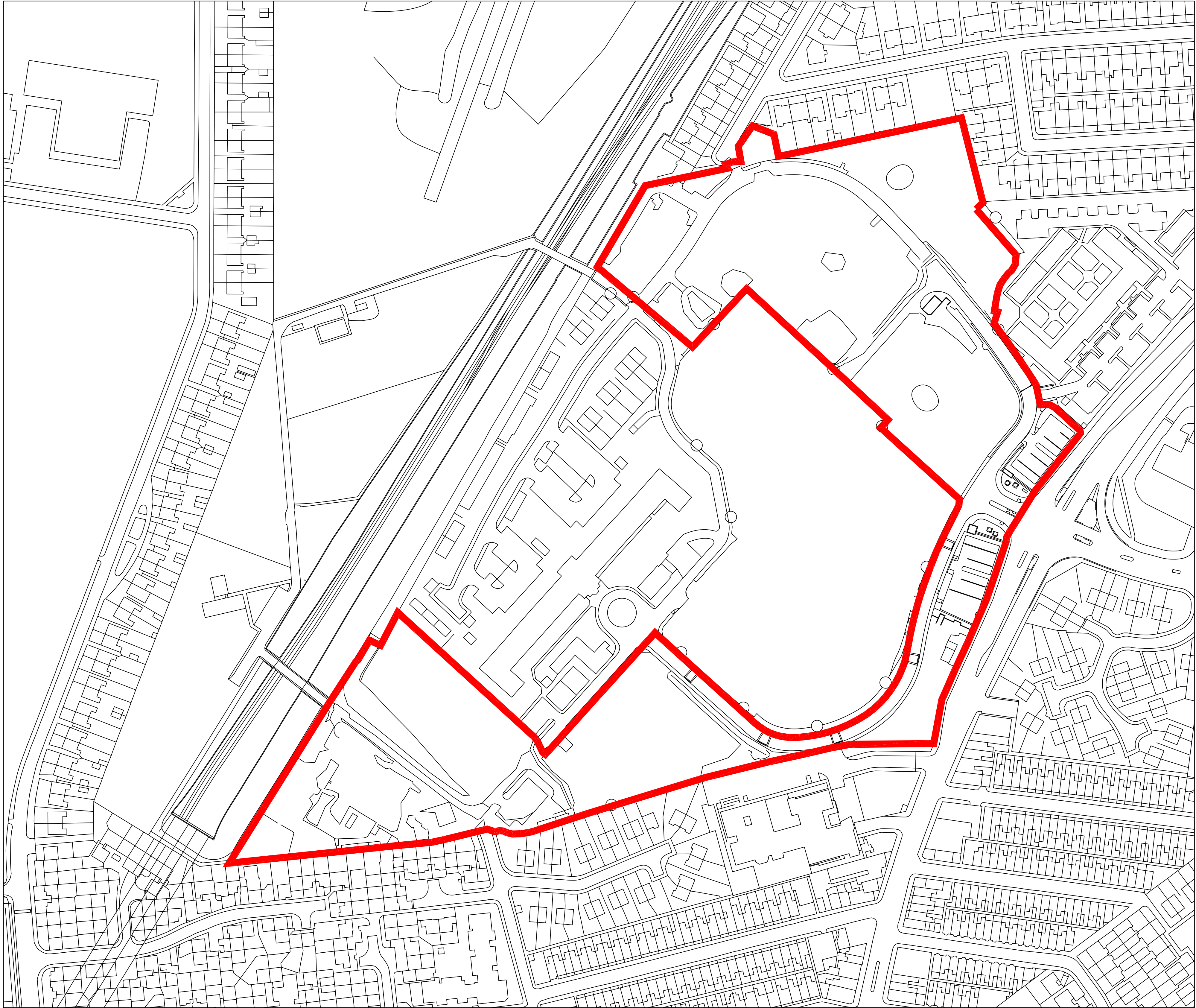


Site Location

<p>North Arrow</p> <p>Quality Ass.</p> <p>UKAS 9001</p> <p>ISO 9001:2008</p> <p>8000 Certificate</p> <p>080004639</p>	<p>Project: Former Walton Hospital Liverpool</p> <p>Client: Mulbury Homes</p> <p>Site: Site Location Plan</p> <p>Original Size: A4</p> <p>Copyright Acknowledgment: Ordnance Survey, © Crown Copyright, All Rights Reserved, Licence No. AL100017966</p> <p>Drawn: N.B.</p> <p>Checked By: SRG</p> <p>Date: March 15</p> <p>Scale: 1:50 000</p>	<p>Ironsides Farrar Environmental Planners Civil Engineers Landscape Architects Graphic Design</p> <p>3 Workley Court MANCHESTER M20 3HU Tel: 0161 753 8800 Fax: 0161 753 8279 manchester@ironsidesfarrar.com</p> <p>EDINBURGH BELLSHILL</p> <p>Drawing No: 30131/App A</p> <p>Revision:</p>
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APPENDIX B

Existing Site Plan



KEY

SITE BOUNDARY

<div>North Point ↑</div> <div>Quality Ass. UKAS 9001:2008 Assurance SGS Certificate GB02/54539</div>	Project Former Walton Hospital Liverpool		IronsidesFarrar Environmental Consultants	
	Client Mulbury Homes		Environmental Planners Civil Engineers Landscape Architects Graphic Design	
	Title Existing Site Plan		3 Worsley Court MANCHESTER M20 3NJ Tel: 0161 703 8801 Fax: 0161 703 8279 manchester@ironsidesfarrar.com	
	Original Size A1		Drawing No. 30131/App B	
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APPENDIX C
Topographical
Survey



North Point ↑ Quality Ass. UKAS 005 Quality Assurance ISO 9001:2008 SGS Certificate GB02/54539	Project Former Walton Hospital Liverpool		Client Mulbury Homes		Title Topographical Survey		Project Former Walton Hospital Liverpool		Client Mulbury Homes		Title Topographical Survey	
	Copyright Acknowledgement Ordnance Survey © Crown Copyright. All rights reserved. Licence No. AL100017966.		Drawn NB Date March 15		Checked By SRG Scale 1:1000		Drawing No. 30131/App C		Revision		Drawing No. 30131/App C	
	Original Size A1		Copyright Acknowledgement Ordnance Survey © Crown Copyright. All rights reserved. Licence No. AL100017966.		Drawn NB Date March 15		Checked By SRG Scale 1:1000		Drawing No. 30131/App C		Revision	
	Original Size A1		Copyright Acknowledgement Ordnance Survey © Crown Copyright. All rights reserved. Licence No. AL100017966.		Drawn NB Date March 15		Checked By SRG Scale 1:1000		Drawing No. 30131/App C		Revision	

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Design
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manchester@ironsidesfarrar.com
EDINBURGH BELLSHILL

APPENDIX D

Aerial & Site Photographs



KEY

SITE BOUNDARY



<div>North-Point</div> <div></div> <div>Quality Ass.</div> <div>UKAS 005</div> <div>Quality Assurance</div> <div>ISO 9001:2008</div> <div>SGS Certificate</div> <div>GB02/54539</div>	Project Former Walton Hospital Liverpool		IronsideFarrar Environmental Consultants	
	Client Mulbury Homes		Environmental Planners Civil Engineers Landscape Architects Graphic Design	
Title Aerial Photograph		3 Worsley Court MANCHESTER M28 3NJ Tel. 0161 703 8801 Fax. 0161 703 8279 manchester@ironsidefarrar.com		
Original Size A3		Copyright Acknowledgement Ordnance Survey® © Crown Copyright. All rights reserved. Licence No. AL100017966.	Drawn NB Date March 15	Checked By SRG Scale NTS
Drawing No. 30131/App D		Revision		



Rice Lane to the west.



Rice Lane to the east.



New hospital unit.



View west along existing access road.



Existing Rice Lane junction.



Former Hospital building – now apartments.



Existing Car Park area in west of the site.



Former building bases in north west corner.



View south from north west corner.



Clock Tower Drive to the east.



North east corner of the site.



View east across site.



View to north east corner of the site.

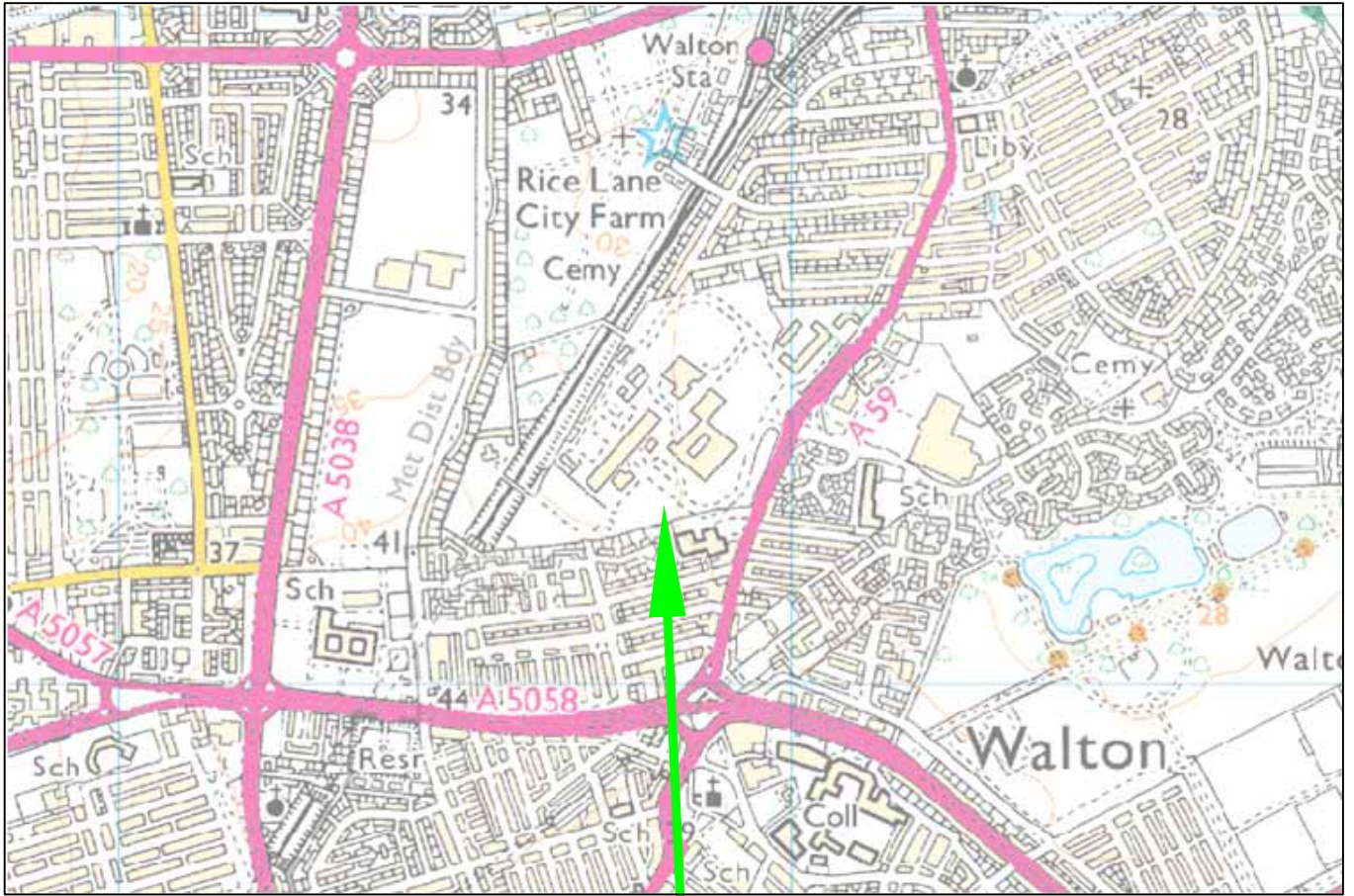


Existing access road south to Rice Lane.



View west to existing Rice Lane junction.

APPENDIX E
Environment Agency
Flood Risk Map



Site Location

<p>North Arrow</p> <p>Quality Ass.</p> <p>UKAS 9001</p> <p>ISO 9001:2008</p> <p>9001 Certificate</p> <p>080054639</p>	<p>Project</p> <p>Former Walton Hospital</p> <p>Liverpool</p> <p>Client</p> <p>Mulbury Homes</p> <p>Environment Agency</p> <p>Flood Risk Map</p>	<p>IronsideFarrar</p> <p>Environmental Planners</p> <p>Architects</p> <p>Engineers</p> <p>Landscapers</p> <p>Graphic Design</p> <p>3 Workley Court MANCHESTER M20 3HU</p> <p>Tel: 0161 753 8801 Fax: 0161 753 8279</p> <p>manchester@ironsidefarrar.com</p> <p>EDINBURGH BELLSHILL</p> <p>Drawing No.</p> <p>30131/App E</p> <p>Revision</p>
<p>Original Size</p> <p>A4</p>	<p>Copyright Acknowledgement</p> <p>© Crown Copyright</p> <p>All Rights Reserved</p> <p>License No. AL100017966</p> <p>March 15</p>	<p>Drawn</p> <p>NB</p> <p>Checked By</p> <p>SRG</p> <p>Date</p> <p>March 15</p> <p>Scale</p> <p>NTS</p>

APPENDIX F
Existing Sewer
Records



CODE

OA: Manhole cover will not lift

B: Drain run now unused

C: Drain run, further direction unground

LEGEND

○ = Manhole

— = Drain layout

→ = Direction of flow

Rev Oct 88 / Mar 89				SEFTON HEALTH AUTHORITY			
PLAN OF MAIN DRAINAGE				WALTON HOSPITAL LIVERPOOL			
SCALE	1:625	DRAWING NUMBER		SCALE	1:625		
DRAWN	F. SMITH	A.00.00.06.101		DRAWN	D.A.B.		
DATE	14.7.87			DATE	13.4.75		
				A.00.00.06.101			

APPENDIX G
Consultation with
United Utilities

From: Simon Gough
Sent: 27 March 2015 10:40
To: 'Lunt, John'; Wastewater Developer Services
Cc: 'Glyn Barrett'
Subject: Former Walton Hospital Site, Rice Lane, Liverpool(30131)
Attachments: 14-160-P01 Location Plan 17.02.15.pdf; 30131_App F1.pdf; 30131_App F2.pdf

John, I refer to our recent conversation regarding the above.

Please find attached a copy of the sewer records for the site.
Also attached is a copy of the former hospital site drainage, the majority of which still remains.

Please note the main hospital building has been converted into residential accommodation and the development at Clocktower Drive undertaken approximately 13years ago.
I would be grateful if you could confirm whether a S104 Agreement was entered into for this development?

Also believe that as there a number of properties potentially using the existing hospital drainage that the whole system may be considered as adopted under the transfer of private drains.

I would be grateful if you could confirm:

- * Have there have been any flooding incidents involving the public sewers in the vicinity of the site?
- * Is there a current S104 Agreement for the Clocktower Drive?
- * The existing combined system can be considered adopted under the transfer of private drainage?
- * A separate system will be required to the new development?
- * Likely flow rates for the proposed development?

I look forward to hearing from you shortly.

Regards

Simon Gough | Director | Ironside Farrar | 3 Worsley Court | Worsley | Manchester |M28 3NJ |
Tel: 0161 703 8801 | Fax: 0161 703 8279 | Mobile: 07717 023091 I
Web:ironsidefarrar.com

Find out more www.thehelix.co.uk

Please consider the environment before printing this e-mail.
Ironside Farrar Limited is a limited company registered in Scotland, registration number: 109330 registered address:
111 McDonald Road, Edinburgh,
EH7 4NW.

APPENDIX H
Proposed Development
Layout

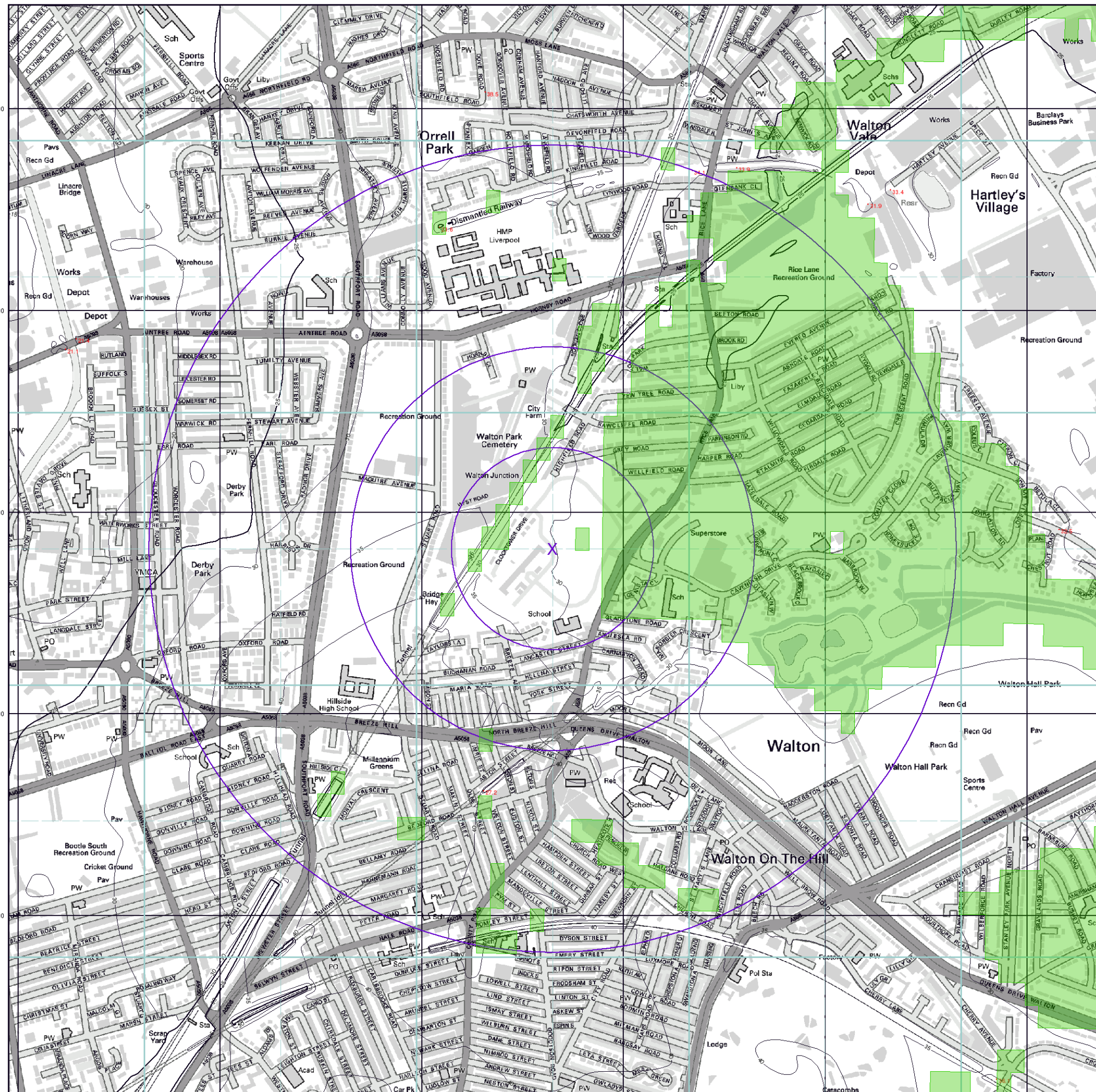


 Quality Ass. UKAS 9001:2008 Assurance SGS Certificate GB02/54539	Project Former Walton Hospital Liverpool	IronsideFarrar Environmental Planners Civil Engineers Landscape Architects Graphic Design 3 Worsley Court, MANCHESTER M20 3NJ Tel: 0161 703 8801 Fax: 0161 703 8279 manchester@ironsidefarrar.com EDINBURGH BELLSHILL	
	Client Mulbury Homes		
	Title Proposed Development & Drainage		
	Original Size A1		
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APPENDIX I

Envirocheck Flood Data

334500 335500 336500 337000



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IronsideFarrar

Environmental Consultants

RMS 100 year Return Flood Map (1:10,000)

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

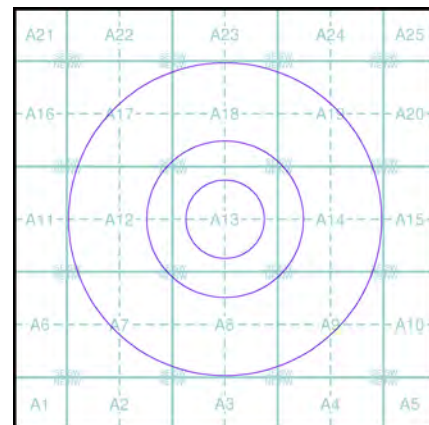
RMS 100 year Return Flood Data

Flood Depth (mm)	Flood Type		Pluvial & Minor River Flood (flood depth n/a)
	Defended Flood	Undefended Flood	
0 - 200			
201 - 500			
501 - 2000			
2001 +			

Contours (height in meters)

- Standard Contour 105 100 95
- Master Contour 105 100 95
- Spot Height *167.8
- MLW Mean Low Water
- MHW Mean High Water

RMS 100 year Return Flood Map - Slice A



Order Details

Order Number: 64885334_1_1
Customer Ref: 30135
National Grid Reference: 335820, 395410
Slice: A
Site Area (Ha): 0.01
Search Buffer (m): 1000

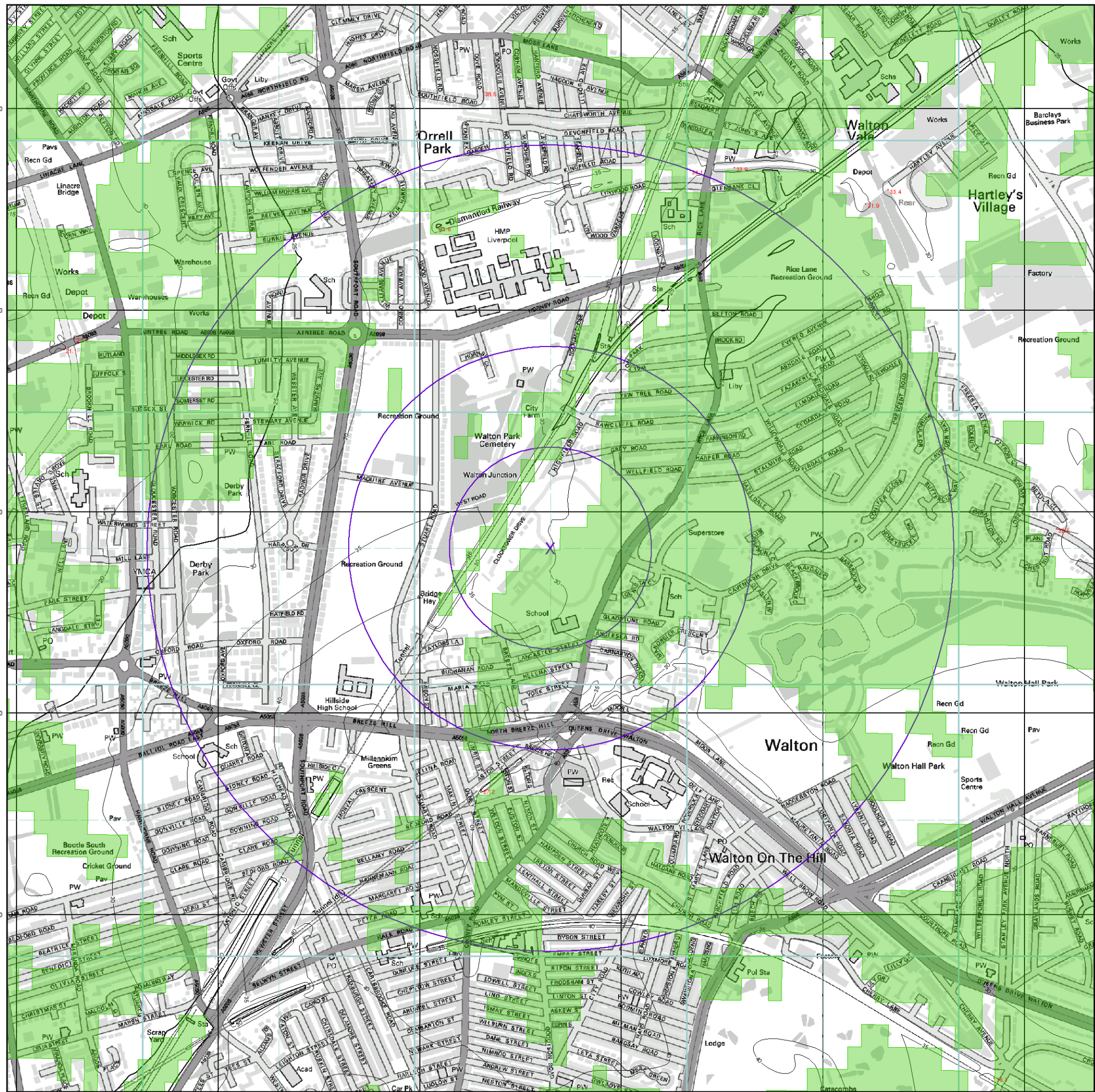
Site Details

Site at 335840, 395440



Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

334500 335000 335500 336000 336500 337000



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Ironsides Farrar

Environmental Consultants

RMS 1000 year Return Flood Map (1:10,000)

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

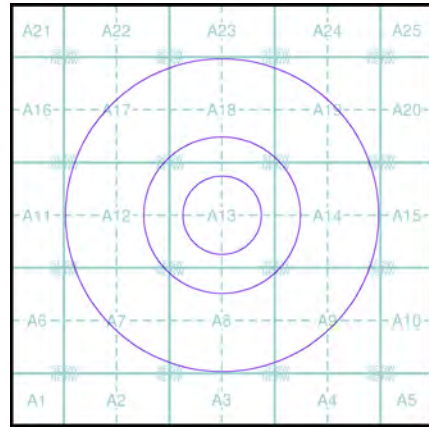
RMS 1000 year Return Flood Data

Flood Depth (mm)	Flood Type		
	Defended Flood	Undefended Flood	Pluvial & Minor River Flood (flood depth n/a)
0 - 200			
201 - 500			
501 - 2000			
2001 +			

Contours (height in meters)

- Standard Contour: 105, 100, 95
- Master Contour: 105, 100, 95
- Spot Height: 167.8
- MLW: Mean Low Water
- MHW: Mean High Water

RMS 1000 year Return Flood Map - Slice A



Order Details

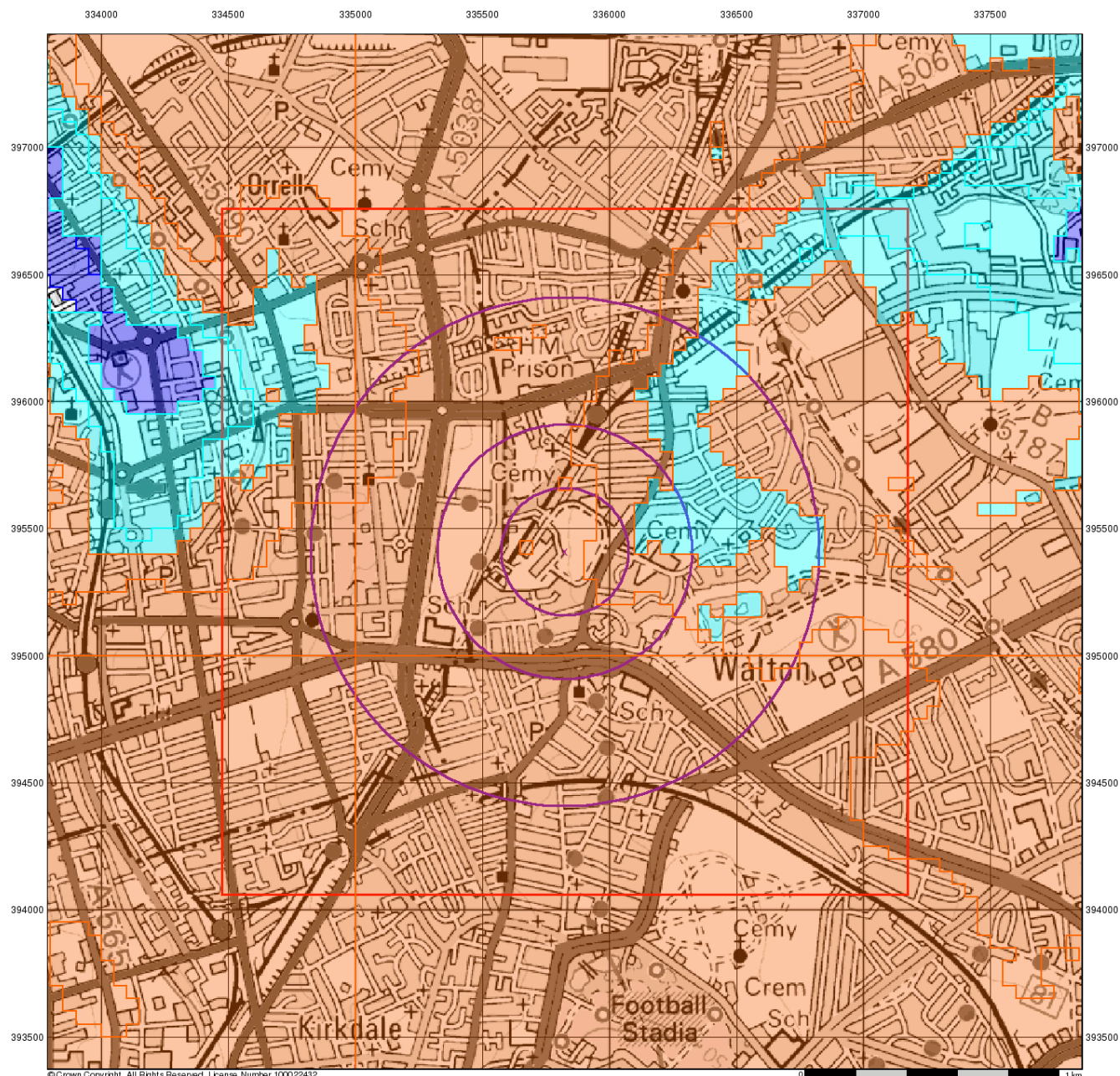
Order Number: 64885334_1_1
Customer Ref: 30135
National Grid Reference: 335820, 395410
Slice: A
Site Area (Ha): 0.01
Search Buffer (m): 1000

Site Details

Site at 335840, 395440



Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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IronsideFarrar Environmental Consultants

BGS Flood Data (1:50,000)

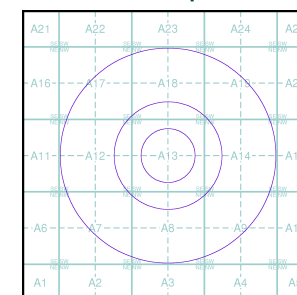
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

BGS Groundwater Flooding Susceptibility

- Potential for Groundwater Flooding to Occur at Surface
- Potential for Groundwater Flooding of Property Situated Below Ground Level
- Limited Potential for Groundwater Flooding to Occur

BGS Flood Data Map - Slice A



Order Details

Order Number: 64885334_1_1
Customer Ref: 30135
National Grid Reference: 335820, 395410
Slice: A
Site Area (Ha): 0.01
Search Buffer (m): 1000

Site Details

Site at 335840, 395440



Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

APPENDIX J

Liverpool CC Consultation

From: Jackson, David [David.Jackson3@amey.co.uk]
Sent: 12 March 2015 15:03
To: Natalie Buckley
Subject: RICE LANE, FORMER WALTON HOSPITAL

Natalie

I can confirm the site has no history of flooding and is subject to no notable flooding from the predicted 1:30yr & 1:200yr flooding models. There are no watercourses (culverted, open and historic) shown on our records and the area is not susceptible to high ground water levels. The Lower Tue Brook culverted watercourse is located approx 350m west of the site but Ironside Farrar have been involved with a development at this location and will be fully aware of this culverted watercourse.

If a planning application is to be submitted for this site then the following information should be noted

If the site has previously been developed it should be demonstrated that the drainage system is still operational for it to be classed as brownfield. Information should be obtained on the system, e.g. pipe diameters, levels, gradients, lengths, hydraulic controls, etc. These details should be used, along with the contributing area characteristics of the site, to set up a drainage model (or to inform another assessment method) in order to evaluate the peak flow rates at the outfalls from the existing site for the design return period events. The maximum allowed flow from the site should then be derived using the 1:2yr critical rainfall event with a 30% reduction applied to offer improvement.

The limiting discharge figure for the proposed development should be used in the design of the drainage system for the minimum requirement that flows for up to the 1:30yr critical rainfall event are retained within the system and that for the 1:100yr+30% climate change allowance, critical rainfall event there will be no flooding to any buildings and any excess volumes of water will be retained on site.

Notwithstanding the above, the existing site drainage constraints will also be taken into account when agreeing any discharge limits and the proposed flow should not exceed existing flows. For example if the existing site outfall was a 150mm dia pipe, irrespective of the area being drained, it would have a maximum flow capacity which may be lower than any proposed flows calculated using the above criteria, assuming a free discharge. Therefore discharge to the existing drainage system from the development would be effectively increased from the existing situation which is contrary to Environment Agency and National Planning Policy Framework guidance for flood risk and surface water management.

Where records of the previously developed system are not available and system characteristics cannot otherwise be determined, or if the drainage system is broken or blocked (or no longer operational), then the run-off characteristics should be defined as greenfield. If the site is classed as greenfield the flow rates from the development will be limited to the equivalent greenfield run off rates. For example the flow rate from the development for the 1:30yr critical rainfall event should not exceed the greenfield run off rate for the site for the 1:30 year rainfall event, likewise for the 1:2 & 1:100 year scenarios.

It should be noted that this discharge figure will satisfy planning requirements but the applicant should consult United Utilities to determine if they have any discharge restrictions, which could be more restrictive.

For all developments over 1ha a FRA (Flood Risk Assessment) will be required which should be based on the requirements as detailed in Environment Agency (Greater Manchester, Merseyside & Cheshire) Local Planning Standing Advice and NPPF guidance. The detail and technical complexity of a FRA will reflect the scale, nature and location of the development. Where available, reference should be made to the Strategic Flood Risk Assessment (SFRA) for locally specific guidance and information.

The following list sets out key information that should be submitted within a FRA for developments

- * A location plan that includes geographical features, street names and identifies the catchment, watercourses or other bodies of water in the vicinity.
- * A plan of the site showing existing site; development proposals; and identification of any structures (e.g. embankments), which may influence local flood flow overland or in any watercourses (e.g. culverts) present on the site.
- * Site levels of both existing and proposed. Reference to Ordnance Datum, may be required where details of context of the site to its surroundings is needed.
- * Details of the existing surface water drainage arrangements on site (if any) and the receptor e.g. soakaway, sewer, canal, watercourse etc.
- * Proposals for surface water management that aims to not increase, and where practicable reduce the rate of runoff from the site as a result of the development
- * Information about the surface water disposal measures already in place and estimates of the rates of run-off generated by the surfaces drained.
- * An assessment of the volume of surface water run-off likely to be generated from the proposed development and confirmation of how any excess volumes would be retained within the development.
- * Information regarding how the proposed drainage design will perform under the increased frequency and intensity of rainfall that is predicted as a result of climate change (30% for residential development & 20% for non- residential).
- * Information about other potential sources of flooding, if any, that may affect the site e.g. streams, surface water run-off, sewers, groundwater, reservoirs, canals and other artificial sources or any combination of these; including details on how these sources of flooding will be managed safely within the development proposal.

It should be noted that the above list is not exhaustive but provides a framework for the FRA to be prepared.

For developments less than 1 ha a FRA will not be required but a drainage strategy / design should be provided proportional to the scale of the development and follow the same design principles with regards to the calculating the maximum design flow rates for the site.

Many thanks

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