ELLUC Projects

ELLUC Projects Ltd

- Consultancy
- Project Management
- Site Regeneration

FLOOD RISK ASSESSMENT

Proposed residential development off
Vine Street
Gorton

Client:

Mulbury Homes
Great Oak Farm
Mag Lane
Lymm
Cheshire
WA13 0TF

ELLUC Projects Ltd
760 Mandarin Court
Centre Park
Warrington
Cheshire
WA1 1GG

Tel: **(01925) 24 3333**

Email: **info@ellucprojects.co.uk**
Web: **www.ellucprojects.co.uk**

Document History and Status

Revision	Date	Purpose/Status	Author	File Ref	Check	Review
F1	03.02.13	Final	Louis McLoughlin	F1	Louis McLoughlin	Louis McLoughlin

This document has been prepared in accordance with the scope of Elluc Projects appointment with its client and is subject to the terms of the appointment. It is addressed to and for the sole use and reliance of Elluc Project's client. Elluc Projects accepts no liability for any use of this document other than by its client and only for the purposes, stated in the document, for which it was prepared and provided. No person other than the client may copy (in whole or in part) use or rely on the contents of this document, without the prior written permission of the Elluc Projects Limited. Any advise, opinions, or recommendations within this document should be read and relied upon only in the context of the document as a whole. The contents of this document are not to be construed as providing legal, business or tax advice or opinion.

© ELLUC Projects Limited 2014

Document Details

Last saved	07/02/2014 12:01
Path	ELLUC-MH-297-010213-FRA-F1.doc
Author	Louis McLoughlin
Project Number	297
Project Name	Vine Street Gorton

Contents

ABBREVIATIONS .....

INTRODUCTION .....

PLANNING POLICY .....

National Planning Policy .....

Local Planning Policy .....

Strategic Flood Risk Assessment .....

Further Guidance .....

REQUIREMENTS OF A FLOOD RISK ASSESSMENT .....

SITE CONTEXT .....

Site Location .....

Existing Site Characterisation / Land-Use .....

Existing Site Topography .....

Existing Watercourses / Water Bodies / Drainage Infrastructure .....

Existing Ground Conditions .....

PROPOSED DEVELOPMENT .....

Proposed Layout .....

Proposed Levels .....

PROPOSED DRAINAGE .....

Surface Water Drainage Options .....

Soakaways .....

Watercourses/Waterbodies .....

Sewers .....

Surface Water Drainage Strategy .....

FLOOD HAZARDS & SOURCES OF FLOODING .....

Potential Flood Hazards .....

Sources of Flooding .....

FLOOD RISK ASSESSMENT .....

Fluvial Flooding .....

Surcharging of Artificial Drainage Systems .....

Infrastructure Failure .....

RESIDUAL RISKS & IMPACTS .....

Residual Risks .....

Impact of Displaced Water .....

Impact on Coastal or Fluvial Morphology .....

CLIMATE CHANGE .....

CONCLUSIONS & RECOMMENDATIONS .....

Appendices

APPENDIX A Extract from NPPF – Flood Risk

APPENDIX B Topographical Survey

APPENDIX C Proposed drainage layout with finished floor levels

APPENDIX D Composite statutory services layout

APPENDIX E Proposed / existing drainage impermeable areas plan

ABBREVIATIONS

Term	Meaning / Definition
AEP	Annual Exceedence Probability
BGL	Below ground level
BGS	British Geological Society
CFMP	Catchment Flood Management Plan
CIRIA	Construction Industry Research and Information Association
CoP	Code of Practice
EA	Environment Agency
EFO	Extreme Flood Outline (Boundary of floodplain associated with a flood event with a probability of occurrence of 0.1%, 1 in 1000 years)
FDA	Flood Defence Agency (e.g. Environment Agency)
FERS	Flood Event Recording System
FFL	Finished Floor Level
FRA	Flood Risk Assessment
FW	Foul Water
GPZ	Groundwater Protection Zone
LDD	Local Development Document
LDF	Local Development Framework
LHA	Local Highway Authority
LPA	Local Planning Authority
m AOD	Metres above Ordnance Datum
MAF	Mean Annual Flood
NGR	National Grid Reference
OS	Ordnance Survey
PPG	Planning Policy Guidance
PPS	Planning Policy Statement
SFRA	Strategic Flood Risk Assessment

SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
SW	Surface Water
WFD	Water Framework Directive

1.0 INTRODUCTION

1.1. Mulbury Homes are proposing to develop an area of land adjacent to Vine Street, Gorton for a residential end use. The Residential site extends to an area greater than 1 Ha (1.14Ha) The site is located off Vine Street. (Ref. Figure 4.2,)

1.2. There are existing sewers in close proximity of the development site (sewers within Vine Street) which are existing adopted sewers.

1.3. The Local Planning Authority has requested that a Flood Risk Assessment is undertaken to assess the risk of flooding to the site.

1.4. Elluc Projects Limited have been commissioned by Mulbury homes to prepare a formal Flood Risk Assessment (statement) in support of a Detailed Planning Application for the proposed redevelopment of the site.

2.0 PLANNING POLICY

NATIONAL PLANNING POLICY

2.1. The National Planning Policy Framework (NPPF)[1] clearly identifies flood risk as a specific material consideration in the Planning Process and in the allocation and release of sites for development or re-development.

2.2. NPPF builds on its predecessor (PPS 25) and seeks to further strengthen the co-ordination between land-use planning and development planning and the operational delivery of flood and coastal defence strategy. NPPF retains key elements of PPS 25 continuing to encourage Local Planning Authorities to use their existing powers to guide, regulate and control development in relation to flooding and flood risk. NPPF expects Local Authorities to adopt a risk-based approach at all levels of Planning, through the application of the Sequential Test detailed in Table 1 and 2, of the Technical Guidance to NPPF document, a copy of which is attached in Appendix A.

2.3. The aim of the sequential test is to steer new development to areas with the lowest probability of flooding. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding. The Strategic Flood Risk Assessment will provide the basis for applying this test. A sequential approach should be used in areas known to be at risk from any form of flooding.

2.4. The Water Resources Act 1991 [Section 105] also requires the Environment Agency to exercise a general supervision over all flood defence matters, including flood plains and washlands which accommodate waters during periods of flood. In discharging their functions, the Agency from time to time carries out comprehensive surveys and flood studies, largely of 'main rivers' within its jurisdiction.

[1] National Planning Policy Framework, published in March 2012 by DCLG

2.5. A Section 105 Study involves the Agency topographically surveying the subject watercourse (or parts of it) and obtaining details of the flow mechanics within the watercourse. This data then enables them to generate a comprehensive hydraulic computer model for the watercourse. From this hydraulic model the EA are able to define the approximate extent of fluvial floodplain associated with the 1 in 100 year (1% annual probability) flooding event or the extent of tidal floodplain associated with the 1 in 200 year (0.5% annual probability) flooding event.

2.6. The extents of the modelled floodplain are then provided to Local Planning Authorities, to enable them to make more informed decisions when considering proposed development in flood-susceptible areas. If development is proposed in a flood-susceptible area, or in an area where there is a history of flooding, the EA, as a statutory consultee in the Planning Process, will generally recommend that the risk of flooding be formally assessed, in accordance with PPS 25, and that a Flood Risk Assessment report be produced to support the Planning Application. The broader modelled flood extents are also indicated on the EA's Flood Zone Maps, available through their website [2].

LOCAL PLANNING POLICY

Irwell Catchment Flood Management Plan (CFMP)

2.7. The site is located within the Irwell catchment area. The EA have produced the 'Irwell Catchment Flood Management Plan' [3]. A copy of the CFMP is available from the EA on request.

2.8. CFMP's are not specifically required by the Water Framework Directive [4] and are prepared voluntarily by the EA (under Government sponsorship). A CFMP is a high-level strategic plan for an area which aims to develop policies to manage flood risk

[2] www.environment-agency.gov.uk
[3] 'River Ribble Catchment Flood Management Plan' Final Report (January 2009)
[4] www.defra.gov.uk/environment/water/wfd/index.htm

over the next 50 to 100 years. These policies take into account the likely impacts of climate change and the effects of land-use and land management, and identify a range of benefits which contribute towards sustainable development. The CFMP's policies establish whether action should be taken to increase, decrease or maintain the current level of flood risk.

Strategic Flood Risk Assessment (SFRA)

2.9. Local Planning Authorities are required to produce Local Development Frameworks, which are a portfolio of Local Development Documents that collectively deliver the spatial planning strategy for the Authority area. The LDD's undergo a Sustainability Appraisal which assists Planning Authorities in ensuring their policies fulfill the principles of sustainability. Strategic Flood Risk Assessments are one of the documents to be used as the evidence base for planning decisions and are a component of the Sustainability Appraisal process. Therefore, SFRAs should be used in the review or production of LDD's.

2.10. To assist Local Planning Authorities in their strategic land-use planning, SFRA's should present sufficient information to enable Local Authorities to apply the Sequential Test to their proposed development sites: *"Decision-makers should use the SFRA to inform their knowledge of flooding, refine the information on the Flood Map and determine the variations in flood risk from all sources of flooding across and from their area. These should form the basis for preparing appropriate policies for flood risk management for these areas."* [5]

2.11. In 2011 Manchester City Council prepared a Strategic Flood Risk Assessment and Preliminary Flood risk assessment report

2.12. The SFRA along with the EA flood risk maps indicate that the proposed development sites lie within **Flood Zone 1** and are therefore unlikely to be at risk of fluvial flooding.

2.13. The SFRA has been developed with the assistance of the Environment Agency and key landowners to provide a robust assessment of current and future levels of flood risk, ensuring that future development takes full account of flood risk and sustainability at the outset.

2.14. A copy of the SFRA is available from Manchester city council.

Further Guidance

CIRIA Guidance

2.15. CIRIA publication 'C624 Development and Flood Risk – Guidance for the Construction Industry' [6], define three levels of FRA which can be undertaken:

Table 2.1 Levels / Scopes of Flood Risk Assessment

FRA Level	Description / Scope
Level 1	**Screening Study** to identify whether there are any flooding or surface water management issues related to a development site that may warrant further consideration. This should be based on readily available existing information, including the SFRA, Environment Agency Flood Map and Standing Advice. The Screening Study will ascertain whether a FRA is required.
Level 2	**Scoping Study** to be undertaken if the Level 1 FRA indicates that the site may lie within an area that is at risk of flooding or that the site may increase flood risk due to increased run-off. This Study should confirm the sources of flooding which may affect the site and should include the following: • an appraisal of the availability and adequacy of existing information; • a qualitative appraisal of the flood risk posed to the site, and potential impact of the development on flood risk elsewhere; • an appraisal of the scope of possible measures to reduce the flood risk to acceptable levels. The Scoping Study may identify that sufficient quantitative information is already available to complete a FRA appropriate to

[6] CIRIA publication 'C624 Development and Flood Risk – Guidance for the Construction Industry', 2004

	the scale and nature of the development.
Level 3	**Detailed Study** to be undertaken if the Level 2 FRA concludes that further quantitative analysis is required to assess flood risk issues related to the development site. The Study should include: • quantitative appraisal of the potential flood risk to the development; • quantitative appraisal of the potential impact of development site on flood risk elsewhere; • quantitative demonstration of the effectiveness of any proposed mitigation measures.

2.16. It is considered that a Level 2 Scoping Study is appropriate at this stage and this Report has therefore been based on the requirements of a Level 2 Study.

3.0 REQUIREMENTS OF A FLOOD RISK ASSESSMENT

3.1. The EA's Flood Zone Maps, available on the EA's website, indicate that the site is located within Flood Zone 1. Flood Zone 1 indicates that there is a low risk of flooding from fluvial or tidal sources. Current EA guidance indicates that all proposed developments in this zone should be accompanied by an FRA and that an FRA should contain:

- Information about the surface water disposal measures already in place and their state of maintenance;
- An assessment of the volume of surface water run-off likely to be generated from the proposed development;
- Information on how that surface water run-off will be disposed of (from the new development);
- Estimates of how climate change could affect the probability and intensity of flooding events in the future;
- Information about any other potential sources of flooding to the site - streams, ditches, sewers, groundwater, overland surface water flow or any combination of these.

3.2. As set out in NPPF flood risk assessments should identify and assess the risks of all forms of flooding to and from the development and demonstrate how these flood risks will be managed so that the development remains safe throughout its lifetime, taking climate change into account.

3.3. The detail and complexity of a Flood Risk Assessment should reflect the level of risk to the proposed development and should:

- be proportionate to the risk and appropriate to the scale, nature and location of the development;
- consider the risk of flooding arising from the development in addition to the risk of flooding to the development;

- take the impacts of climate change into account;
- be undertaken by competent people, as early as possible in the particular planning process, to avoid misplaced effort and raising landowner expectations where land is unsuitable for development;
- consider both the potential adverse and beneficial effects of flood risk management infrastructure including raised defences, flow channels, flood storage areas and other artificial features together with the consequences of their failure;
- consider the vulnerability of those that could occupy and use the development, taking account of the Sequential and Exception Tests and the vulnerability classification (including arrangements for safe access;
- consider and quantify the different types of flooding (whether from natural and human sources and including joint and cumulative effects) and identify flood risk reduction measures, so that assessments are fit for the purpose of the decisions being made;
- consider the effects of a range of flooding events including extreme events on people, property, the natural and historic environment and river and coastal processes;
- include the assessment of the remaining (known as 'residual') risk after risk reduction measures have been taken into account and demonstrate that this is acceptable for the particular development or land use;
- consider how the ability of water to soak into the ground may change with development, along with how the proposed layout of development may affect drainage systems;
- be supported by appropriate data and information, including historical information on previous events

4.0 SITE CONTEXT

SITE LOCATION

4.1. The sites are located off Vine street, Gorton. Ref. Figures 4.1 and Figure 4.2:

Figure 4.1 Site Location Plan

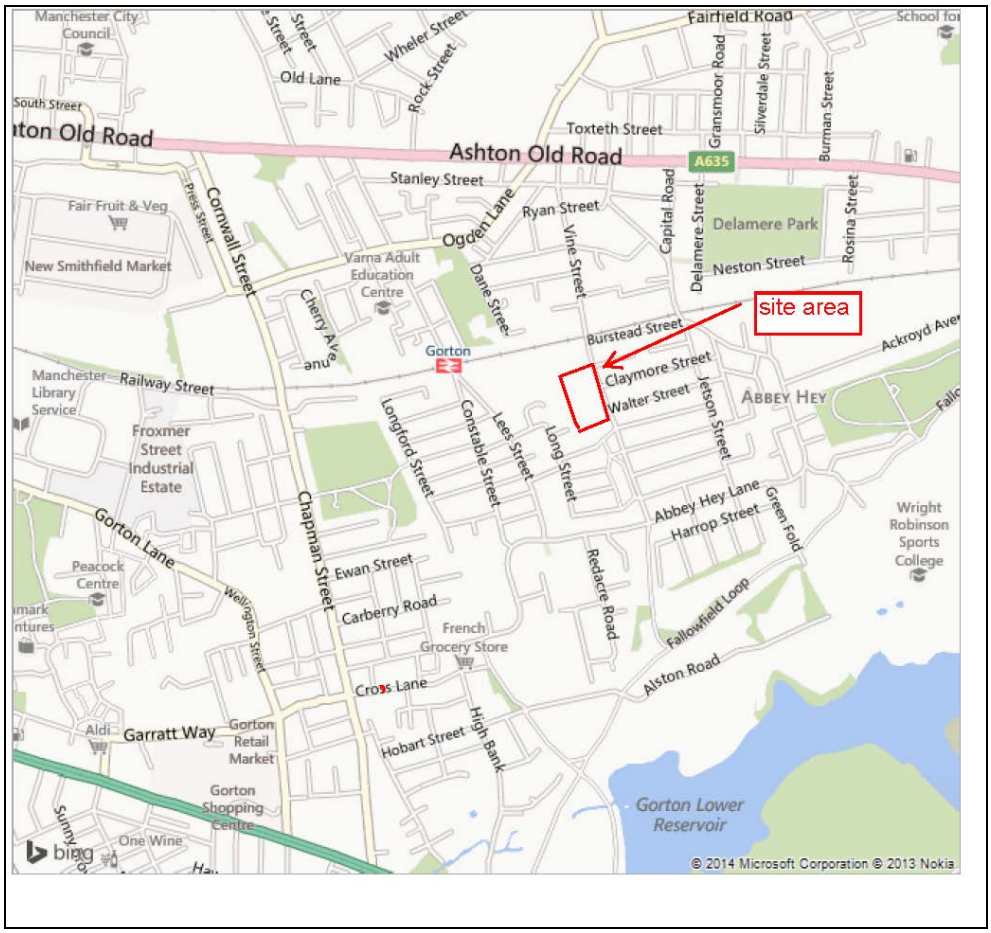




Figure 4.2: Aerial Image

EXISTING SITE CHARACTERISATION / LAND-USE

SITE 1

4.2. The site and surrounding boundary conditions are shown on the Aerial Image in Figure 4.2.

4.3. To the North the site is bounded by existing fields beyond which there is an existing railway line

4.4. To the East is bounded by existing residential properties off Vine Street

4.5. The South of the site is bounded by an existing Public open space area

4.6. The west of the site is bounded by residential properties off Long Street

4.7. The site is currently an existing green field

EXISTING SITE TOPOGRAPHY

4.8. The site levels across the site can be described as level

EXISTING WATERCOURSES / WATER BODIES /DRAINAGE INFRASTRUCTURE

4.9. There are a number of existing drains in the vicinity of the site.

4.10. Sewer record drawings have been provided by United utilities

4.11. The Site is currently a greenfield site

4.12. An assessment of Surface Water flows from the existing site based has calculated the maximum existing flow rate of the site would be equal to 6 l/s based on greenfield run off of 6 L/S

4.13. Any redevelopment of the site should therefore ensure that the maximum SW discharge does not exceed existing run-off flows indicated in (4.12 above)

EXISTING GROUND CONDITIONS

4.14. Initial site investigation have concluded that soakaways will not be suitable for the said development proposals

5.0 PROPOSED DEVELOPMENT

PROPOSED LAYOUT

5.1. The proposed site layouts are shown in Figure 5.1

5.2. The proposed development area shall be utilised wholly for residential end use

PROPOSED LEVELS

5.3. Generally levels across the proposed residential sites will be kept as close as possible to existing as part of the redevelopment. (see concept drainage layout with proposed finished floor levels within Appendix C)

Figure 5.1 Proposed Layout



NOTES:

1. ALL ADOPTABLE DRAINAGE WORKS HAVE BEEN DESIGNED AND ARE TO BE CONSTRUCTED IN ACCORDANCE WITH "SEWERS FOR ADOPTION 6TH EDITION" AND UU SUPPLEMENT GUILDELINES

2. ALL CLAY PIPE WORK SHALL BE EXTRA STRENGTH CLAYWARE TO B.S EN 295:1991 PART 1

3. ALL PRECAST CONCRETE PIPEWORK SHALL BE TO THE CLASS STATED ON THE DRAWINGS IN ACCORDANCE WITH B.S EN 1916:2002. ALSO, ALL MANHOLES AND CHAMBERS SHALL BE TO B.S EN 1917:2002

4. THE CONTRACTOR MAY ELECT TO USE REINFORCED PVC PIPES AS COVERED BY B.S 4660:2000 & B.S EN 1401-1, STRUCTURED WALL UPVC PIPES TO COMPLY WITH WIS 4-30-01 UPTO AND INCLUDING 300MM. (BY PRIOR AGREEMENT WITH ADOPTING AUTHORITY) MAX. PIPE LENGTH TO BE 3.0M

5. ALL LEVELS RELATE TO TOPOGRAPHICAL SURVEY DATUM

6. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS

7. PLOT DRAINAGE CONNECTIONS TO SEWERS MUST BE 150MM DIAMETER AND UNLESS OTHERWISE STATED LAID TO THE INVERT SHOWN.

8. LEVELS GIVEN ON DRAGOUT CHAMBERS ARE INCOMING PIPE LEVELS

9. PLOT DRAINAGE RUNS TO BE KEPT WITHIN THE CURTILAGE OF THE PLOT THEY SERVE WHEREVER POSSIBLE.

10. THE CONTARCTOR SHALL BE RESPONSIBLE FOR ENSURING THAT ANY EXISTING INVERT LEVELS INDICATED ON DRAWINGS ARE CORRECT BEFORE THE WORK ARE COMMENCED.

11. ALL CONNECTIONS TO ADOPTABLE SEWERS SHALL BE MANUFACTURED JUNCTION PIPES, SADDLE CONNECTIONS WILL NOT BE PERMITTED, UNLESS SPECIFIED.

12. ALL SEWERS FOR ADOPTION WITH GREATER THAN 1.20M COVER IN ROADS OR 0.8M COVER IN FIELDS SHALL HAVE CLASS S GRANULAR BED AND SURROUND.

13. ANY SEWER FOR ADOPTION WITH LESS THAN 1.2M COVER IN ROADS OR 0.9M COVER IN FIELDS SHALL HAVE A MINIMUM OF 150MM ST4 CONCRETE SURROUND. FLEXIBILITY SHALL BE MAINTAINED BY THE PROVISION OF FLEXCELL OR SIMILAR APPROVED JOINT FILLER BREAKS IN THE CONCRETE SURROUND AT EACH PIPE JOINT

14. IT IS THE RESPONSIBILITY FOR THE CONTRACTOR TO CHECK ALL ONSITE EXISTING GROUND LEVELS PRIOR TO COMMENCING AND IF THERE ARE ANY DESCREPENCIES THE CONTRACTOR MUST REPORT TO THE ENGINEER IMMEDIATELY

15. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE DRAINAGE AUTHORITY OF THE COMMENCEMENT OF ANY DRAINAGE WORKS AND TO COMPLETE ANY REQUIRED SEWER CONNECTION FORMS INCLUSIVE OF PAYING ANY REQUIRED FEES. THE CONTRACTOR MUST ALLOW FOR THE SUPERVISION OF THE SEWER CONSTRUCTION WORKS BY THE LOCAL AUTHORITY AND NOTIFY THE SUPERVISING OFFICER, GIVING NOTICE WHICH IN ACCORDANCE WOTH THE LA REQUIREMENTS.

16. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO APPLY FOR ANY REQUIRED ROAD OPENING PERMITS WITH THE LOCAL AUTHORY INCLUDING THE PAYMENT OF ANY FEES

17. BEFORE COMMENCING ANY WORKS ON SITE, THE CONTRACTOR MUST CONTACT THE RELIEVANT STATUTORY UNDERTAKER AND BE IN POSSESSION OF THE LATEST AVAILABLE DRAWINGS FROM THE STATUTORY UNDERTAKERS WHICH SHOWS DETAILS OF THEIR SERVICES/APPARATUS.
THE CONTRACTOR MUST CONFIRM EXACT LOCATION AND DEPTH OF ANY SERVICES/APPARATUS BY THE USE OF ELECTRO-LOCATION OR SIMILAR DEVICES AND BY HAND DUG TRIAL HOLES.
MISCHANICAL EXCAVATOR, POWER TOOLS ETC. MUST NOT BE USED TO LOCATE EXISTING SERVICES/APPARATUS.

Rev:	Description:	Date:	By:	Chkd:
A	Layout Revised	07.02.14	RA	LM

Status: PRELIMINARY

Project: VINE STREET GORTON

Drg Title: ARCHITECTS LAYOUT

ELLUC Projects

ELLUC PROJECTS
DEVELOPMENT HOUSE
70 BURFORD LANE
LYMM CHESHIRE
WA13 0SJ

t: (01925) 755 413
f: (01925) 752 013
info@ellucprojects.co.uk
www.ellucprojects.co.uk

Scale:	Size:	First Issue:	Drawn:	Checked:
1:500	A1	SEPT '13	LMCL	LMCL

Drg No: ELL-297-MH-005

Rev: A

© This drawing is the copyright of Elluc Projects Ltd

6.0 PROPOSED DRAINAGE

SURFACE WATER DRAINAGE OPTIONS

6.1. Redevelopment of the site will result in an increase of impermeable areas.

6.2. In order to ensure that post-development run-off volumes and peak flow rates discharging from do not exceed current levels, it may be necessary to employ SuDS (Sustainable Drainage Systems) methods and source control techniques, including flow control devices to restrict flows and to store attenuated water on site. The provision of such techniques will ensure that the maximum discharge from the site does not exceed current run-off rates. In addition, where practicable, opportunities for reducing flood risk through the management of surface water run-off from the site should be included.

6.3. Storage of attenuated flows within the site could be provided in a number of ways:

- under ground – over-sized pipes / tanks or proprietary storage systems such as 'Stormcell';
- above ground – storage / balancing pond, designated surface areas (low risk areas such as car parks, open space);
- combination of underground and above ground;

6.4. Proposed SW drainage systems are generally designed in accordance with 'Sewers for Adoption' [7], which requires that any surface water drainage system, which is proposed to be Adopted after construction, should not surcharge during the 1 in 5 year storm event, and should not produce any surface flooding during a 1 in 30 year storm event (i.e. all run-off contained wholly within the sewerage system during the 1 in 30 year event).

6.5. Whilst Sewers for Adoption requires there to be no surface flooding during the 1 in 30 year storm event, consideration needs to be given to the type of development proposed and its sensitivity to the consequences of more extreme events and the

[7] 'Sewers for Adoption' 6th Edition, published by WRc Plc., March 2006

possibility for surcharging and over-land flows as a result of any on-site drainage system operating above its design capacity. Residential development is generally considered to be a sensitive receptor in terms of flooding and consideration has therefore been given to minimising the risk of surface flooding during the 1 in 100 year event.

6.6. It is generally accepted that a degree of surface flooding can be permitted during extreme storm events, subject to specific surface areas being designated as flood-susceptible and subject to flooding of these areas posing little or no risk to human life and/or damage to property. Examples of surface areas which might be permitted to flood during extreme events are:

- Agricultural land;
- Recreational land (playing fields etc.);
- Landscaped areas;
- Car parks;
- Other non-inhabited, designated areas.

6.7. In all cases where surface flooding might be permitted or designed in to a scheme, due diligence needs to be given to NPPF and the need to make potential users of such areas aware of their functionality and purpose, and the requirement to maintain safe egress and access at all times.

6.8. The Building Regulations Approved Document H (2002) outlines a hierarchy of potential methods of disposing of surface water from a site:

- A soakaway; or where that is not practicable
- A watercourse or river; or where that is not practicable,
- A sewer.

6.9. The viability of this hierarchy has been assessed below:

SOAKAWAY

6.10. Initial Intrusive Ground Investigation information has been provided, and the usage of soakaways has been discounted due to the impermeable nature of the ground conditions.

WATERCOURSES / WATER BODIES

6.11. There are no suitable outfalls to existing water courses

SEWERS

6.12. Sewer record drawings have been reviewed and there are existing sewers adjacent to the site within the existing highway.

SURFACE WATER DRAINAGE STRATEGY

6.13. It is proposed that the Surface Water flows will discharge into the existing adopted sewers within the existing highways adjacent to the site.

6.14. The proposed surface water network will been designed using Microdrainage flow simulation software to ensure the following:

- No surcharging of drainage network for Design Storm of 1 in 2 years.
- No flooding for Design Flood frequency of 1 in 30 years.
- 1:100 year + 30% model should be duly reviewed and flood routing plans prepared as part of the detailed site designs
- A discharge rate of 6 l/s has been agreed with United utilities

Foul Water Drainage Strategy

6.15. Foul Water shall discharge into the existing adopted sewers within the existing highways

7.0 FLOOD HAZARDS & SOURCES OF FLOODING

POTENTIAL FLOOD HAZARDS

7.1. Prior to undertaking an FRA, the different types of flooding mechanisms which may affect the site need to be identified and then assessed to determine whether the development site is located within an area which is at risk of flooding from one or more of the applicable mechanisms.

7.2. CIRIA Report C624 [8], Table A2.1, lists a number of key factors that should be considered during a Level 1 FRA. This table can be used to summarise the findings of a Level 1 FRA study and to identify those flood hazards which may be applicable to the site in question. The boxes shaded grey indicate those sources of flooding which are unlikely to be identified for each question. If sufficient information is not available to identify the specific source of flooding, then all possible sources should be ticked. If a tick is placed below any flood hazard then a Level 2 FRA will be required to assess flood risk issues relating to that hazard in more detail.

7.3. Table 7.1 below identifies the flood hazards applicable to this site.

[8] CIRIA publication 'C624 Development and Flood Risk – Guidance for the Construction Industry'

Table 7.1 Flood Hazard Identification

Question	Flood Hazard						
	Fluvial	Sea	Estuaries	Groundwater	Overland flow	Artificial drainage systems	Infrastructure failure
Is the development site next to the sea or any watercourse shown on Ordnance Survey maps?	×	×	×				
Is the development site, or part of the development site, identified as being at risk of flooding within available documentation?	×	×	×	×	×	×	×
If a strategic flood risk assessment is available, is the development site, or part of the development site, identified as being at risk of flooding?	×	×	×	×	×	×	×
If a flood zone map is available, is the development site, or part of the development site, within a High Risk zone?	×	×	×				
If a flood zone map is available, is the development site, or part of the development site, within a Low to Medium Risk zone?	×	×	×				
If a flood zone map is not available, is the development site, or part of the development site, situated on alluvium based on consideration of geological maps of the area?	×	×	×				
If there is an existing property on, or next to the site at the same level, is the property within a flood warning area?	×	×	×	×			
Are the LPA / FDA aware of any existing, historical or potential flooding problems that may affect the site?	×	×	×	×	×	×	×
Do the physical characteristics of the site suggest that it may be prone to flooding?	×	×	×	×	×	✓	✓
If a flood zone map is not available, is the development site, or part of the development site below 10m AOD AND does the FDA consider the development to be at risk of tidal flooding?		×	×				
Is the development located within a natural or artificial hollow, or at the base of a valley or at the bottom of a hill slope?				×	×		
Does examination of historical maps indicate any likelihood of flood risk at the site?	×	×	×	×	×		
Do the names of surrounding roads, areas or houses suggest the possibility of seasonal or historical flooding?	×	×	×	×	×		
Is the site likely to involve excavation / construction below existing ground levels (excluding foundations)?				×			
Is the land use upslope of the site such that the generation of overland flow may be encouraged, and can water from this area flow onto the site?					×		
Are there any artificial drainage systems on or next to the site, at the same level, or upslope of, the site?						✓	✓
Is the development site protected by an existing flood defence?	×	×	×			×	×
Is the development site protected by a flood control structure (eg flap valve, sluice gate, tidal barrier etc)	×	×	×			×	×

Is the development site located upstream of a culvert which may be prone to blockage?	×		×	×	×	×	×
Are water levels in a watercourse located in or next to a development site controlled by a pumping station?	×	×	×	×	×	×	×
Is the development site next to or downstream / down slope of a canal?						×	×
Is the development site downstream/ down slope of a reservoir or other significant water body?						×	×
FURTHER COMMENT ON FLOOD RISK WITHIN THIS FRA?	×	×	×	×	×	✓	✓

SOURCES OF FLOODING

7.4. It is considered that there are 2 potential sources of flooding to the site:

- Surcharging of artificial drainage systems – flooding from existing or proposed drainage systems operating above their design capacity;
- Infrastructure failure – flooding as a result of failure of a flood defence, breach of a River / Canal bank etc.;

7.5. The risk of flooding from these various sources is assessed in the following Sections of this Report.

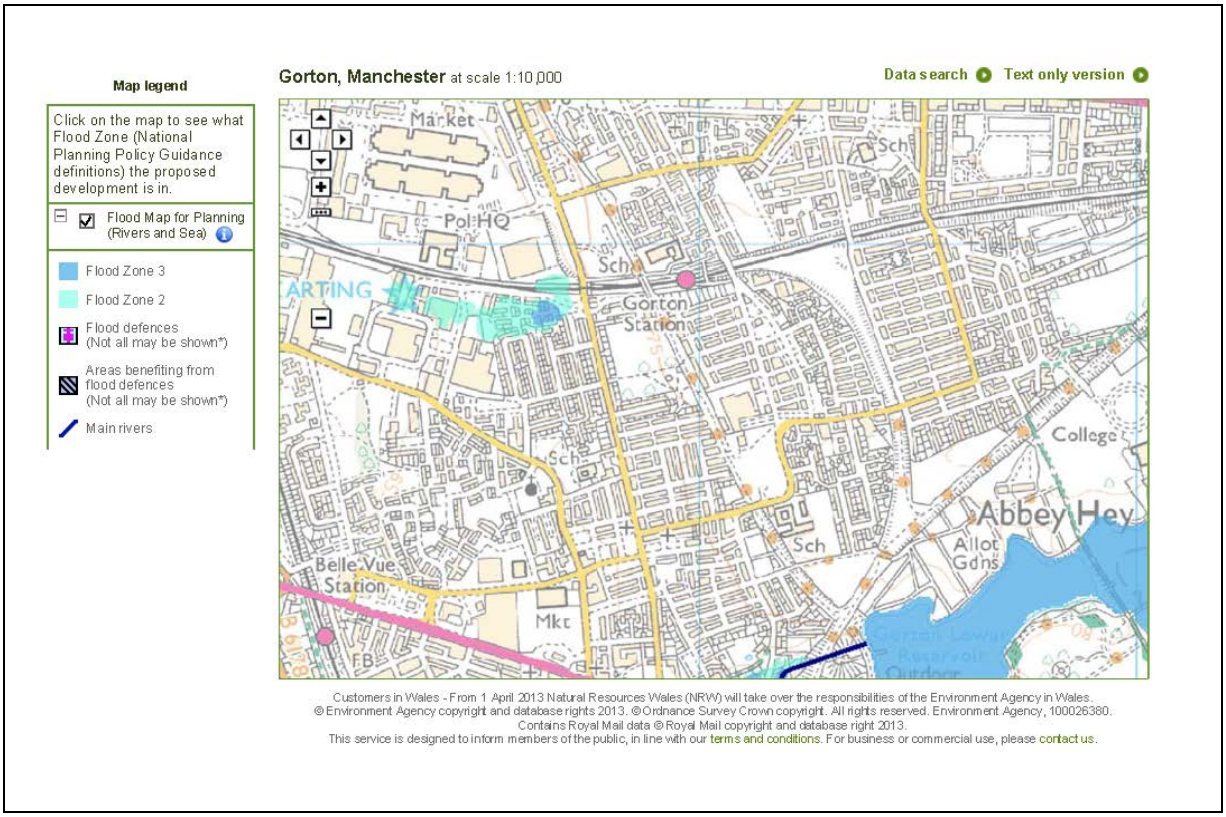
8.0 FLOOD RISK ASSESSMENT

FLUVIAL FLOODING

8.1. There are no records of the site ever having been flooded or ever having been affected by flooding.

8.2. The Flood Zone Maps, which are available on the Environment Agency's website (ref. Section 2 of this Assessment), show the site to be within Flood Zone 1, and therefore unlikely to be affected by fluvial flooding:

Figure 8.1 EA Flood Zone Map (not to scale)



© Crown copyright. All rights reserved. Environment Agency, 100026380, 2008

8.3. Based on currently available information, the risk of fluvial flooding at the site from adjacent Watercourses, Drains and other Water Bodies is considered to be low and on this basis, no further assessment of fluvial flooding is considered necessary.

Surcharging of Artificial Drainage Systems

8.4. ELLUC Have reviewed the associated Manchester Council SFRA document, within this review we and can confirm that there are is no issues of flooding from Combined or surface water sewers within the vicinity of the said site.

8.5. The risk of flooding from surcharging of artificial drainage systems is therefore considered to be low, and on this basis any further assessment of flooding via this mechanism is not considered necessary.

INFRASTRUCTURE FAILURE

8.6. The central CIRIA Report C624 defines 'infrastructure failure' as the structural, hydraulic, geotechnical, mechanical or operational failure of infrastructure which normally retains, transmits or controls the flow of water. This risk of flooding is usually associated with 3 main categories of infrastructure:

- failure of infrastructure designed to store or carry water (e.g. dam break, canal leak, water mains burst);
- failure of infrastructure designed to protect an area from flooding (e.g. flood defence breach, flap valve failure, penstock failure, pumping station failure);
- blockage of a pipe, bridge or culvert.

8.7. There are no dams, reservoirs or canals located upstream / upslope of the site

8.8. Failure of any water mains could result in leakage and consequently over-land flows. There is therefore a risk of over-land flows being generated as a result of an infrastructure failure in any water mains, however, such failures occur very infrequently and there is little that can be done to anticipate them.

8.9. Water main failures are usually notified to the asset owner within a short period of time of the failure occurring and remedial Work is usually implemented soon thereafter to prevent subsequent property damage and inconvenience. Any failure of a water main is therefore likely to continue for a relatively short period of time.

8.10. Based on the above information, the risk of flooding as a result of infrastructure failure is considered to be low and on this basis any further assessment of flooding from infrastructure failure is not considered necessary.

9.0 RESIDUAL RISKS & IMPACTS

RESIDUAL RISKS

9.1. Table 9.1 outlines the initial qualitative assessment of risk posed by each potential source of flooding, the mechanisms for flooding and the likely consequences. The Table also includes a review of possible mitigation measures and what effect, if any, the mitigation measures are likely to have on the residual risk posed by each potential flood source.

9.2. Categories of risk have been qualitatively defined as:

- 'High' Risk: Flooding is likely to result in significant damage to property and pose a significant risk to life;
- 'Medium' Risk: Flooding is likely to result in possible minor damage to property but flood progress would allow adequate time for residents to be warned and safely evacuated to higher ground or appropriate places of safety;
- 'Low' Risk: Flooding is unlikely to result in any damage to property damage and pose little or no risk to life.

Table 9.1 Qualitative Assessment of Residual Flood Risks

Source	Flood Mechanism & Consequences	Initial Assessment of Risk	Recommended Mitigation Measures	Residual Risk
Fluvial flooding	Risk of fluvial flooding at the site from adjacent Watercourses, Drains and other Water Bodies.	Low	• Fluvial flooding of the site is not expected during the 1 in 100 year event + climate change.	Low
Surcharging of artificial drainage systems	Drainage systems operating above design capacity, resulting in: • surcharging of manholes / drainage systems; • over-land flow through development; • ponding in low-lying areas of site; • no over-land flow route for flood waters accumulating in low-lying areas.	Low	• Appropriate design of SW drainage system to provide sufficient attenuation; • Provision of overland flood flow routes through proposed development.	Low
Infrastructure failure	Water main burst or pumping station failure, resulting in: • Possible over-land flows through / adjacent to the site and possible inundation of property; • Possible ponding in low-lying areas;	Low	• No mitigation measures considered necessary; • Safe access/egress available to adjacent highway. • Flood flow route through development.	Low

9.3. The mitigation measures proposed in this Report will generally reduce the risk of flooding from each potential source.

IMPACT OF DISPLACED WATER

9.4. The proposed works will not displace any water and thus will have no impact.

IMPACT ON COASTAL OR FLUVIAL MORPHOLOGY

9.5. The proposed redevelopment will have no impact upon the fluvial morphology of any River or Watercourse in the vicinity of the site.

10.0 CLIMATE CHANGE

10.1. In making an assessment of the impacts of climate change on flooding from land, rivers and sea, Table 10.1 (NPPF Technical Guidance Document – Table 5) below recommends that peak rainfall intensities and peak river flows should be increased by 5% and 10% respectively between the years of 1990-2025; with both peak rainfall intensities and peak river flows increased by 20% for the years 2055-2085:

Table 10.1 NPPF Technical Guidance Document Table 5)

Parameter	1990 to 2025	2025 to 2055	2055 to 2085	2085 to 2115
Peak rainfall intensity	+5%	+10%	+20%	+30%
Peak river flow	+10%	+20%		
Offshore wind speed	+5%		+10%	
Extreme wave height	+5%		+10%	

10.2. For practical reasons it is difficult to define the lifetime of a development as each development has different characteristics. However, residential development is considered to have a minimum lifetime horizon of 100 years, unless there is specific justification for considering a shorter period (e.g. development controlled by a time-limited Planning Condition).

10.3. Therefore, over the next 100 years, (the anticipated lifetime of the proposed development), the recommendations contained in table 5 NPPF technical guidance document in terms of increased rainfall, would equate to an increase of 30% in peak rainfall intensity.

10.4. The preliminary design of the proposed SW drainage system has taken account of this increase in peak rainfall intensity over the lifetime of the proposed development and has demonstrated that surface water run-off can be managed in a sustainable manner on the site, including the effects of climate change. It is

therefore considered that the proposed development has taken account of climate change effects

11.0 CONCLUSIONS & RECOMMENDATIONS

11.1. Mulbury homes are proposing to redevelop the proposed site for a residential development.

11.2. The sites is located off Vine Street in the borough of Gorton, Manchester

11.3. The Local Planning Authority have requested that the risk of flooding be formally assessed through a Flood Risk Assessment.

11.4. The site lies within Flood Zone 1 and is therefore unlikely to be affected by fluvial flooding.

11.5. The site levels can be classified as a “flat site”

11.6. An assessment of Surface Water flows from the existing site based has calculated the maximum existing flow rate of the site would be equal to 6 l/s

11.7. An anticipated site discharge rate would be 6 l/s which is agreed with united utilities

11.8. Redevelopment of the site will not be expected to displace any flood waters.

11.9. Fluvial flooding of the site is not anticipated.

11.10. No mitigation measures are considered necessary to mitigate the risk from infrastructure failure.

11.11. No drainage survey or CCTV survey of the existing drainage system has yet to be completed but will be required prior to detailed design.

11.12. Initial geo-Environmental Investigation have been completed and it is concluded that soakaways will not be feasible on the development site

11.13. Foul water from the development shall enter the combined drainage network adjacent to the site

11.14. Based on the information provided to Elluc Projects Ltd in support of this Flood Risk Assessment, redevelopment of the site would be considered sustainable in terms of Flood Risk, subject to the various recommendations in line with National and Local Planning Policy.

APPENDIX A:

Introduction

1. This document provides additional guidance to local planning authorities to ensure the effective implementation of the planning policy set out in the National Planning Policy Framework on development in areas at risk of flooding and in relation to mineral extraction. This guidance retains key elements of Planning Policy Statement 25 and of the existing minerals policy statements and minerals planning guidance notes which are considered necessary and helpful in relation to these policy areas. The retention of this guidance is an interim measure pending a wider review of guidance to support planning policy.

Flood risk

2. As set out in the National Planning Policy Framework, inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. For these purposes:

   - "areas at risk of flooding" means land within Flood Zones 2 and 3; or land within Flood Zone 1 which has critical drainage problems and which has been notified to the local planning authority by the Environment Agency;

   - "flood risk" means risk from all sources of flooding - including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources.

The Sequential and Exception Tests

3. As set out in the National Planning Policy Framework, the aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. The flood zones (see table 1) are the starting point for this sequential approach. Zones 2 and 3 are shown on the flood map[1] with Flood Zone 1 being all the land falling outside Zones 2 and 3. These flood zones refer to the probability of sea and river flooding only, ignoring the presence of existing defences.

4. Strategic Flood Risk Assessments (see paragraphs 7-8) refine information on the probability of flooding, taking other sources of flooding and the impacts of climate change (see paragraphs 11-15) into account. They provide the basis for applying the Sequential Test, on the basis of the flood zones in table 1. Where table 1

[1] To access the flood map, see the Environment Agency's website at: http://www.environment-agency.gov.uk/homeandleisure/floods/default.aspx

indicates the need to apply the Exception Test (as set out in the National Planning Policy Framework), the scope of a Strategic Flood Risk Assessment will be widened to consider the impact of the flood risk management infrastructure on the frequency, impact, speed of onset, depth and velocity of flooding within the flood zones considering a range of flood risk management maintenance scenarios. Where a Strategic Flood Risk Assessment is not available, the Sequential Test will be based on the Environment Agency flood zones.

5. The overall aim should be to steer new development to Flood Zone 1. Where there are no reasonably available sites in Flood Zone 1, local planning authorities allocating land in local plans or determining planning applications for development at any particular location should take into account the flood risk vulnerability of land uses (see table 2) and consider reasonably available sites in Flood Zone 2, applying the Exception Test if required (see table 3). Only where there are no reasonably available sites in Flood Zones 1 or 2 should the suitability of sites in Flood Zone 3 be considered, taking into account the flood risk vulnerability of land uses and applying the Exception Test if required.

Table 1: Flood zones

(Note: These flood zones refer to the probability of river and sea flooding, ignoring the presence of defences)

Zone 1 - low probability

Definition
This zone comprises land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%).

Appropriate uses
All uses of land are appropriate in this zone.

Flood risk assessment requirements
For development proposals on sites comprising one hectare or above the vulnerability to flooding from other sources as well as from river and sea flooding, and the potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off, should be incorporated in a flood risk assessment. This need only be brief unless the factors above or other local considerations require particular attention.

Policy aims
In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of sustainable drainage systems[2].

[2] Sustainable drainage systems cover the whole range of sustainable approaches to surface drainage management. They are designed to control surface water run off close to where it falls and mimic natural drainage as closely as possible.

Zone 2 - medium probability

Definition
This zone comprises land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year.

Appropriate uses
Essential infrastructure and the water-compatible, less vulnerable and more vulnerable uses, as set out in table 2, are appropriate in this zone. The highly vulnerable uses are *only* appropriate in this zone if the Exception Test is passed.

Flood risk assessment requirements
All development proposals in this zone should be accompanied by a flood risk assessment.

Policy aims
In this zone, 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 systems.

Zone 3a - high probability

Definition
This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

Appropriate uses
The water-compatible and less vulnerable uses of land (table 2) are appropriate in this zone. The highly vulnerable uses should not be permitted in this zone.

The more vulnerable uses and essential infrastructure should only be permitted in this zone if the Exception Test is passed. Essential infrastructure permitted in this zone should be designed and constructed to remain operational and safe for users in times of flood.

Flood risk assessment requirements
All development proposals in this zone should be accompanied by a flood risk assessment.

Policy aims
In this zone, 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 systems;

- relocate existing development to land in zones with a lower probability of flooding; and
- 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.

Zone 3b - the functional floodplain

Definition
This zone comprises land where water *has* to flow or be stored in times of flood.

Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. But land which would flood with an annual probability of 1 in 20 (5%) or greater in any year, or is designed to flood in an extreme (0.1%) flood, should provide a starting point for consideration and discussions to identify the functional floodplain.

Appropriate uses
Only the water-compatible uses and the essential infrastructure listed in table 2 that has to be there should be permitted in this zone. It should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows; and
- not increase flood risk elsewhere.

Essential infrastructure in this zone should pass the Exception Test.

Flood risk assessment requirements
All development proposals in this zone should be accompanied by a flood risk assessment.

Policy aims
In this zone, 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 systems;
- relocate existing development to land with a lower probability of flooding.

.

Table 2: Flood risk vulnerability classification

Essential infrastructure • Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind turbines.
Highly vulnerable • Police stations, ambulance stations and fire stations and command centres and telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use[3]. • Installations requiring hazardous substances consent[4]. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as "essential infrastructure")[5].
More vulnerable • Hospitals. • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. • Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non–residential uses for health services, nurseries and educational establishments. • Landfill and sites used for waste management facilities for hazardous waste[6]. • Sites used for holiday or short-let caravans and camping, *subject to a specific warning and evacuation plan*.[7]
Less vulnerable • Police, ambulance and fire stations which are *not* required to be operational during flooding. • Buildings used for shops, financial, professional and other services,

[3] For any proposal involving a change of use of land to a caravan, camping or chalet site, or to a mobile home site or park home site, the Sequential and Exception Tests should be applied.
[4] See Circular 04/00: *Planning controls for hazardous substances* (paragraph 18) at: www.communities.gov.uk/publications/planningandbuilding/circularplanningcontrols
[5] In considering any development proposal for such an installation, local planning authorities should have regard to planning policy on pollution in the National Planning Policy Framework.
[6] For definition, see *Planning for Sustainable Waste Management: Companion Guide to Planning Policy Statement 10* at www.communities.gov.uk/publications/planningandbuilding/planningsustainable
[7] See footnote 3.

restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non–residential institutions not included in “more vulnerable”, and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment works which do *not* need to remain operational during times of flood. • Sewage treatment works (if adequate measures to control pollution and manage sewage during flooding events are in place).
Water-compatible development • Flood control infrastructure. • Water transmission infrastructure and pumping stations. • Sewage transmission infrastructure and pumping stations. • Sand and gravel working. • Docks, marinas and wharves. • Navigation facilities. • Ministry of Defence defence installations. • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water-based recreation (excluding sleeping accommodation). • Lifeguard and coastguard stations. • Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. • Essential ancillary sleeping or residential accommodation for staff required by uses in this category, *subject to a specific warning and evacuation plan*.

Notes to table 2:

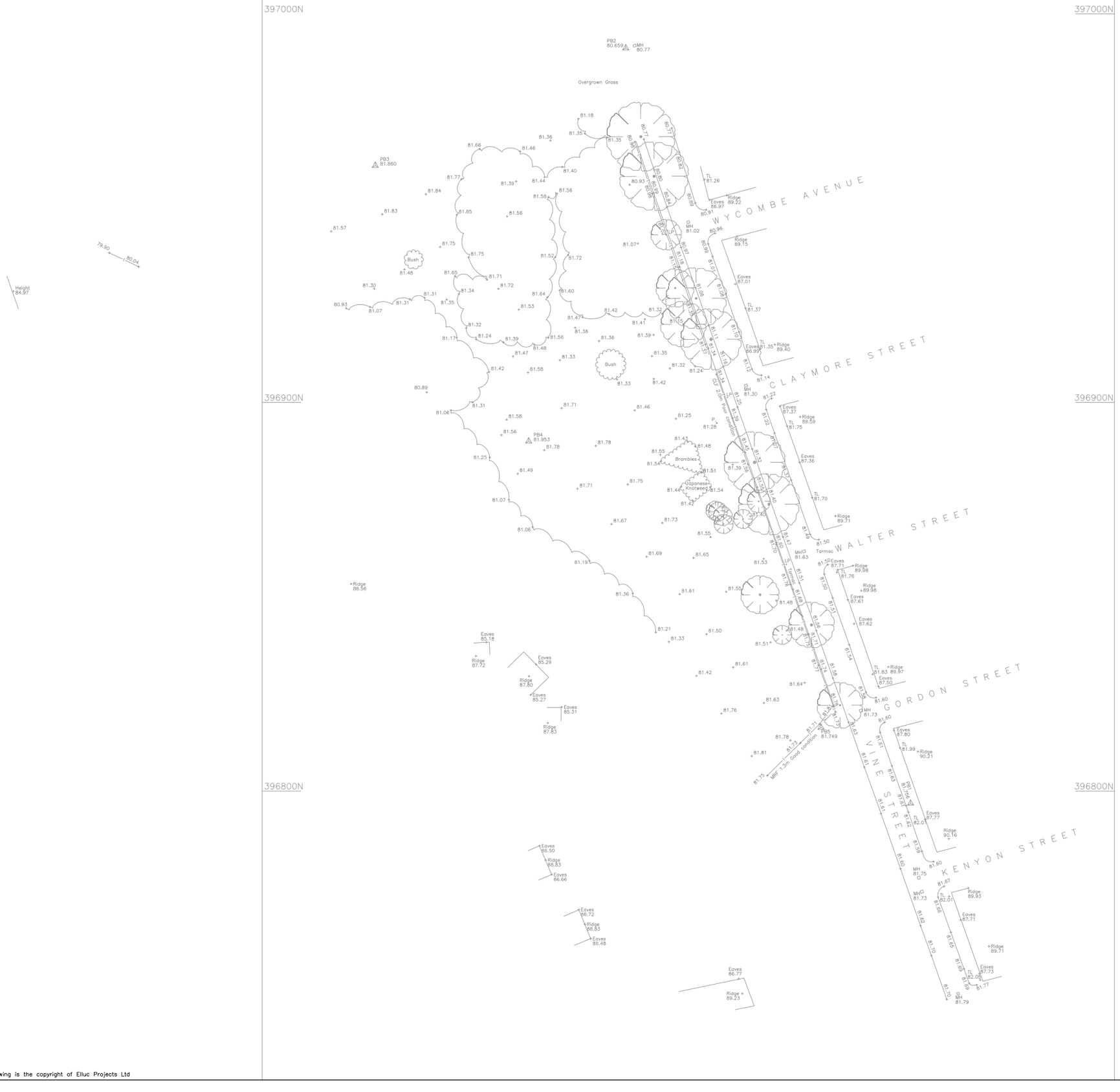
a. This classification is based partly on Department for Environment, Food and Rural Affairs and Environment Agency research on *Flood Risks to People* (*FD2321/TR2*)[8] and also on the need of some uses to keep functioning during flooding.

b. Buildings that combine a mixture of uses should be placed into the higher of the relevant classes of flood risk sensitivity. Developments that allow uses to be distributed over the site may fall within several classes of flood risk sensitivity.

c. The impact of a flood on the particular uses identified within this flood risk vulnerability classification will vary within each vulnerability class. Therefore, the flood risk management infrastructure and other risk mitigation measures needed to ensure the development is safe may differ between uses within a particular vulnerability classification.

[8] See website for further details.
www.defra.gov.uk/science/Project_Data/DocumentLibrary/FD2320_3364_TRP.pdf

APPENDIX B:



NOTES:

1. ALL ADOPTABLE DRAINAGE WORKS HAVE BEEN DESIGNED AND ARE TO BE CONSTRUCTED IN ACCORDANCE WITH "SEWERS FOR ADOPTION 6TH EDITION" AND UU SUPPLEMENT GUILDELINES

2. ALL CLAY PIPE WORK SHALL BE EXTRA STRENGTH CLAYWARE TO B.S EN 295:1991 PART 1

3. ALL PRECAST CONCRETE PIPEWORK SHALL BE TO THE CLASS STATED ON THE DRAWINGS IN ACCORDANCE WITH B.S EN 1916:2002, ALSO, ALL MANHOLES AND CHAMBERS SHALL BE TO B.S EN 1917:2002

4. THE CONTRACTOR MAY ELECT TO USE REINFORCED PVC PIPES AS COVERED BY B.S 4660:2000 & B.S EN 1401-1, STRUCTURED WALL UPVC PIPES TO COMPLY WITH WIS 4-35-01 UPTO AND INCLUDING 300MM. (BY PRIOR AGREEMENT WITH ADOPTING AUTHORITY) MAX. PIPE LENGTH TO BE 3.0M

5. ALL LEVELS RELATE TO TOPOGRAPHICAL SURVEY DATUM

6. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS

7. PLOT DRAINAGE CONNECTIONS TO SEWERS MUST BE 150MM DIAMETER AND UNLESS OTHERWISE STATED LAID TO THE INVERT SHOWN.

8. LEVELS GIVEN ON DRAGOUT CHAMBERS ARE INCOMING PIPE LEVELS

9. PLOT DRAINAGE RUNS TO BE KEPT WITHIN THE CURTILAGE OF THE PLOT THEY SERVE WHEREVER POSSIBLE.

10. THE CONTARCTOR SHALL BE RESPONSIBLE FOR ENSURING THAT ANY EXISITNG INVERT LEVELS INDICATED ON DRAWINGS ARE CORRECT BEFORE THE WORK ARE COMMENCED.

11. ALL CONNECTIONS TO ADOPTABLE SEWERS SHALL BE MANUFACTURED JUNCTION PIPES. SADDLE CONNECTIONS WILL NOT BE PERMITTED, UNLESS SPECIFIED.

12. ALL SEWERS FOR ADOPTION WITH GREATER THAN 1.20M COVER IN ROADS OR 0.9M COVER IN FIELDS SHALL HAVE CLASS S GRANULAR BED AND SURROUND.

13. ANY SEWER FOR ADOPTION WITH LESS THAN 1.2M COVER IN ROADS OR 0.9M COVER IN FIELDS SHALL HAVE A MINIMUM OF 150MM ST4 CONCRETE SURROUND. FLEXIBILITY SHALL BE MAINTAINED BY THE PROVISION OF FLEXCELL OR SIMILAR APPROVED JOINT FILLER BREAKS IN THE CONCRETE SURROUND AT EACH PIPE JOINT

14. IT IS THE RESPONSIBILITY FOR THE CONTRACTOR TO CHECK ALL ONSITE EXISTING GROUND LEVELS PRIOR TO COMMENCING AND IF THERE ARE ANY DESCREPENCIES THE CONTRACTOR MUST REPORT TO THE ENGINEER IMMEDIATELY

15. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE DRAINAGE AUTHORITY OF THE COMMENCEMENT OF ANY DRAINAGE WORKS AND TO COMPLETE ANY REQUIRED SEWER CONNECTION FORMS INCLUSIVE OF PAYING ANY REQUIRED FEES. THE CONTRACTOR MUST ALLOW FOR THE SUPERVISION OF THE SEWER CONSTRUCTION WORKS BY THE LOCAL AUTHORITY AND NOTIFY THE SUPERVISING OFFICER, GIVING NOTICE WHICH IN ACCORDANCE WOTH THE L.A REQUIREMENTS.

16. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO APPLY FOR ANY REQUIRED ROAD OPENING PERMITS WITH THE LOCAL AUTHORIY INCLUDING THE PAYMENT OF ANY FEES

17. BEFORE COMMENCING ANY WORKS ON SITE, THE CONTRACTOR MUST CONTACT THE RELEVANT STATUTORY UNDERTAKER AND BE IN POSSESSION OF THE LATEST AVAILABLE DRAWINGS FROM THE STATUTORY UNDERTAKERS WHICH SHOWS DETAILS OF THEIR SERVICES/APPARATUS.
THE CONTRACTOR MUST CONFIRM EXACT LOCATION AND DEPTH OF ANY SERVICES/APPARATUS BY THE USE OF ELECTRO-LOCATION OR SIMILAR DEVICES AND BY HAND DUG TRIAL HOLES.
MECHANICAL EXCAVATOR, POWER TOOLS ETC. MUST NOT BE USED TO LOCATE EXISTING SERVICES/APPARATUS.

Rev:	Description:	Date:	By:	Chkd:

Status: PRELIMINARY

Project: VINE STREET GORTON

Drg Title: TOPOGRAPHIC SURVEY

ELLUC Projects

ELLUC PROJECTS
DEVELOPMENT HOUSE
70 BURFORD LANE
LYMM CHESHIRE
WA13 0SJ

t: (01925) 755 413
f: (01925) 752 013
info@ellucprojects.co.uk
www.ellucprojects.co.uk

Scale:	Size:	First Issue:	Drawn:	Checked:
1:500	A1	SEPT 13	LMCL	LMCL

Drg No: ELL-297-MH-006 Rev: /

©This drawing is the copyright of Elluc Projects Ltd

APPENDIX C:



©This drawing is the copyright of Elluc Projects Ltd

NOTES:

1. ALL ADOPTABLE DRAINAGE WORKS HAVE BEEN DESIGNED AND ARE TO BE CONSTRUCTED IN ACCORDANCE WITH "SEWERS FOR ADOPTION 6TH EDITION" AND UU SUPPLEMENT GUILDELINES

2. ALL CLAY PIPE WORK SHALL BE EXTRA STRENGTH CLAYWARE TO B.S EN 295:1991 PART 1

3. ALL PRECAST CONCRETE PIPEWORK SHALL BE TO THE CLASS STATED ON THE DRAWINGS IN ACCORDANCE WITH B.S EN 1916:2002. ALSO, ALL MANHOLES AND CHAMBERS SHALL BE TO B.S EN 1917:2002

4. THE CONTRACTOR MAY ELECT TO USE REINFORCED PVC PIPES AS COVERED BY B.S 4660:2000 & B.S EN 1401-1. STRUCTURED WALL UPVC PIPES TO COMPLY WITH WIS 4-35-01 UPTO AND INCLUDING 300MM. (BY PRIOR AGREEMENT WITH ADOPTING AUTHORITY) MAX. PIPE LENGTH TO BE 3.0M

5. ALL LEVELS RELATE TO TOPOGRAPHICAL SURVEY DATUM

6. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS

7. PLOT DRAINAGE CONNECTIONS TO SEWERS MUST BE 150MM DIAMETER AND UNLESS OTHERWISE STATED LAID TO THE INVERT SHOWN.

8. LEVELS GIVEN ON DRAGOUT CHAMBERS ARE INCOMING PIPE LEVELS

9. PLOT DRAINAGE RUNS TO BE KEPT WITHIN THE CURTILAGE OF THE PLOT THEY SERVE WHEREVER POSSIBLE.

10. THE CONTARCTOR SHALL BE RESPONSIBLE FOR ENSURING THAT ANY EXISITNG INVERT LEVELS INDICATED ON DRAWINGS ARE CORRECT BEFORE THE WORK ARE COMMENCED.

11. ALL CONNECTIONS TO ADOPTABLE SEWERS SHALL BE MANUFACTURED JUNCTION PIPES. SADDLE CONNECTIONS WILL NOT BE PERMITTED, UNLESS SPECIFIED.

12. ALL SEWERS FOR ADOPTION WITH GREATER THAN 1.20M COVER IN ROADS OR 0.9M COVER IN FIELDS SHALL HAVE CLASS S GRANULAR BED AND SURROUND.

13. ANY SEWER FOR ADOPTION WITH LESS THAN 1.2M COVER IN ROADS OR 0.9M COVER IN FIELDS SHALL HAVE A MINIMUM OF 150MM ST4 CONCRETE SURROUND. FLEXIBILITY SHALL BE MAINTAINED BY THE PROVISION OF FLEXCELL OR SIMILAR APPROVED JOINT FILLER BREAKS IN THE CONCRETE SURROUND AT EACH PIPE JOINT

14. IT IS THE RESPONSIBILITY FOR THE CONTRACTOR TO CHECK ALL ONSITE EXISTING GROUND LEVELS PRIOR TO COMMENCING AND IF THERE ARE ANY DESCREPENCIES THE CONTRACTOR MUST REPORT TO THE ENGINEER IMMEDIAT ELY

15. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE DRAINAGE AUTHORITY OF THE COMMENCEMENT OF ANY DRAINAGE WORKS AND TO COMPLETE ANY REQUIRED SEWER CONNECTION FORMS INCLUSIVE OF PAYING ANY REQUIRED FEES. THE CONTRACTOR MUST ALLOW FOR THE SUPERVISION OF THE SEWER CONSTRUCTION WORKS BY THE LOCAL AUTHORITY AND NOTIFY THE SUPERVISING OFFICER, GIVING NOTICE WHICH IN ACCORDANCE WOTH THE L.A REQUIREMENTS.

16. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO APPLY FOR ANY REQUIRED ROAD OPENING PERMITS WITH THE LOCAL AUTHORITY INCLUDING THE PAYMENT OF ANY FEES

17. BEFORE COMMENCING ANY WORKS ON SITE, THE CONTRACTOR MUST CONTACT THE RELEVANT STATUTORY UNDERTAKER AND BE IN POSSESSION OF THE LATEST AVAILABLE DRAWINGS FROM THE STATUTORY UNDERTAKERS WHICH SHOWS DETAILS OF THEIR SERVICES/APPARATUS.
THE CONTRACTOR MUST CONFIRM EXACT LOCATION AND DEPTH OF ANY SERVICES/APPARATUS BY THE USE OF ELECTRO-LOCATION OR SIMILAR DEVICES AND BY HAND DUG TRIAL HOLES.
MECHANICAL EXCAVATOR, POWER TOOLS ETC. MUST NOT BE USED TO LOCATE EXISTING SERVICES/APPARATUS.

Rev:	Description:	Date:	By:	Chkd:
A	Layout Revised	07.02.14	RA	LM

Status: PRELIMINARY

Project: VINE STREET
GORTON

Drg Title: CONCEPT
DRAINAGE LAYOUT

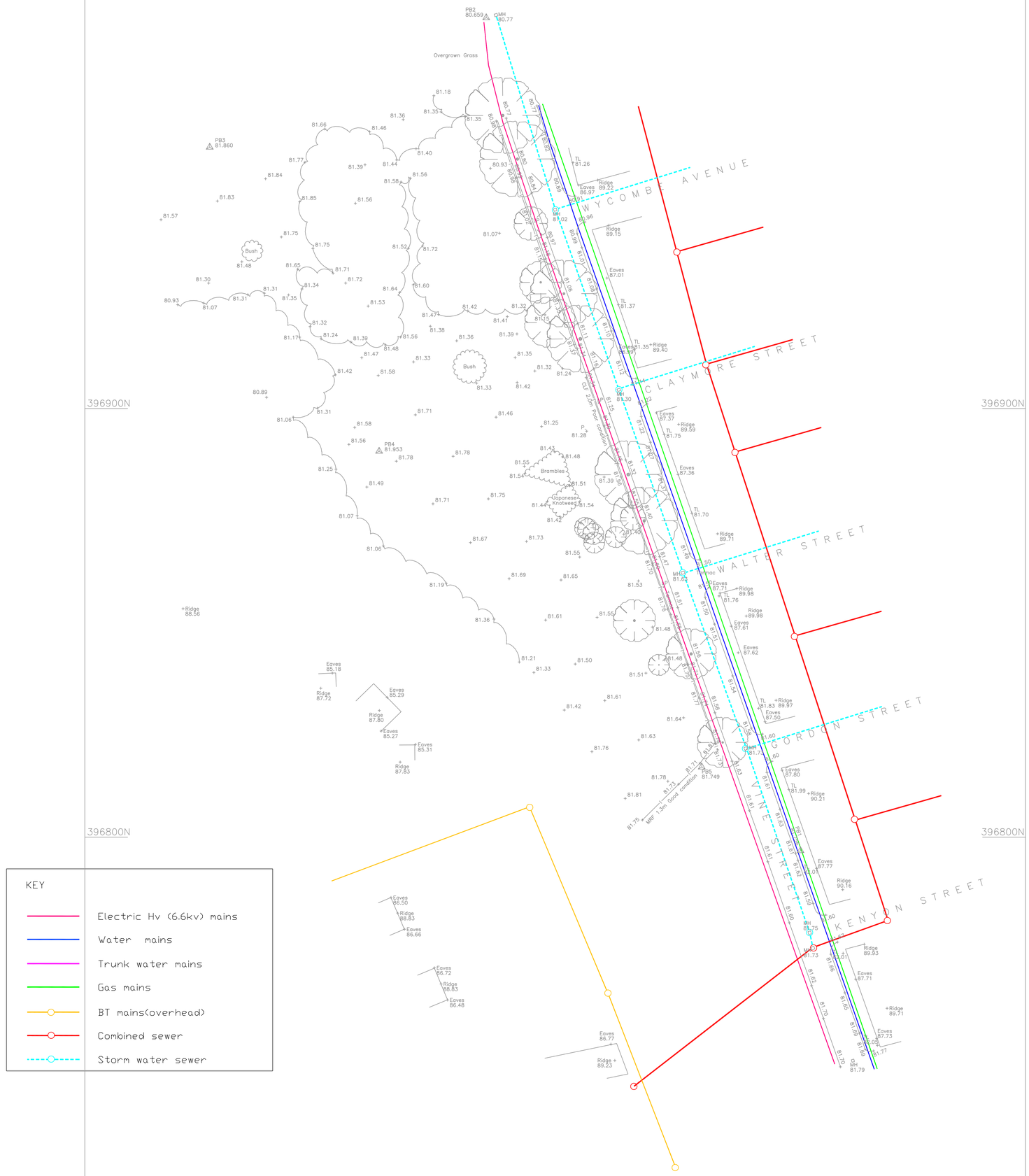
ELLUC Projects
ELLUC PROJECTS
DEVELOPMENT HOUSE
70 BURFORD LANE
LYMM CHESHIRE
WA13 0SJ
t: (01925) 755 413
f: (01925) 752 013
Info@ellucprojects.co.uk
www.ellucprojects.co.uk

Scale:	Size:	First Issue:	Drawn:	Checked:
1:500	A1	SEPT 13	LMCL	LMCL

Drg No: ELL-297-MH-001

Rev: A

APPENDIX D:



KEY

- Electric Hv (6.6kv) mains
- Water mains
- Trunk water mains
- Gas mains
- BT mains(overhead)
- Combined sewer
- Storm water sewer

NOTES:

1. ALL ADOPTABLE DRAINAGE WORKS HAVE BEEN DESIGNED AND ARE TO BE CONSTRUCTED IN ACCORDANCE WITH "SEWERS FOR ADOPTION 6TH EDITION" AND UU SUPPLEMENT GUILDELINES

2. ALL CLAY PIPE WORK SHALL BE EXTRA STRENGTH CLAYWARE TO B.S EN 295:1991 PART 1

3. ALL PRECAST CONCRETE PIPEWORK SHALL BE TO THE CLASS STATED ON THE DRAWINGS IN ACCORDANCE WITH B.S EN 1916:2002. ALSO, ALL MANHOLES AND CHAMBERS SHALL BE TO B.S EN 1917:2002

4. THE CONTRACTOR MAY ELECT TO USE REINFORCED PVC PIPES AS COVERED BY B.S 4660:2000 & B.S EN 1401-1, STRUCTURED WALL UPVC PIPES TO COMPLY WITH WIS 4-35-01 UPTO AND INCLUDING 300MM. (BY PRIOR AGREEMENT WITH ADOPTING AUTHORITY) MAX. PIPE LENGTH TO BE 3.0M

5. ALL LEVELS RELATE TO TOPOGRAPHICAL SURVEY DATUM

6. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS

7. PLOT DRAINAGE CONNECTIONS TO SEWERS MUST BE 150MM DIAMETER AND UNLESS OTHERWISE STATED LAID TO THE INVERT SHOWN.

8. LEVELS GIVEN ON DRAGOUT CHAMBERS ARE INCOMING PIPE LEVELS

9. PLOT DRAINAGE RUNS TO BE KEPT WITHIN THE CURTILAGE OF THE PLOT THEY SERVE WHEREVER POSSIBLE.

10. THE CONTARCTOR SHALL BE RESPONSIBLE FOR ENSURING THAT ANY EXISITNG INVERT LEVELS INDICATED ON DRAWINGS ARE CORRECT BEFORE THE WORK ARE COMMENCED.

11. ALL CONNECTIONS TO ADOPTABLE SEWERS SHALL BE MANUFACTURED JUNCTION PIPES, SADDLE CONNECTIONS WILL NOT BE PERMITTED, UNLESS SPECIFIED.

12. ALL SEWERS FOR ADOPTION WITH GREATER THAN 1.20M COVER IN ROADS OR 0.9M COVER IN FIELDS SHALL HAVE CLASS S GRANULAR BED AND SURROUND.

13. ANY SEWER FOR ADOPTION WITH LESS THAN 1.2M COVER IN ROADS OR 0.9M COVER IN FIELDS SHALL HAVE A MINIMUM OF 150MM ST4 CONCRETE SURROUND. FLEXIBILITY SHALL BE MAINTAINED BY THE PROVISION OF FLEXCELL OR SIMILAR APPROVED JOINT FILLER BREAKS IN THE CONCRETE SURROUND AT EACH PIPE JOINT

14. IT IS THE RESPONSIBILITY FOR THE CONTRACTOR TO CHECK ALL ONSITE EXISTING GROUND LEVELS PRIOR TO COMMENCING AND IF THERE ARE ANY DESCREPENCIES THE CONTRACTOR MUST REPORT TO THE ENGINEER IMMEDIATELY

15. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE DRAINAGE AUTHORITY OF THE COMMENCEMENT OF ANY DRAINAGE WORKS AND TO COMPLETE ANY REQUIRED SEWER CONNECTION FORMS INCLUSIVE OF PAYING ANY REQUIRED FEES. THE CONTRACTOR MUST ALLOW FOR THE SUPERVISION OF THE SEWER CONSTRUCTION WORKS BY THE LOCAL AUTHORITY AND NOTIFY THE SUPERVISING OFFICER, GIVING NOTICE WHICH IN ACCORDANCE WOTH THE L.A REQUIREMENTS.

16. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO APPLY FOR ANY REQUIRED ROAD OPENING PERMITS WITH THE LOCAL AUTHORIY INCLUDING THE PAYMENT OF ANY FEES

17. BEFORE COMMENCING ANY WORKS ON SITE, THE CONTRACTOR MUST CONTACT THE RELEVANT STATUTORY UNDERTAKER AND BE IN POSSESSION OF THE LATEST AVAILABLE DRAWINGS FROM THE STATUTORY UNDERTAKERS WHICH SHOWS DETAILS OF THEIR SERVICES/APPARATUS.
THE CONTRACTOR MUST CONFIRM EXACT LOCATION AND DEPTH OF ANY SERVICES/APPARATUS BY THE USE OF ELECTRO-LOCATION OR SIMILAR DEVICES AND BY HAND DUG TRIAL HOLES.
MECHANICAL EXCAVATOR, POWER TOOLS ETC. MUST NOT BE USED TO LOCATE EXISTING SERVICES/APPARATUS.

Rev:	Description:	Date:	By:	Chkd:

Status: PRELIMINARY

Project: VINE STREET GORTON

Drg Title: COMPOSITE SERVICES LAYOUT

ELLUC Projects

ELLUC PROJECTS
DEVELOPMENT HOUSE
70 BURFORD LANE
LYMM CHESHIRE
WA13 0SJ

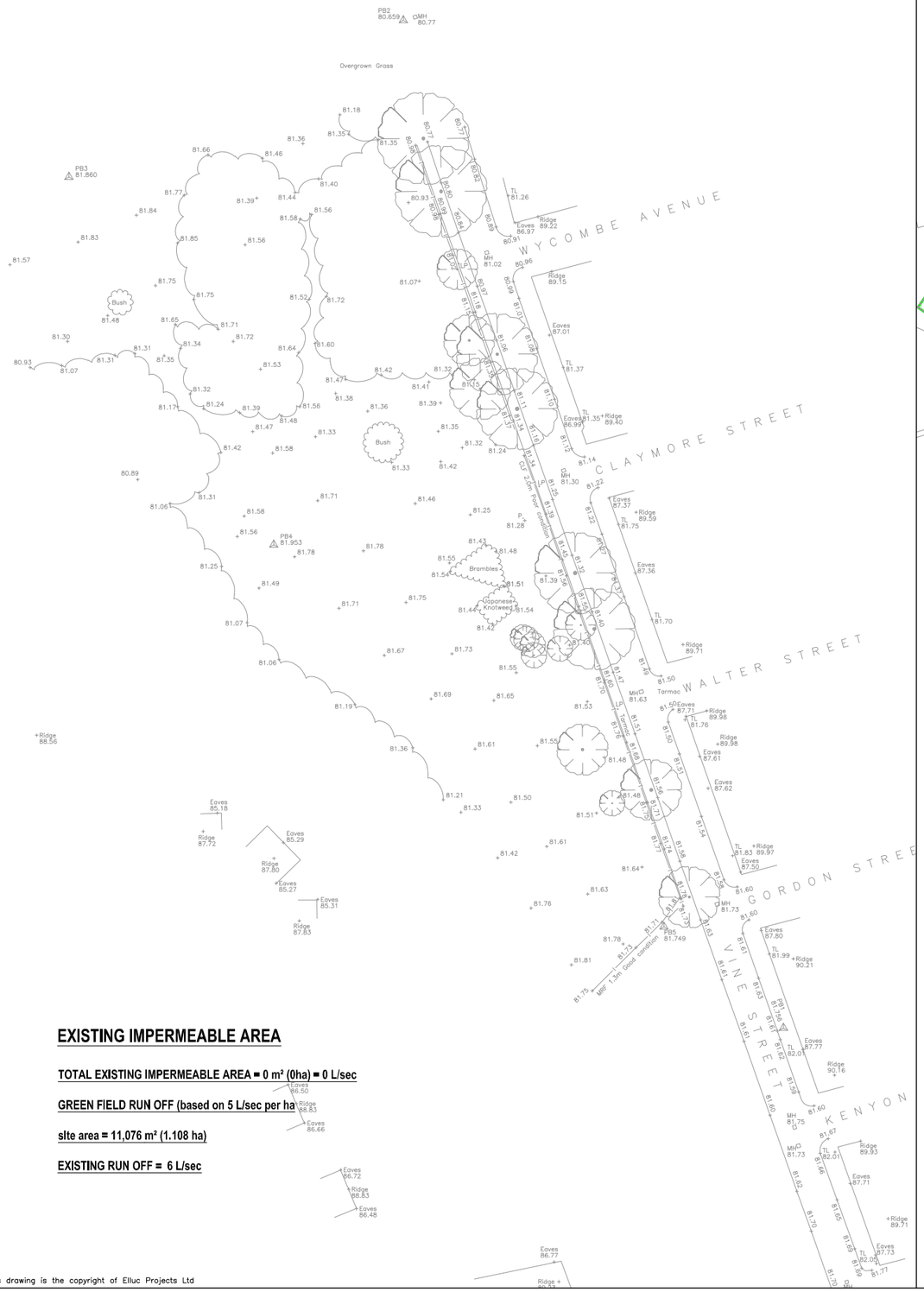
t: (01925) 755 413
f: (01925) 752 013
info@ellucprojects.co.uk
www.ellucprojects.co.uk

Scale:	Size:	First Issue:	Drawn:	Checked:
1:500	A1	SEPT 13	LMCL	LMCL

Drg No: ELL-297-MH-003 Rev: /

© This drawing is the copyright of Elluc Projects Ltd

APPENDIX E:



EXISTING IMPERMEABLE AREA

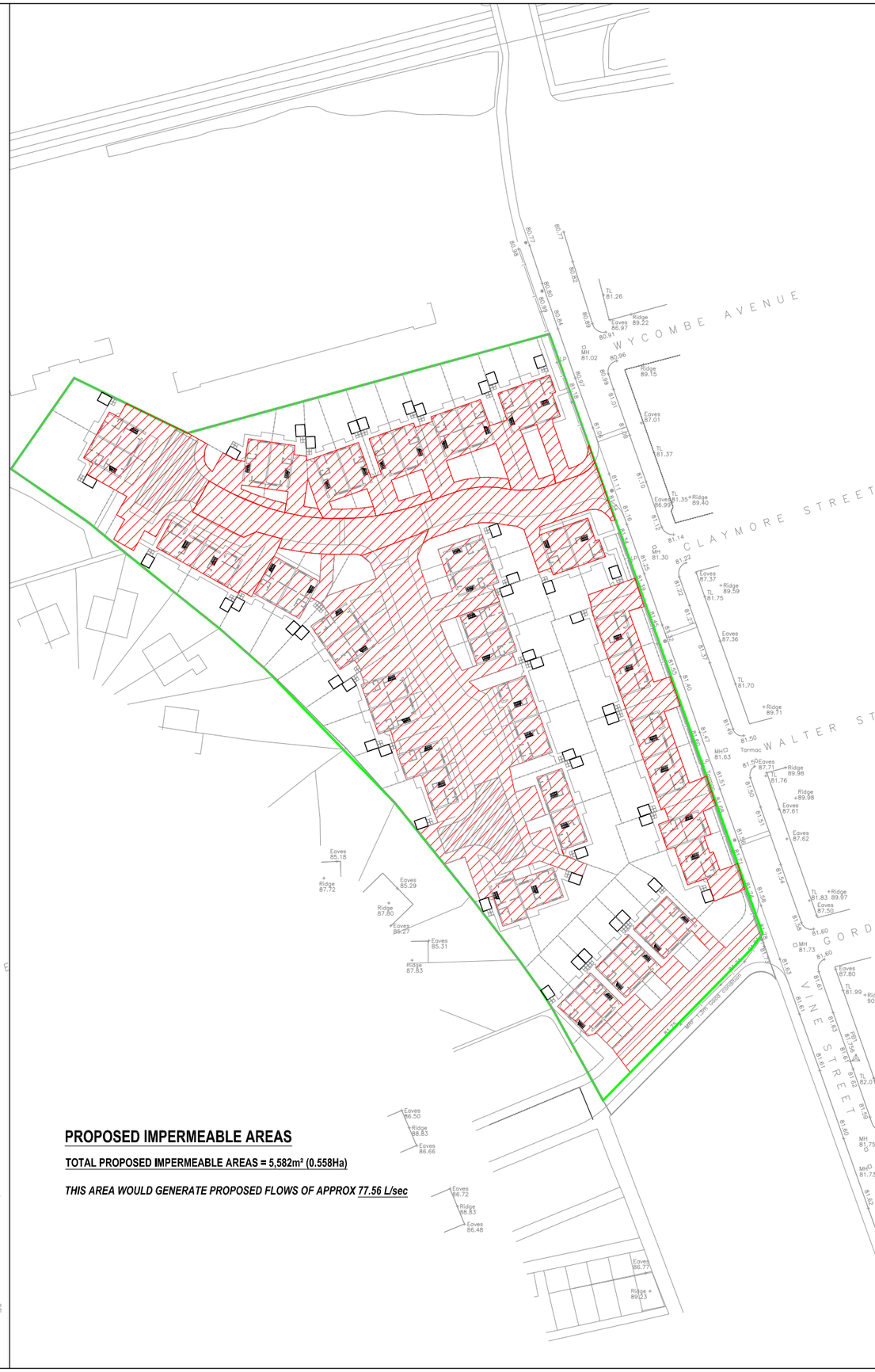
TOTAL EXISTING IMPERMEABLE AREA = 0 m² (0ha) = 0 L/sec

GREEN FIELD RUN OFF (based on 5 L/sec per ha

site area = 11,076 m² (1.108 ha)

EXISTING RUN OFF = 6 L/sec

©This drawing is the copyright of Elluc Projects Ltd



PROPOSED IMPERMEABLE AREAS

TOTAL PROPOSED IMPERMEABLE AREAS = 5,582m² (0.558Ha)

THIS AREA WOULD GENERATE PROPOSED FLOWS OF APPROX 77.56 L/sec

NOTES:

1. ALL ADOPTABLE DRAINAGE WORKS HAVE BEEN DESIGNED AND ARE TO BE CONSTRUCTED IN ACCORDANCE WITH "SEWERS FOR ADOPTION 6TH EDITION" AND UU SUPPLEMENT GUILDELINES

2. ALL CLAY PIPE WORK SHALL BE EXTRA STRENGTH CLAYWARE TO B.S EN 295:1991 PART 1

3. ALL PRECAST CONCRETE PIPEWORK SHALL BE TO THE CLASS STATED ON THE DRAWINGS IN ACCORDANCE WITH B.S EN 1916:2002, ALSO, ALL MANHOLES AND CHAMBERS SHALL BE TO B.S EN 1917:2002

4. THE CONTRACTOR MAY ELECT TO USE REINFORCED PVC PIPES AS COVERED BY B.S 4660:2000 & B.S EN 1401-1. STRUCTURED WALL UPVC PIPES TO COMPLY WITH WIS 4-35-01 UPTO AND INCLUDING 300MM. (BY PRIOR AGREEMENT WITH ADOPTING AUTHORITY) MAX. PIPE LENGTH TO BE 3.0M

5. ALL LEVELS RELATE TO TOPOGRAPHICAL SURVEY DATUM

6. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS

7. PLOT DRAINAGE CONNECTIONS TO SEWERS MUST BE 150MM DIAMETER AND UNLESS OTHERWISE STATED LAID TO THE INVERT SHOWN.

8. LEVELS GIVEN ON DRAGOUT CHAMBERS ARE INCOMING PIPE LEVELS

9. PLOT DRAINAGE RUNS TO BE KEPT WITHIN THE CURTILAGE OF THE PLOT THEY SERVE WHEREVER POSSIBLE.

10. THE CONTARCTOR SHALL BE RESPONSIBLE FOR ENSURING THAT ANY EXISITNG INVERT LEVELS INDICATED ON DRAWINGS ARE CORRECT BEFORE THE WORK ARE COMMENCED.

11. ALL CONNECTIONS TO ADOPTABLE SEWERS SHALL BE MANUFACTURED JUNCTION PIPES. SADDLE CONNECTIONS WILL NOT BE PERMITTED, UNLESS SPECIFIED.

12. ALL SEWERS FOR ADOPTION WITH GREATER THAN 1.20M COVER IN ROADS OR 0.9M COVER IN FIELDS SHALL HAVE CLASS S GRANULAR BED AND SURROUND.

13. ANY SEWER FOR ADOPTION WITH LESS THAN 1.2M COVER IN ROADS OR 0.9M COVER IN FIELDS SHALL HAVE A MINIMUM OF 150MM ST4 CONCRETE SURROUND. FLEXIBILITY SHALL BE MAINTAINED BY THE PROVISION OF FLEXCELL OR SIMILAR APPROVED JOINT FILLER BREAKS IN THE CONCRETE SURROUND AT EACH PIPE JOINT

14. IT IS THE RESPONSIBILITY FOR THE CONTRACTOR TO CHECK ALL ONSITE EXISTING GROUND LEVELS PRIOR TO COMMENCING AND IF THERE ARE ANY DESCREPENCIES THE CONTRACTOR MUST REPORT TO THE ENGINEER IMMEDIAT ELY

15. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE DRAINAGE AUTHORITY OF THE COMMENCEMENT OF ANY DRAINAGE WORKS AND TO COMPLETE ANY REQUIRED SEWER CONNECTION FORMS INCLUSIVE OF PAYING ANY REQUIRED FEES. THE CONTRACTOR MUST ALLOW FOR THE SUPERVISION OF THE SEWER CONSTRUCTION WORKS BY THE LOCAL AUTHORITY AND NOTIFY THE SUPERVISING OFFICER, GIVING NOTICE WHICH IN ACCORDANCE WOTH THE LA REQUIREMENTS.

16. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO APPLY FOR ANY REQUIRED ROAD OPENING PERMITS WITH THE LOCAL AUTHORITY INCLUDING THE PAYMENT OF ANY FEES

17. BEFORE COMMENCING ANY WORKS ON SITE, THE CONTRACTOR MUST CONTACT THE RELEVANT STATUTORY UNDERTAKER AND BE IN POSSESSION OF THE LATEST AVAILABLE DRAWINGS FROM THE STATUTORY UNDERTAKERS WHICH SHOWS DETAILS OF THEIR SERVICES/APPARATUS.
THE CONTRACTOR MUST CONFIRM EXACT LOCATION AND DEPTH OF ANY SERVICES/APPARATUS BY THE USE OF ELECTRO-LOCATION OR SIMILAR DEVICES AND BY HAND DUG TRIAL HOLES.
MECHANICAL EXCAVATOR, POWER TOOLS ETC. MUST NOT BE USED TO LOCATE EXISTING SERVICES/APPARATUS.

Rev:	Description:	Date:	By:	Chkd:

Status: PRELIMINARY

Project: VINE STREET GORTON

Drg Title: PROPOSED & EXISTING IMPERMEABLE AREAS

ELLUC Projects

ELLUC PROJECTS
DEVELOPMENT HOUSE
70 BURFORD LANE
LYMM CHESHIRE
WA13 0SJ

t: (01925) 755 413
f: (01925) 752 013
info@ellucprojects.co.uk
www.ellucprojects.co.uk

Scale:	Size:	First Issue:	Drawn:	Checked:
1:500	A1	SEPT 13	LMCL	LMCL

Drg No: ELL-297-MH-002

Rev: /

ELLUC Projects Ltd

- Consultancy
- Project Management
- Site Regeneration









E-mail: info@ellucprojects.co.uk

Web: www.ellucprojects.co.uk