



**Proposed Development at
10 Gun Street,
Reading
RG1 2JR
Flood Risk Assessment**

On behalf of **PDR Limited**

Project Ref: 332511813 | Rev: A | Date: November 2022

Registered Office: Buckingham Court Kingsmead Business Park, London Road, High Wycombe, Buckinghamshire, HP11 1JU
Office Address: Caversham Bridge House, Waterman Place, Reading, Berkshire RG1 8DN
T: +44 (0)118 950 0761 E: PBA.Reading@stantec.com

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	Name	Position	Signature	Date
Prepared by:	Connor Egan	Graduate Water Scientist	<i>C Egan</i>	07/10/2022
Reviewed by:	John Pulsford	Senior Associate	<i>J Pulsford</i>	07/10/2022
Approved by:	Amy Hensler	Director	<i>A Hensler</i>	07/10/2022
For and on behalf of Stantec UK Limited				

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Contents

Executive Summary	2
Summary of Key FRA Data.....	3
Abbreviations.....	4
1 Introduction.....	5
1.1 Scope of Report.....	5
1.2 Existing Site and Proposed Development.....	5
1.3 Sources of Information	5
1.4 Caveats and Exclusions	6
2 Planning Policy Context	7
2.1 National Policy and Guidance	7
2.2 Local Policy and Guidance.....	8
Reading Borough Council Strategic Flood Risk Assessment	9
3 Site Setting	10
3.1 Site Description	10
3.2 Topography	10
3.3 Hydrological Setting.....	10
3.4 Existing Drainage Arrangements.....	11
3.5 Geology and Hydrogeology.....	11
4 Assessment of Flood Risk	12
4.1 EA Open Data Flood Maps	12
4.2 Preliminary Flood Risk Assessment.....	14
4.3 Strategic Flood Risk Assessment.....	15
4.4 Lower Kennet Hydraulic Modelling Study 2018	16
Present Day Scenarios.....	16
5 Climate Change Allowances Guidance.....	18
Lower Kennet Hydraulic Modelling Study 2018 - Climate Change Scenarios	19
6 Proposed Development and Sequential Test	21
6.1 Proposed Development.....	21
6.2 Flood Risk Vulnerability.....	21
6.3 NPPF Sequential and Exception Tests	21
7 Flood Mitigation Strategy	23
7.1 Building Design.....	23
7.2 Floodplain Storage and Flood Flow Routes	23
7.3 Safe Access.....	23
7.4 Surface Water Drainage Strategy	24
8 Conclusions	25

Figures

Figure 3-1: Site Location Plan (not to scale)	10
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Figure 4-1: EA Flood Zone Map	12
Figure 4-2: EA Risk of Flooding from Surface Water Map	13
Figure 4-3: EA Historic Flood Map	14
Figure 4-4: Kennet Hydraulic Modelling Study 2018 Node Points	16
Figure 5-1: Kennet and Tributaries Management Catchment.....	19

Tables

Table 4-1: Kennet Hydraulic Modelling Study 2018 Flood Levels – Present Day.....	16
Table 5-1: Climate Change – Peak River Flow - Central Allowances	18
Table 5-2: Climate Change – Peak Rainfall Intensity Allowances	19
Table 5-3: Kennet Hydraulic Modelling Study 2018 Flood Levels – Climate Change.....	20

Appendices

Appendix A	Open Data Flood Maps
Appendix B	Surveys
Appendix C	Development Proposals
Appendix D	Lower Kennet Hydraulic Modelling Study 2018

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Executive Summary

This Flood Risk Assessment (FRA) has been prepared by Stantec UK Ltd to accompany a planning application for the proposed development of 10 Gun Street, Reading, Berkshire as an entertainment venue.

In accordance with the fundamental objectives of the National Planning Policy Framework (NPPF), the FRA demonstrates that:

- (i) The development is safe;
- (ii) The development does not increase flood risk; and,
- (iii) The development does not detrimentally affect third parties.

The Environment Agency (EA) data confirms that the site is located primarily within Flood Zone 1, defined in Planning Practice Guidance (PPG), Flood Risk and Coastal Change, Table 1 as follows:

Flood Zone 1 'Low Probability' less than a 1 in 1000 (0.1%) Annual Probability of flooding from rivers

The proposals for this development constitute a 'More Vulnerable' land use, which is considered appropriate within Flood Zone 1 and therefore it passes the Sequential Test (reference NPPF Annex 3 and national PPG, Flood Risk and Coastal Change, Table 2). The Exception Test is not required.

The Holy Brook, a tributary of the River Kennet passes through the site in a culvert and is the main potential source of flooding in the area as the site lies outside the modelled and historic floodplain of the main River Kennet. However, the risk of flooding from the Holy Brook is negligible based on examinations of the modelled present day and climate change impact flood levels and the topographic and culvert surveys.

The site is predominantly at a 'Very Low' risk of surface water flooding. There are some areas along the northern (Gun Street) and southern (rear access road) boundaries of the site which are shown to be at a greater risk of surface water flooding.

The proposed development will not have a detrimental impact on floodplain storage capacity or flood flow routes, and continuous safe access is available via the front and rear of the site.

The surface water drainage strategy proposed is for rain water from the roofs being collected and discharged into the Holy Brook via existing surface water drainage system and culvert. This applies to both the existing site and the proposed development as they are both 100% impermeable.

No flood mitigation strategy is therefore required as the site is unaffected by the Holy Brook, the surface water flood risk is low and there is appropriate safe escape.

In summary, the FRA demonstrates that the proposed development is safe, has no impact on others and in accordance with the requirements of national and local planning policy.

Summary of Key FRA Data

Aspect of flood risk	Applicable Guidance/ Source of Data	Summary	Section of FRA
Site Location	n/a	10 Gun Street, Reading, Berkshire, RG1 2JR. OS grid ref 471,470m E, 173,280m N	3.1
Existing Ground Levels	Topographic Survey by Metrix Surveys	Ground levels on Gun Street measure from 40.6-40.7m AOD. The existing finished floor level of the site is 40.4-40.5m AOD at the front and 39.96m AOD at the rear of the building. The existing basement level is 37.59m AOD.	3.2
Primary source of flood risk	EA Flood Map for Planning	Holy Brook	4.1
Presence of flood defences	EA Flood Map for Planning	There are no existing flood defences within the vicinity of the site.	3.3
Proposed Development	Proposals by Alan Brown Design	Proposed two storey rear extension to no 10 Gun Street at basement and ground floor levels to create venue and café with additional two storey building to the rear of the brook for ancillary, storage, and escape route purposes.	6.1
Planning Aspects			
Flood Risk Vulnerability	Planning Practice Guidance (PPG) 'Flood Risk and Coastal Change'	'More Vulnerable'	6.2
Flood Zone		Flood Zone 1 'Low Probability'	4.1
Sequential Test		Sequential Test passed	6.3
Exception Test		Exception Test not required	6.3
Applicable Climate Change Allowances	EA climate change allowances guidance	Kennet and Tributaries River Management Catchment - +21% (Central)	5
Reference Flood Levels			
Present Day	Lower Hydraulic Modelling Study 2018	Node Point Holy2_0579.1 (Downstream of site) 1 in 20 annual probability = 37.57m AOD 1 in 100 annual probability = 37.58m AOD 1 in 1000 annual probability = 37.78m AOD	4.4
Climate Change		Node Point Holy2_0579.1 (Downstream of site) 1 in 100 annual probability +25%= 37.67m AOD	4.4
Proposed Mitigation Measures			
Ground Floor Levels	BS8533:2017 RBC SFRA section 12.3	The site lies a significant distance outside the fluvial floodplain.	7.1
Floodplain Storage	RBC SFRA section 12.5	No impact on floodplain storage capacity	7.2
Flood Flow Routes	RBC SFRA section 12.6	No impact on flow routes	7.2
Safe Access	RBC SFRA section 12.7	Continuous safe access available	7.3
Surface Water Drainage	SuDS Manual RBC SFRA section 13	Surface water runoff from the roofs and other impermeable surfaces will be concentrated and delivered into the Holy Brook via existing surface water drainage and culvert.	7.4

Abbreviations

ABI	-	Association of British Insurers
AP	-	Annual Probability
BGS	-	British Geological Survey
CDM	-	Construction (Design and Management)
DEFRA	-	Department for Environment, Food and Rural Affairs
EA	-	Environment Agency
FRA	-	Flood Risk Assessment
GIS	-	Geographic Information System
LLFA	-	Lead Local Flood Authority
m AOD	-	Metres Above Ordnance Datum (Newlyn)
NPPF	-	National Planning Policy Framework
PFRA	-	Preliminary Flood Risk Assessment
PPG	-	Planning Practice Guidance
RBC	-	Reading Borough Council
RoSWF-		Risk of Surface Water Flooding
SFRA	-	Strategic Flood Risk Assessment

1 Introduction

1.1 Scope of Report

- 1.1.1 This Flood Risk Assessment (FRA) has been prepared by Stantec UK Ltd ('Stantec') on behalf of our client, PDR Limited, to support a planning application for the proposed development of 10 Gun Street, Reading, Berkshire, RG1 2JR.
- 1.1.2 This FRA is a revised scheme from previous planning submissions in 2015 and 2019.
- 1.1.3 In 2015, a planning application was submitted for the redevelopment of the site, which included the refurbishment and extension of the existing property for a new café restaurant, a proposed basement to the rear of the existing building extending to near the Holy Brook, a terraced garden area to the rear of the property, de-culverting over half of the Holy Brook within the site boundary and constructing a 2-storey structure to form a Micro-Brewery.
- 1.1.4 In 2019, a planning application was submitted for a change of use development at the site from office use to a café/restaurant along with the erection of a building to the rear for a microbrewery and the creation of an external open area for customer use.
- 1.1.5 The report is based on the available flood risk information for the site as detailed in **Section 1.3** and prepared in accordance with the planning policy requirements set out in **Section 2**.
- 1.1.6 Stantec has many years of experience in, amongst other areas, the assessment of flood risk, hydrology, flood defence and river engineering. The authors and reviewers of the document are all experienced engineers, and the reviewers are members of chartered institutions such as the Chartered Institution of Water and Environmental Management (CIWEM) or the Institution of Civil Engineers (ICE).

1.2 Existing Site and Proposed Development

- 1.2.1 The existing site currently consists of commercial uses and is located on Gun Street, Reading. The site is next door to an entertainment business (The Purple Turtle), which is owned and operated by the applicant.
- 1.2.2 The site lies within the administrative boundary of Reading Borough Council.
- 1.2.3 The proposal is for a *'two storey rear extension to no 10 Gun Street at basement and ground floor levels to create venue and first floor café with roof terrace with additional two storey building to the rear of the brook for ancillary, storage, and escape route purposes'* – see further details in **Section 6.1**.

1.3 Sources of Information

- 1.3.1 The FRA has been prepared based on the following sources of information:
- Environment Agency (EA) published '**Open Data**' datasets available online, reproduced with OS mapping under licence to Stantec (contains Ordnance Survey data © Crown copyright and database right [2022], contains Environment Agency information © Environment Agency and database right) (see **Appendix A**);
 - **Topographic survey** of the site (Drawing references 10059T/100 and B4014/113) undertaken by Metrix Surveys in March 2008 and September 2010 (see **Appendix B**);
 - Holy Brook section drawings (Drawing reference B4014/114) undertaken by Metrix Surveys in March 2008 (see **Appendix B**);

- **Development proposals** by Alan Brown Design (see **Appendix C**);
- Hydraulic Outputs from the **Lower Kennet Hydraulic Modelling Study 2018** (see **Appendix D**);
- Reading Borough Council (RBC) **Preliminary Flood Risk Assessment** (PFRA), dated June 2011; and
- RBC Level 1 **Strategic Flood Risk Assessment** (SFRA), dated June 2017.

1.4 Caveats and Exclusions

- 1.4.1 This FRA has been prepared in accordance with the NPPF, the associated PPG and Local Planning Policy. The proposed flood management (including ground floor level recommendations) and surface water management strategies are based on the relevant British Standards (BS8533), the standing advice provided by the EA or based on common practice.
- 1.4.2 Activities during the construction phase may have an impact on the existing and future flood risk. Thus, an assessment of the risks and appropriate mitigation measures should be identified and managed by the contractor.
- 1.4.3 The Construction (Design and Management) Regulations (CDM Regulations) will apply to any future development of this site which involves “construction” work, as defined by the CDM Regulations. As such it is the responsibility of the proposed developer (ultimate client) to fulfil its duties under the CDM Regulations.
- 1.4.4 The approach for the FRA and proposals for the surface water management strategy are based on the requirements of the EA and RBC in its role as Lead Local Flood Authority (LLFA). The conclusions are based on data available at the time of the study and on the subsequent assessment that has been undertaken in relation to the development proposals as outlined in **Section 1.2**. As such, we recommend the end user reviews the validity of the flood data on an annual basis with the EA.
- 1.4.5 It should be noted that the insurance market applies its own tests to properties in terms of determining premiums and the insurability of properties for flood risk. Those undertaking development in areas which may be at risk of flooding are advised to contact their insurers or the Association of British Insurers (ABI) to seek further guidance prior to commencing development. Stantec does not warrant that the advice in this report will guarantee the availability of flood insurance either now or in the future.

2 Planning Policy Context

This FRA has been prepared in accordance with the relevant national, regional and local planning policy and statutory authority guidance as detailed below.

2.1 National Policy and Guidance

- 2.1.1 National policy in relation to flood risk is contained within the **National Planning Policy Framework (NPPF)**, updated July 2021, issued by the Department for Levelling Up, Housing and Communities, with reference to Section 14 'Meeting the challenge of climate change, flooding and coastal change'.
- 2.1.2 The associated **Planning Practice Guidance (PPG)** was released in March 2014 (with reference to the 'Flood Risk and Coastal Change' section) and last updated August 2022.
- 2.1.3 The NPPF and PPG demonstrate a flood risk management approach for the lifespan of the proposed development considering the effects of climate change. The document sets the framework to minimise vulnerability, provide resilience to the impacts of climate change, and to fully consider the potential impacts of climate change for the lifetime of the development within the mitigation measures.
- 2.1.4 The guidance on the application of climate change allowances in FRAs is linked via the PPG and was most recently updated in May 2022:

<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>.
- 2.1.5 The guidance provides contingency allowances for the potential increases in peak river flow, peak rainfall intensity and sea level rise which are considered accordingly subject to the site conditions – discussed further in **Section 5**.
- 2.1.6 The NPPF sets out the requirement for the Sequential Test and Exception Test in paragraphs 162 and 163 respectively – see below.

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

163. If it is not possible for development to be located in areas with a lower risk of flooding (taking into account wider sustainable development objectives), the exception test may have to be applied. The need for the exception test will depend on the potential vulnerability of the site and of the development proposed, in line with the Flood Risk Vulnerability Classification set out in Annex 3"

- 2.1.7 These tests are to be applied where appropriate, depending on the proposed development flood risk 'vulnerability', the Flood Zone in which it is located and the risk of flooding from other sources. This is detailed further in **Section 6.3**.

2.2 Local Policy and Guidance

Reading Borough Council Local Plan

- 2.2.1 Local planning policy is contained within the **RBC Local Plan** (adopted November 2019), with particular reference to **Policy EN11** - 'Waterspaces', and **Policy EN18** 'Flooding and Sustainable Drainage Systems', which state:

Policy EN11 Waterspaces

"Reading's waterspaces will be protected and enhanced, so that they can continue to contribute to local and regional biodiversity and ecology, flood mitigation, local character, heritage and visual amenity, the provision of accessible leisure and recreational opportunities and, where appropriate, navigation. There will be no adverse impact on the functions and setting of any watercourse and its associated corridor. Where development in the vicinity of watercourses is acceptable, it will:-

- Provide appropriate, attractive uses and buildings that enhance the relationship of buildings, spaces and routes to the watercourse, including through creating or enhancing views of the watercourse, and create a high quality public realm;*
- Make positive contributions to the distinct character, appearance, historic significance, landscape and amenity of the watercourses;*
- Provide a strengthened role for watercourses as important landscape features, wildlife corridors, historic features and recreation opportunities;*
- Wherever practical and consistent with its biodiversity role, provide good, level access to and along the waterside for all those who want to use it;*
- Be set at least ten metres back from the watercourse wherever practicable and appropriate to protect its biodiversity significance;*
- Improve the quality of watercourse environment through protecting and enhancing habitats and ensuring that habitat creation is balanced with access and urban uses; and*
- Pursue opportunities for deculverting of watercourses."*

Policy EN18 Flooding and Sustainable Drainage Systems

"Development will be directed to areas at lowest risk of flooding in the first instance, following the Sequential and Exceptions Test set out in the NPPF, and taking into account the effects of climate change. It will consider flooding from all sources, including fluvial, surface water, groundwater and sewer flooding. Where development in areas at risk of flooding is necessary, it will not reduce the capacity of the flood plain to store floodwater, impede the flow of floodwater or in any way increase the risks to life and property arising from flooding. Wherever possible, development should be designed to reduce flood risk, both on- and off-site.

All major developments⁶³ must incorporate sustainable drainage systems (SuDS) as appropriate and in line with the Government's Technical Standards. Smaller schemes are encouraged to incorporate SuDS, where possible. Runoff rates should aim to reflect greenfield conditions and, in any case, must be no greater than the existing conditions of the site. Schemes should ensure that the movement of water through vertical infiltration as well as horizontal run-off does not worsen contamination effects. Wherever possible, SuDS provision should maximise ecological benefits, link into the existing Green Network, incorporate tree planting and landscaping and avoid damage to existing significant trees, including through changes to the site hydrology. All new developments in areas of flood risk should give priority to SuDS."

Reading Borough Council Strategic Flood Risk Assessment

- 2.2.2 The **RBC Strategic Flood Risk Assessment (SFRA)** was released in 2017 and forms part of the Local Plan evidence base, to inform future spatial planning and to assist in developing planning policies to address flood risk. Moreover, the document provides an overall understanding of the flood risk within the study area taking into account all potential sources.

Reading Borough Council Preliminary Flood Risk Assessment

- 2.2.3 The RBC is defined as the Lead Local Flood Authority (LLFA) under the Flood and Water Management Act 2010. The first element of the Flood Risk Regulations (2009) is for LLFAs to produce a **Preliminary Flood Risk Assessment (PFRA)** providing a high-level overview of flood risk from all sources within a local area, including consideration of surface water, groundwater and ordinary (minor) watercourses.
- 2.2.4 The RBC PFRA was released in 2011 and has been reviewed to ascertain any details of historic flooding at the site as part of this study – see **Section 4.2**.

3 Site Setting

3.1 Site Description

- 3.1.1 The site is located on Gun Street in Reading, Berkshire (postcode RG1 2JR). The site centre OS grid reference is 471,470m E, 173,280m N - see **Figure 3-1**.
- 3.1.2 The site currently consists of a commercial use.
- 3.1.3 The site is bordered by Gun Street to the north, a bar/ nightclub (The Purple Turtle) owned by the applicant to the west, a rear access road and the Oracle shopping centre to the south and an Estate Agents to the east.
- 3.1.4 Main access to the site is via Gun Street.

Figure 3-1: Site Location Plan (not to scale)



3.2 Topography

- 3.2.1 The topographic survey in **Appendix B** by Metrix Surveys Ltd shows that the external ground levels on Gun Street is approximately 40.6-40.7m AOD. The existing finished floor level is at 40.4-40.5m AOD at the front of the building and 39.96m AOD at the rear of the building.
- 3.2.2 At the rear of the site, the existing ground level over the culvert, which the Holy Brook flows through, is at 38.65m AOD.
- 3.2.3 EA LIDAR survey data, as shown within **Figure 003** in **Appendix A**, shows that the site lies within an area of Reading at levels of approximately 39.0-40.0m AOD, with elevations gradually decreasing southwards towards the River Kennet.

3.3 Hydrological Setting

- 3.3.1 The **River Thames** is the primary river in the Reading area. It is located approximately 980m to the north of the site and flows in an easterly direction.

- 3.3.2 The **River Kennet** is located approximately 180m south of the site. It flows in a north easterly direction and has its confluence with the River Thames approximately 2km downstream of the site.
- 3.3.3 The **Holy Brook** (a tributary of the River Kennet) flows through central Reading in a mixture of open channel and culvert.
- 3.3.4 From Bridge Street to the west and Yield Hall Lane to the east of the site the Holy Brook is mainly in culvert with a very short open section upstream to the rear of 2-4 Gun Street, upstream of the adjacent property and a longer open section downstream from the site's eastern boundary before entering a long culvert under the Oracle Shopping Centre.
- 3.3.5 The Holy Brook passes through the site towards the rear (south) and is fully culverted. A plan of the site, including the location of the Holy Brook within the site and the culvert cross sections at key locations, is appended in **Appendix B**.
- 3.3.6 There are no existing formal flood defences in the vicinity of the site. However, the culvert and river walls effectively act as flood defences. This is discussed in more detail below.

3.4 Existing Drainage Arrangements

- 3.4.1 The existing site is a commercial building and open area to the rear. The existing drainage arrangements are not known in detail. The site is 100% impermeable and is likely to drain to the local public sewer network at the front of the site on Gun Street and to the Holy Brook to the rear where it passes through the site.

3.5 Geology and Hydrogeology

- 3.5.1 The British Geological Survey (BGS) Geology of Britain Viewer indicates an underlying geology as follows:
- The site is underlain by a bedrock of the Seaford Chalk Formation and Newhaven Chalk Formation (Chalk);
 - Superficial Deposits of the Taplow Gravel Member (Sand and gravel) are recorded across the site;
- 3.5.2 It is anticipated that the natural strata are overlain by Made Ground associated with the previous and present land use of the site.
- 3.5.3 The site does not lie within an EA Groundwater Source Protection Zone. However, the site lies on a Principal designated bedrock aquifer and a Secondary A designated superficial drift aquifer. The site also lies predominantly within an area of Groundwater Vulnerability designated 'Medium-High' with a small area designated 'High' at the rear of the site.

4 Assessment of Flood Risk

The assessment of flood risk has been undertaken based on the sources of information listed in [Section 1.3](#).

4.1 EA Open Data Flood Maps

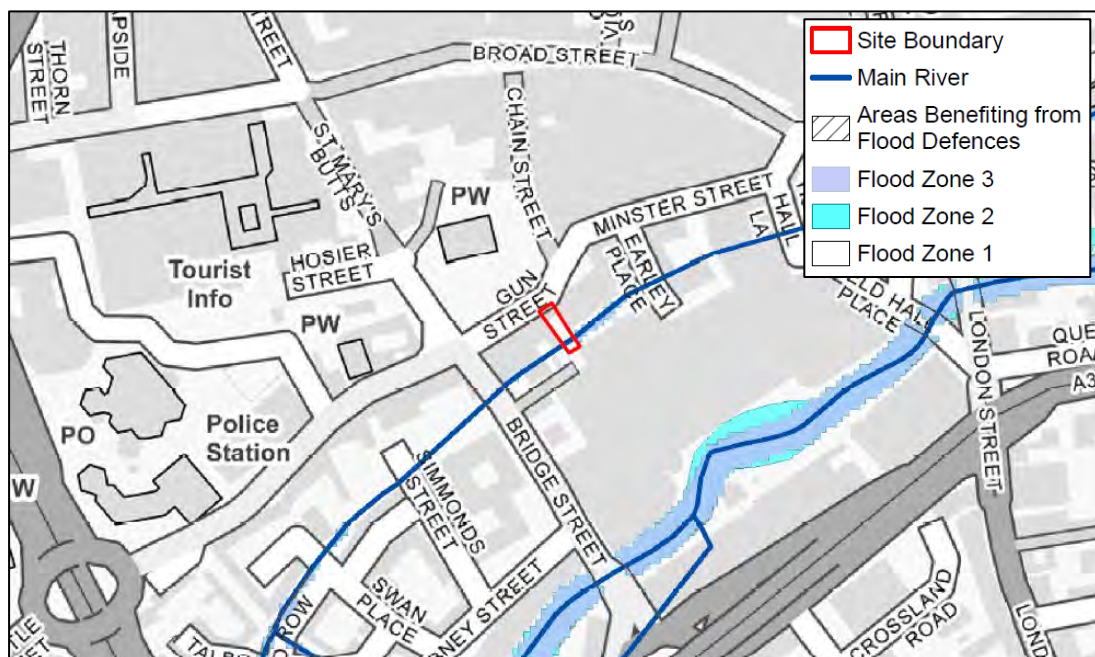
- 4.1.1 The following maps have been taken from the Stantec GIS flood maps report in [Appendix A](#) based on the EA Open Data datasets available online and reproduced with OS mapping under licence to Stantec.

Flood Zone Map

- 4.1.2 The first phase in identifying whether a site is potentially at risk of flooding is to consult the .GOV.UK 'Flood Map for Planning' website. This provides an initial indication of the extent of the Flood Zones, which is refined through the use of more detailed site-specific level survey and modelled flood levels. The Flood Zones are defined in Table 1 of the Planning Practice Guidance (PPG) 'Flood Risk and Coastal Change' section as follows:

- **Flood Zone 1 'Low Probability'** – Land at less than 1 in 1000 (0.1%) annual probability of river or sea flooding;
- **Flood Zone 2 'Medium Probability'** – Land between 1 in 100 (1%) and 1 in 1000 (0.1%) annual probability of river flooding, or between 1 in 200 (0.5%) and 1 in 1000 (0.1%) annual probability of sea flooding;
- **Flood Zone 3 'High Probability'** – Land at 1 in 100 (1%) or greater annual probability of river flooding, or 1 in 200 (0.5%) or greater annual probability of sea flooding;

Figure 4-1: EA Flood Zone Map



- 4.1.3 The EA Flood Zone map indicates the site lies within **Flood Zone 1 'Low Probability'** – see [Figure 4-1](#). It also shows small areas of **Flood Zone 2 'Medium Probability'** and **Flood Zone 3 'High Probability'** flood extents immediately downstream of the site associated with the Holy Brook. However, these extents are likely to be due to the grid size used in the hydraulic model

as the watercourse is contained within high river walls at this point and not a realistic indication of a floodplain that exists beyond the channel.

Flood Risk from Surface Water

4.1.4 The EA 'Risk of Flooding from Surface Water' map shows where areas could be potentially susceptible to surface water flooding in an extreme rainfall event. The latest mapping assesses flooding resulting from severe rainfall events based on the following three scenarios:

- 'High' Risk: 1 in 30 (3.3%) or greater AP rainfall event;
- 'Medium' Risk: Between a 1 in 100 (1%) and 1 in 30 (3.3%) AP rainfall event;
- 'Low' Risk: Between 1 in 1000 (0.1%) and 1 in 100 (1%) AP rainfall event;
- 'Very Low' Risk: Lower than 1 in 1000 (0.1%) AP rainfall event.

4.1.5 The EA mapping shows that the site is predicted to be at a 'Very Low' risk of surface water flooding - see **Figure 4-2** . There are some areas along the northern and southern boundaries of the site which are shown to be at a greater risk.

4.1.6 In the low-risk scenario, surface water flood depths are 300-900mm on the footway at the front of the site, whereas depths on the carriageway are below 300mm. This reflects the local situation outside the Site where the footway is lower than the adjacent carriageway.

4.1.7 In the medium and high-risk scenarios, surface water flood depths are below 300mm on the footway and the carriageway.

4.1.8 Therefore, as the front of the existing building is level with the Gun Street footway and the rear of the building is lower, surface water could enter the building via the front entrance in extreme events.

Figure 4-2: EA Risk of Flooding from Surface Water Map



4.1.9 It should be noted that the surface water maps are generated using a generic methodology on a national scale, whereby rainfall is routed over a relatively coarse ground surface model. The analysis does not take account of any specific local information on below-ground drainage infrastructure and infiltration, although an adjustment is included in urban areas to account for

the impact of sewerage and a standard infiltration allowance based on soil type. Consequently, the mapping only provides a guide to potentially vulnerable areas based on the general topography of an area and not a detailed assessment of the risk on a specific site.

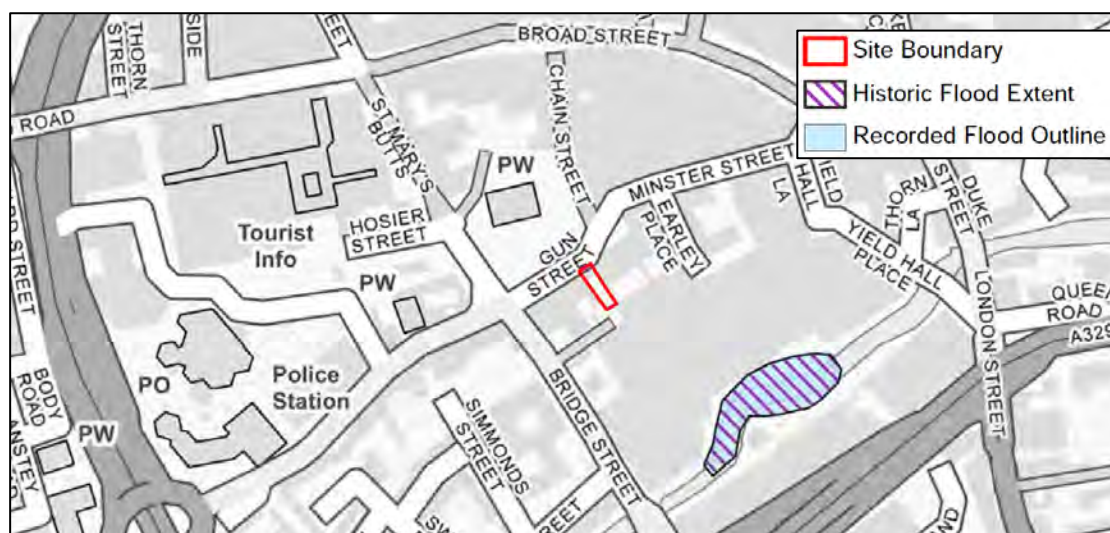
Flood Risk from Reservoirs Map

- 4.1.10 The EA provides maps showing the risk of flooding in the event of a reservoir failure. The reservoir breach extents are captured in the baseline flood maps taken from the Stantec GIS flood maps report in **Appendix A**.
- 4.1.11 The EA reservoir maps show two flooding scenarios, a 'dry-day' and a 'wet-day'. The 'dry-day' scenario predicts the flooding that would occur if the dam or reservoir failed when rivers are at normal levels. The 'wet day' scenario predicts how much worse the flooding might be if a river is already experiencing an extreme natural flood.
- 4.1.12 The mapping confirms the site is not at risk of a reservoir breach during a 'dry-day' and a 'wet-day' scenario.

Historic Flood Map

- 4.1.13 The EA 'Historic Flood Map' is a dataset showing the maximum extent of all individual recorded flood outlines from rivers, the sea and groundwater and shows areas of land that have previously been subject to flooding. This map indicates that recorded floods on the Kennet have not affected the site – see **Figure 4-3**.

Figure 4-3: EA Historic Flood Map



4.2 Preliminary Flood Risk Assessment

- 4.2.1 The RBC Preliminary Flood Risk Assessment (PFRA) was prepared in 2011 and provides a high-level assessment of flood risk issues within the Borough. This document has been reviewed and key information of relevance to the site has been extracted.
- 4.2.2 **PFRA Figure 4.1 (Local information on past floods)** shows local information on recorded flood events in Reading using data from Royal Berkshire Fire and Rescue Service, SFRA records and RBC records. It indicates that there have been no recorded incidents of flooding from any reported sources at the site.
- 4.2.3 **PFRA Figure 4.2 (National information on past floods – EA Historic Flood Map)** shows the extents of EA recorded historic flooding. It also indicates that there have been no recorded

incidents of flooding from fluvial sources at the site. This is consistent with the data shown in **Figure 4-3**.

- 4.2.4 **PFRA Figure 5.4 (Areas Susceptible to Groundwater Flooding (AStGWF))** indicates that the site is within an area at '>=75%' susceptible to groundwater flooding. Groundwater vulnerability has been mapped using strategic scale data.

4.3 Strategic Flood Risk Assessment

- 4.3.1 The current RBC Strategic Flood Risk Assessment (SFRA) Level 1 report was prepared in 2017 and provides advice to RBC on flood risk issues within the Borough. This document has been reviewed and key information of relevance to the site has been extracted.

- **Historic Flooding:** Map F1 provides the EA historic floodplain map, consistent with the data discussed in **Section 4.1**. Maps F2_C1, F1_C2 and F2_C3 show historic flooding records affecting the north of Reading for 9 recorded flood events. These show that the site has largely been unaffected and, critically, did not flood during the March 1947 floods (F2-N2), which is the worst recorded historic flooding incident affecting the Reading area.
- **Flood Zone:** Map F4_C shows flood zones in the central area of Reading. This map indicates the site is predominantly in Flood Zone 1 and partly in Flood Zone 3. However, the flood zones have subsequently been updated to take account of more recent EA River Thames and River Kennet modelling and therefore this SFRA map is superseded by the latest version shown in **Figure 4-1**;
- **Modelled Flood Extents:** SFRA map series references F5_C and F5_C_CC provide modelled present day and climate change flood extents through the Borough's central area. Map F5_C and Map 5_C_CC indicate the site lies outside all present day and climate change flood events. As mentioned above, this mapping has subsequently been updated to take account of the new EA River Thames and River Kennet modelling and therefore this map is superseded by the information discussed in **Section 3.4**;
- **Surface Water:** SFRA map series reference F6_C provides the surface water flood risk through the Borough's central area. It shows that the majority of the site is at very low risk of flooding from surface water. However, there is a medium and high risk of surface water flooding along the southern boundary of the site. These outputs are consistent with the surface water flood map discussed in **Section 3.1**;
- **Reservoir Breach:** SFRA Map F7 shows the flood risk associated with reservoir breach in the area (the only reservoir affecting the Borough being Whiteknights Lake at Reading University). The mapping confirms that any flooding as a result of a breach is limited to land to the south-east of Reading and the site is unaffected;
- **Groundwater:** SFRA Map F8 provides a high-level overview of areas susceptible to groundwater flooding, taken from a national dataset and based on underlying geological conditions across 1km grid squares. The site is shown in an area at 'greater than 75%' susceptibility;
- **Sewers:** Map F9 provides a summary of Thames Water sewer flooding incidents by postcode, indicating the postcode area of the site (RG1 2) has 21-50 recorded sewer flooding incidents from both internal and external sources.

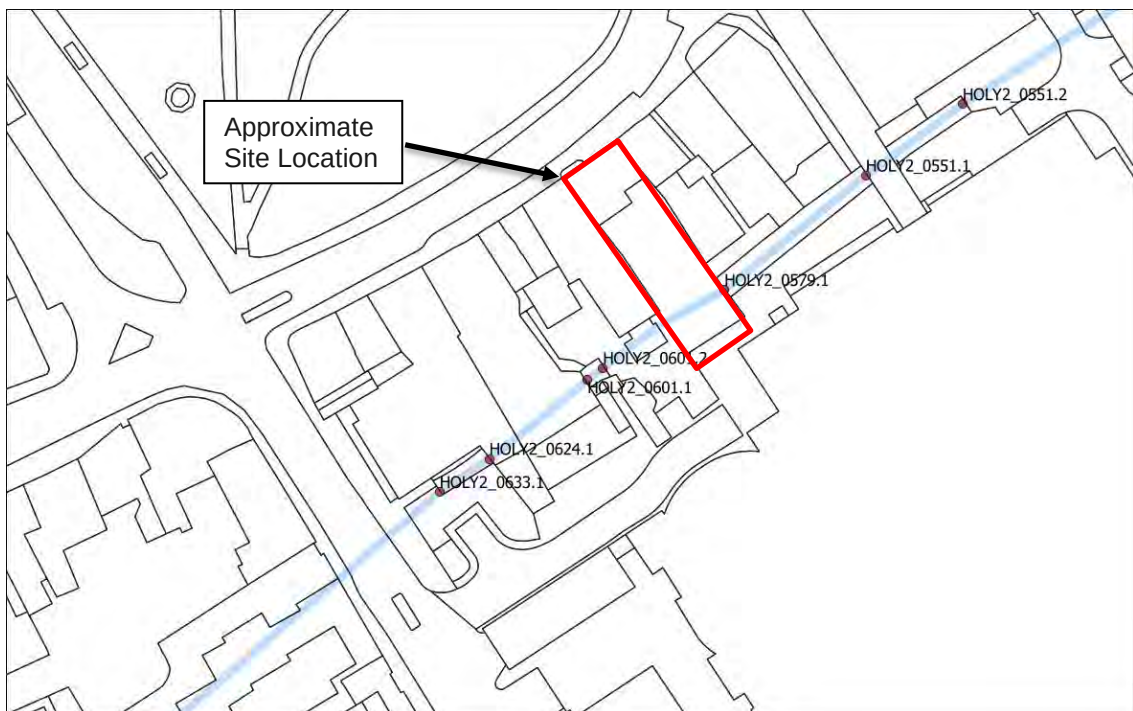
4.4 Lower Kennet Hydraulic Modelling Study 2018

4.4.1 Data has been extracted from the Lower Kennet Hydraulic Modelling Study 2018. This model includes flood levels, flows and velocities at node points along the Holy Brook. The 2018 model has been produced more recently than the model used to generate mapping within the SFRA and forms the basis of the latest EA Flood Zone mapping. This model is therefore considered to be the best available information for assessing flood risk to the site.

Present Day Scenarios

4.4.2 **Figure 4-4** below shows the location of the node points in the model along the Holy Brook.

Figure 4-4: Kennet Hydraulic Modelling Study 2018 Node Points



4.4.1 The Holy Brook is culverted upstream under numbers 8 and 9 and beneath the site, emerging into open channel downstream at number 12 (Node HOLY2_0579.1). There is a short section of open channel at number 7 upstream of the site (Node HOLY2_0601.2). Therefore, the potential source of flood risk is flood water overtopping the walls in an open channel section either upstream or downstream of the site and flowing overland to reach the site.

4.4.2 The continuous run of buildings along Gun Street prevent flow entering the site via the existing buildings and therefore the rear area is the only possible flow path. The modelled present day flood levels for each node point along the Holy Brook are shown in **Table 4-1**.

Table 4-1: Kennet Hydraulic Modelling Study 2018 Flood Levels – Present Day

Node Point	Upstream/Downstream of the Site	Present Day Flood Events (Annual Probability)		
		1 in 20 (5%) (m AOD)	1 in 100 (1%) (m AOD)	1 in 1000 (0.1%) (m AOD)
HOLY2_0601.2	Upstream	37.85	37.86	38.07
HOLY2_0579.1	Downstream	37.57	37.58	37.78

- 4.4.3 Upstream of the site, the survey (**Appendix B**) indicates that the ground levels are generally 39.45m AOD and the culvert headwall higher at 39.99m AOD. These levels are significantly above the upstream node modelled flood level up to and including the 1 in 1000 Annual Probability (AP) flood event.
- 4.4.4 Downstream of the site there is a boundary wall that extends to 42.25m AOD, again significantly above the highest modelled flood level.
- 4.4.5 Culvert survey drawing B4014/114 in **Appendix B** shows sections of the culvert running underneath the properties along Gun Street including the site. Culvert Section 2-2, which runs underneath the site, has an invert level of 36.97m and a soffit level of 38.30m. The springing point level of the culvert arch roof is approximately 37.60m AOD.
- 4.4.6 The 1 in 100 year AP upstream of the site is 37.86m AOD and 37.58m AOD downstream, an average of 37.72m AOD, i.e approximately 120mm above the springing level and 0.58m below the soffit. Therefore, the culvert does not surcharge at the site.
- 4.4.7 It is therefore concluded that there is negligible fluvial flood risk to the site from the Holy Brook for the present-day event as there are no flow routes into the site.
- 4.4.8 Culvert blockage is a potential risk to the site but as the culvert extends a considerable distance upstream and there is only a very short section of open channel (at No. 7 Gun Street, on private land) the probability of large debris entering the watercourse and causing a blockage at the culvert entrance downstream is very low. Even if this did occur, there is no direct flow path to the site.
- 4.4.9 The potential impacts of climate change over the lifetime of the proposed development have been considered so that mitigation measures can be considered accordingly and are discussed in **Section 2.2**.

5 Climate Change Allowances Guidance

5.1.1 The NPPF and PPG place emphasis on the need to fully consider – and design for – the impacts of climate change as set out in the 'Flood risk assessments: climate change allowances' planning guidance. This guidance provides contingency allowances for potential increases due to climate change in:

- o Peak river flow;
- o Rainfall intensity;
- o Sea level rise.

5.1.2 The first two elements are discussed in turn below. Sea level rise is not applicable at the site.

Peak River Flow

5.1.3 The peak river flow allowances provide a range of allowances based on percentile (i.e., the degree of certainty of an event occurring, based on the range of climate change scenarios assessed through scientific investigations). The applicable values for a site are dependent on the 'River Management Catchment' in which the site is located, which can be confirmed via the online mapping tool embedded within the guidance.

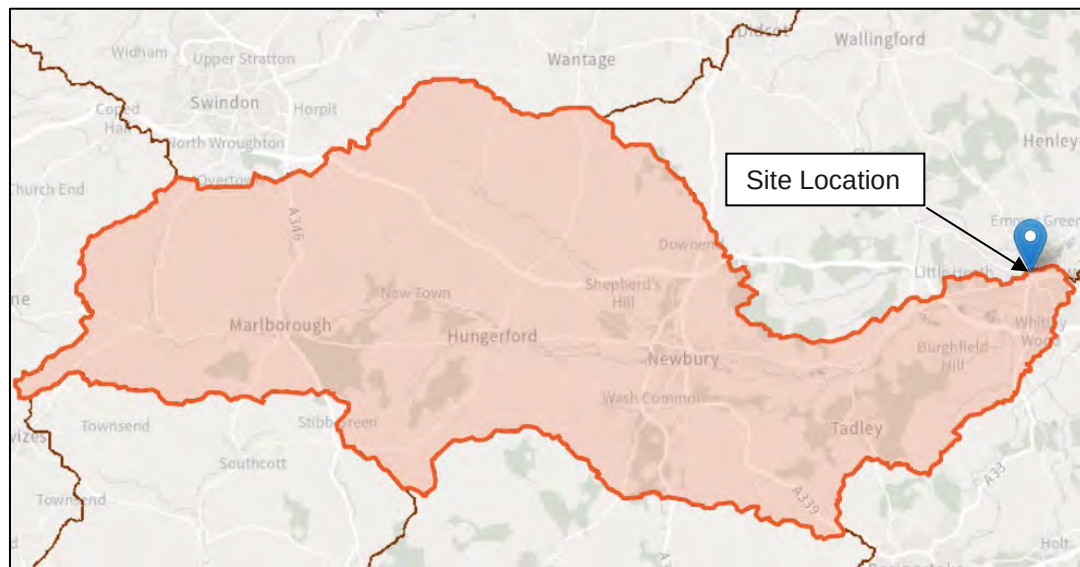
5.1.4 The peak river flow allowances provide a range of scenarios based on percentile (i.e., the degree of certainty of an event occurring, based on the range of climate change scenarios assessed through scientific investigations). The provided allowances are subject to the sub-catchments of river basin district (known as management catchments) and the vulnerability classification of the proposed use of the site.

5.1.5 The Central allowance is identified as the design standard for most forms of proposed development in all appropriate Flood Zones. The peak river flow allowances to be considered as part of the FRA are as detailed in **Table 5-1**. The Kennet and Tributaries Management Catchment is shown in **Figure 5-1**.

Table 5-1: Climate Change – Peak River Flow - Central Allowances

River Management Catchment	Central Climate Change Allowance - Epoch		
	2020s	2050s	2080s
<i>Kennet and Tributaries Management Catchment</i>	+10%	+8%	+21%

Figure 5-1: Kennet and Tributaries Management Catchment



- 5.1.6 As the development is commercial it is considered to have a design life of 75 years and therefore a climate change allowance of +21% is appropriate

Peak Rainfall

- 5.1.1 The potential increase in peak rainfall intensity needs to be considered in the surface water drainage strategy for new developments.
- 5.1.2 The EA climate change allowances guidance was updated in May 2022 to include a GIS based 'peak rainfall allowances' map showing the anticipated changes in rainfall intensity based on river management catchment. The anticipated changes in peak rainfall intensity in small catchments (less than 5km²), or urbanised drainage catchments are summarised in **Table 5-2**. For large rural drainage catchments, the peak river flow allowances are applied.

Table 5-2: Climate Change – Peak Rainfall Intensity Allowances

<i>Kennet and tributaries Management Catchment</i>	Total potential change anticipated (2070s epoch – i.e., 2061 to 2125)	
	<i>Central</i>	<i>Upper End</i>
<i>3.3% (1 in 30-year) rainfall</i>	+25%	+35%
<i>1% (1 in 100-year) rainfall</i>	+25%	+40%

- 5.1.3 As the development proposals are considered as having a design life of 75 years, a 40% climate change allowance is appropriate for detailed design of the surface water drainage system.

Lower Kennet Hydraulic Modelling Study 2018 - Climate Change Scenarios

- 5.1.4 The applicable 1 in 100 AP +21% allowance for climate change was obtained from the Peak River Flow map on the PPG Climate Change Allowances website. However, this allowance has not been modelled as part of this study. The 1 in 100 AP +25% allowance for climate change

has been modelled in the Lower Kennet Hydraulic Modelling Study 2018 Therefore, a 1 in 100 AP +25% allowance for climate change has been used as a conservative assessment.

- 5.1.5 The modelled climate change flood levels for the 1 in 100 AP +25% allowance for climate change flood event modelled at each node point along the Holy Brook are shown in **Table 5-3**.

Table 5-3: Kennet Hydraulic Modelling Study 2018 Flood Levels – Climate Change

Node Point	Upstream/Downstream	1 in 100 Annual Probability +25% Allowance for Climate Change Flood Levels (m AOD)
HOLY2_0601.2	Upstream	37.95
HOLY2_0579.1	Downstream	37.67

- 5.1.6 These modelled flood levels are approximately 100m higher than the present-day flood levels discussed in **Section 4.4**.
- 5.1.7 As set out in Section 4.4, comparison with the ground levels noted in the topographic survey and the culvert survey indicates the site is not affected by the climate change flood levels in the 1 in 100 AP +25% allowance for climate change flood event.

6 Proposed Development and Sequential Test

6.1 Proposed Development

6.1.1 This FRA accompanies a detailed planning application for:

“Two storey rear extension to no 10 Gun Street at basement and ground floor levels to create venue and first floor café with additional two storey building to the rear of the brook for ancillary, storage, and escape route purposes”

6.1.2 The existing culverted Holy Brook will remain culverted through the site.

6.1.3 Details of the proposals by Alan Brown Design Architects are included in **Appendix C**,

6.1.4 The proposed basement level is approximately 37.59m AOD.

6.1.5 The proposed main venue level ties into the existing building ground floor at the front at 40.60m AOD

6.1.6 Both the ground floor and basement levels in the main building rise to bridge over the culverted Holy Brook with the rear building lower ground and ground floor levels set level with the crossing of the culvert

6.1.7 The flood risk and any proposed mitigation is based on a design life for the development of 75 years..

6.2 Flood Risk Vulnerability

6.2.1 The NPPF Annex 3 confirms the ‘Flood risk vulnerability classification’ of a site, depending upon the proposed usage.

6.2.2 The proposed development is classed as ‘**More Vulnerable**’ development – night clubs and drinking establishments.

6.2.3 This classification is subsequently applied to PPG ‘Flood Risk and Coastal Change’ Table 2 ‘Flood risk vulnerability and flood zone incompatibility’ to determine whether:

- The proposed development is permitted or not for the Flood Zone in which it is located, and;
- Whether an Exception Test is required for the proposed development.

6.2.4 The location of the proposed ‘More Vulnerable’ development is in Flood Zone 1. Table 2 confirms that the proposed development is permitted in Flood Zone 1.

6.2.5 The flood risk Sequential Test is required where it is not possible to locate development in low-risk areas (i.e., Flood Zone 1, land at low risk of flooding from other sources).

6.3 NPPF Sequential and Exception Tests

6.3.1 The NPPF follows a sequential risk-based approach in determining the suitability of land for development in flood risk areas, with the intention of steering all new development to the lowest flood risk areas.

6.3.2 The site is within Flood Zone 1 – i.e., the Flood Zone at lowest risk of flooding, and it is predominantly at a low or very low risk from all other sources of flooding, including surface water – and therefore the Test is passed.

- 6.3.3 The Exception Test is not required as confirmed in PPG 'Flood Risk and Coastal Change' Table 2.

7 Flood Mitigation Strategy

7.1 Building Design

Floor Levels

- 7.1.1 Standard requirements for ground floor levels of new development are set out in BS8533:2017 'Assessing and Managing Flood Risk in New Development – Code of Practice'. This recommends floor levels are set a minimum of 300mm above the modelled 1 in 100 annual probability plus allowance for climate change flood level. This is also consistent with the guidance from the EA and the recommendations in the RBC SFRA.
- 7.1.2 Although the Holy Brook flows through a culvert underneath the site, there is no floodplain associated with it. Therefore, the site does not lie within a fluvial floodplain.
- 7.1.3 The proposed building ground floor level is set at approximately 40.4-40.5m AOD, in excess of 0.45m above the design flood level. Therefore, no mitigation is required.
- 7.1.4 The proposed main basement level is at 37.59m AOD, which is level with the culvert springing level (37.59m), 0.62m above the culvert's invert level (36.97m AOD) and 0.71m below the culvert soffit level (38.3m). The 1 in 100 AP and 1 in 100 AP +25% allowance for climate change flood levels in the culvert are approximately 0.35m above the basement level. As the flooding is fully contained within the culvert that is not surcharged and flooding cannot reach the site from overland, no mitigation is proposed.

7.2 Floodplain Storage and Flood Flow Routes

- 7.2.1 Any new development located in the vicinity of a watercourse should be constructed such that it does not detrimentally impact on flow routes or reduce the available floodplain storage over a site; either of which could potentially cause an increase in flood levels on-site or elsewhere. This is considered up to the benchmark of the 1 in 100 annual probability plus allowance for climate change fluvial flood level.
- 7.2.2 The site lies fully outside the fluvial floodplain and therefore development will cause no detrimental impact in this regard.

7.3 Safe Access

- 7.3.1 It is necessary to consider and incorporate safe access arrangements as part of the mitigation, to ensure the users/occupants of the development are safe in times of flooding.
- 7.3.2 The design event is taken as the 1 in 100 year event with an allowance for climate change for flooding from all sources
- 7.3.3 The site and surrounding access points are outside the design event fluvial floodplain; therefore, this is not a risk.
- 7.3.4 In the 100 year (1%) rainfall event, surface water flood depths at the front of the venue are below 150mm, whereas surface water flood depths at the rear of the venue are 600-900mm – see **Figure 005b** in **Appendix A**. Surface water could flow into the building from Gun Street through the building and possibly fill the basement level via the internal stairs, but this is not possible from the rear of the site.
- 7.3.5 The basement is proposed to include stores and toilets for customers, therefore the risk of flooding to occupants of the basement would only occur if they are in the basement and surface water enters the building via the open doors at the front entrance at the peak of an extreme

rainfall event. It is considered that there would be sufficient warning of this happening for occupants to safely exit the basement.

- 7.3.6 There are two possible access routes from the buildings including the basement level to the rear and front of the building.

7.4 Surface Water Drainage Strategy

- 7.4.1 The proposed development is located on an area of 100% impermeable surfacing. Under existing site conditions rain water from the roofs and impermeable areas is collected and discharged either into the Holy Brook via existing surface water drainage and culvert or to the public sewerage system in Gun Street.
- 7.4.2 The proposals are for a new building to the rear and other hard landscaping elements, and this will replicate the existing run-off characteristics.
- 7.4.3 The proposed drainage regime for the proposed development will maintain this existing drainage arrangement for the site; discharging to the Holy Brook or Gun Street and as such the proposed development will result in no detrimental impact on surface water runoff.
- 7.4.4 Any outfall into the Holy Brook should be fitted with an anti-backflow device to prevent high water levels in the culvert backing up into the drainage system.

8 Conclusions

- 8.1.1 This FRA has been prepared by Stantec to accompany a planning application for the proposed development of 10 Gun Street, Reading, Berkshire.

Flood Risk

- 8.1.2 The site lies in Flood Zone 1 'Low Probability' (Land at less than 1 in 1000 (0.1%) Annual Probability of river or sea flooding).
- 8.1.3 The main source of flooding is the Holy Brook, but examination of the modelled present day and climate change impact flood levels and the topographic and culvert surveys confirms that the risk of flooding from the Holy Brook is negligible.
- 8.1.4 The data shown in the Environment Agency's Risk of Flooding from Surface Water map indicates that the site is predominately at 'Very Low' risk from surface water flooding. However, there are some areas along the northern and southern boundaries of the site which are shown to be at a 'High' risk of surface water flooding.
- 8.1.5 The remaining sources of flood risk are considered to be a low risk.

Vulnerability and Sequential Test

- 8.1.6 The proposals are for the extension of the site for commercial uses, classified as 'More Vulnerable' as defined in as defined in the National Planning Practice Framework (NPPF) Annex 3.
- 8.1.7 The site lies in Flood Zone 1 'Low Probability' and is predominantly at a low or very low risk of flooding from other sources including surface water. Therefore, the Sequential Test is passed. The Exception Test is not required.

Mitigation Strategy

- 8.1.8 The proposed main building ground floor level is significantly above the design flood level in the culverted Holy Brook. The main basement is below the design flood level but there is no possible flow route from the culvert into the site and therefore into the basement
- 8.1.9 The proposed development will not have an impact on floodplain storage capacity or flood flow routes.
- 8.1.10 Continuous safe access is available via the front and rear of the building.
- 8.1.11 The existing site is 100% impermeable and surface water runoff is collected and discharged into the Holy Brook via existing surface water drainage and culvert. This is unchanged by the proposed development.

Summary

- 8.1.12 In conclusion, the future occupants and users of the proposed development will be at a low risk of flooding and the development will not increase flood risk elsewhere. It is demonstrated that the proposal complies with the National Planning Policy Framework (NPPF), PPG and the local planning policy with respect to flood risk and is an appropriate development at this location.

Appendix A Open Data Flood Maps

- Site Location Plan
- Site Location (Aerial Photography)
- Area Topography (LiDAR)
- EA Flood Zone Map
- EA Surface Water Flood Risk
- Reservoir Flood Map
- EA Historic Flood Map



	Client:	10 GUN STREET, READING, RG1 2JR Site Location	0 250 500 m		1:5,000 @ A3	Date: 04/10/2022
	PDR Limited		Contains Ordnance Survey data © Crown copyright and database right 2022.		Drawn: CE	Checked: JP
					Figure 001	Rev A



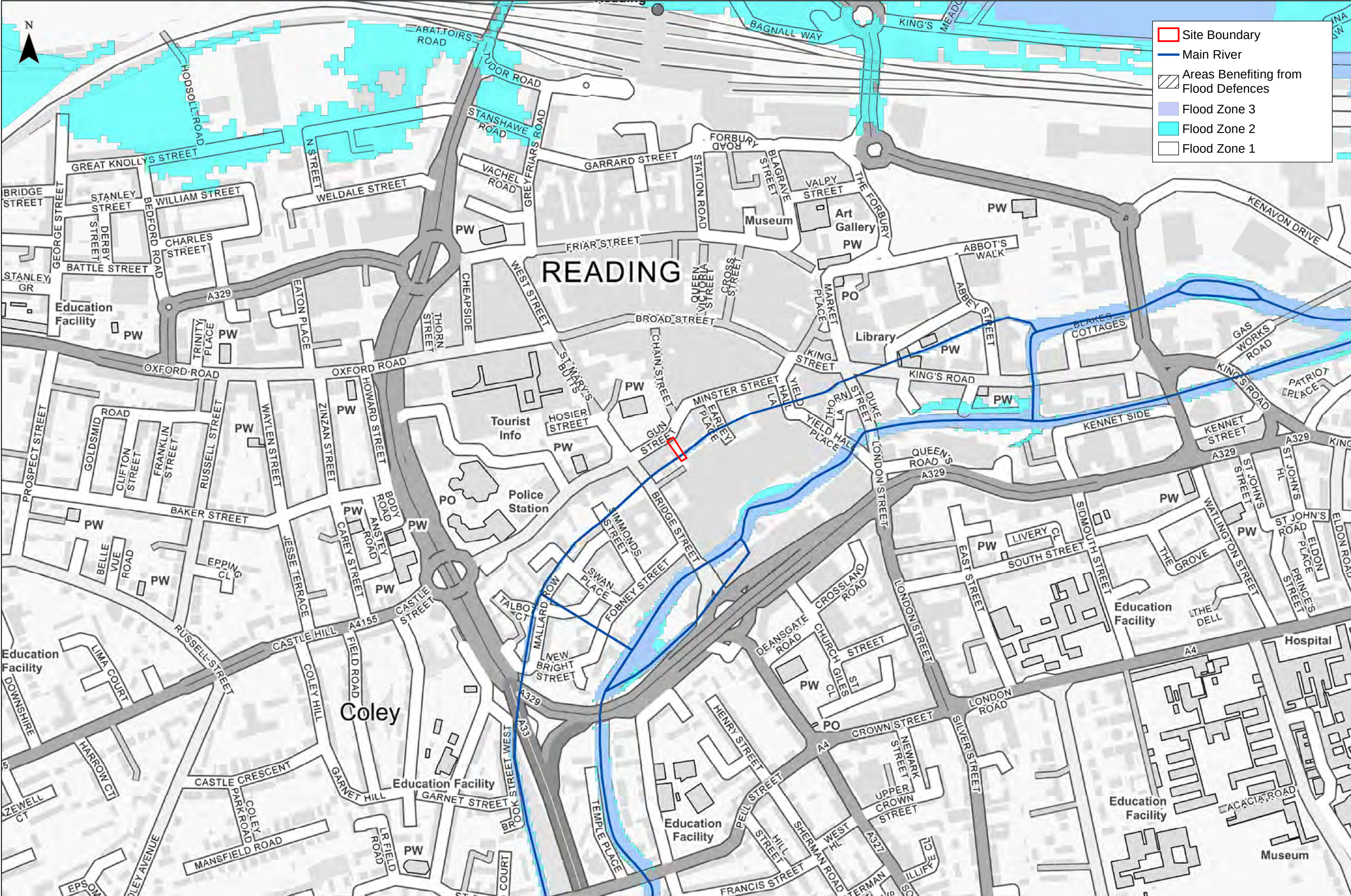
Site Boundary

READING

Coley

	Client: PDR Limited	10 GUN STREET, READING, RG1 2JR Site Location (Aerial)	0250500 m Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community Contains Ordnance Survey data (c) Crown copyright and database right 2022.	1:5,000 @ A3 Drawn: CE Figure 002	Date: 04/10/2022 Checked: JP Rev A
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	Client:	10 GUN STREET, READING, RG1 2JR EA Flood Zone	0250500m Contains Environment Agency information © Environment Agency and/or database right Contains Ordnance Survey data © Crown copyright and database right 2022. Flood Zones refer to the probability of river and/or sea flooding, ignoring the presence of defences	1:5,000 @ A3	Date: 04/10/2022
	PDR Limited			Drawn: CE	Checked: JP
	Figure 004			Rev A	



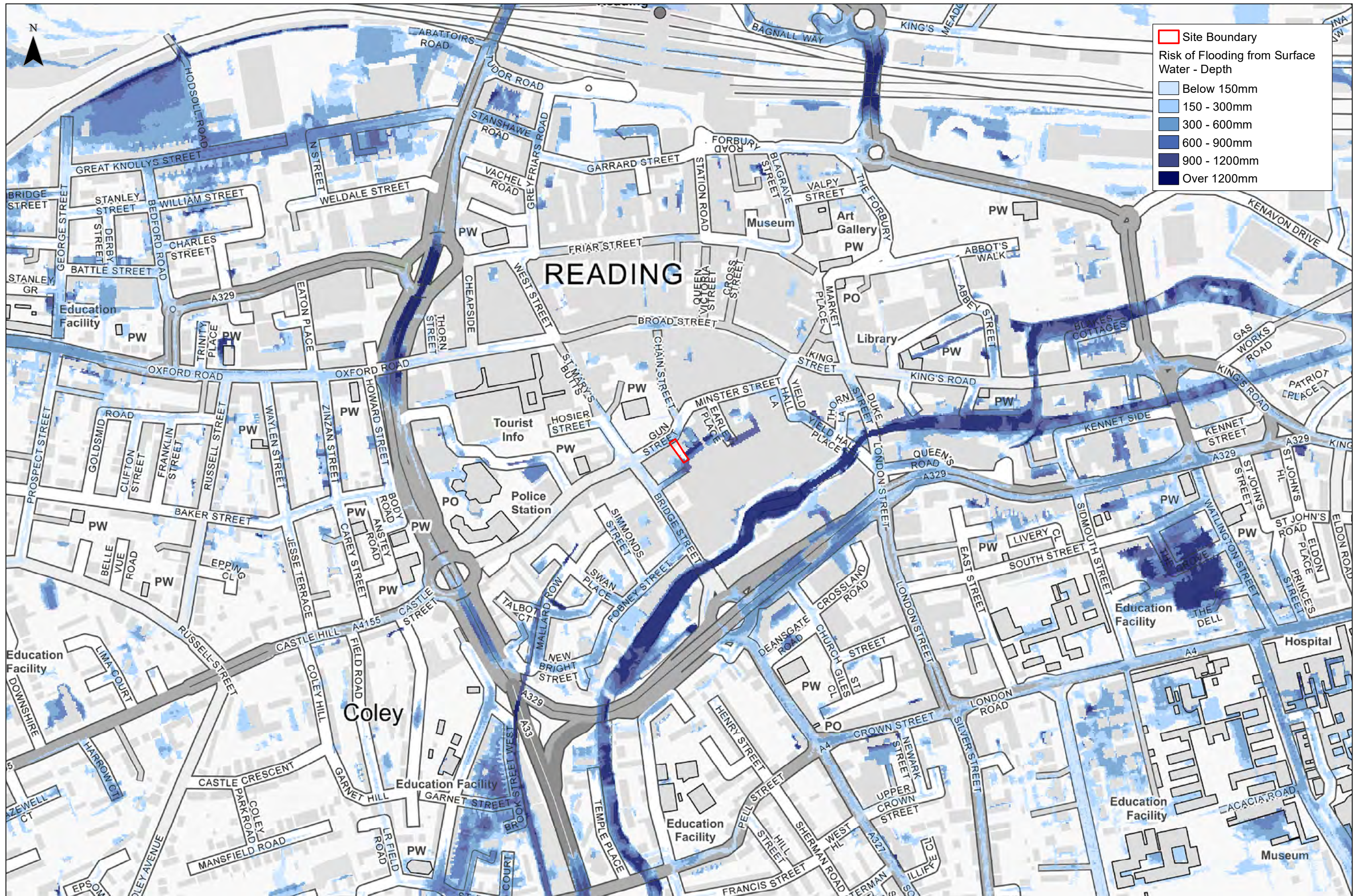
	Client:	10 GUN STREET, READING, RG1 2JR EA Surface Water Flood Risk	0 250 500 m Contains Environment Agency information © Environment Agency and database right Contains Ordnance Survey data © Crown copyright and database right 2022. Maps based on EA updated 'Flood Map for Surface Water' ('uFMSW') released in 2013 as the latest iteration of a national scale surface water modelling exercise	1:5,000 @ A3	Date: 04/10/2022
	PDR Limited			Drawn: CE	Checked: JP
	Figure 005			Rev A	



	Client:	10 GUN STREET, READING, RG1 2JR EA Surface Water Flood Risk - Depth 3.3 Percent Chance	0250500 m Contains Environment Agency information © Environment Agency and database right Contains Ordnance Survey data © Crown copyright and database right 2022. Maps based on EA updated 'Flood Map for Surface Water' ('uFMISW') released in 2013 as the latest iteration of a national scale surface water modelling exercise	1:5,000 @ A3	Date: 04/10/2022
	PDR Limited			Drawn: CE	Checked: JP
	Figure 005a			Rev A	



	Client:	10 GUN STREET, READING, RG1 2JR EA Surface Water Flood Risk - Depth 1.0 Percent Chance	0 250 500 m Contains Environment Agency information © Environment Agency and database right Contains Ordnance Survey data © Crown copyright and database right 2022. Maps based on EA updated 'Flood Map for Surface Water' ('uFMISW') released in 2013 as the latest iteration of a national scale surface water modelling exercise	1:5,000 @ A3	Date: 04/10/2022
	PDR Limited			Drawn: CE	Checked: JP
	Figure 005b			Rev A	



	Client:	10 GUN STREET, READING, RG1 2JR EA Surface Water Flood Risk - Depth 0.1 Percent Chance	 Contains Environment Agency information © Environment Agency and database right Contains Ordnance Survey data © Crown copyright and database right 2022. Maps based on EA updated 'Flood Map for Surface Water' ('uFMSW') released in 2013 as the latest iteration of a national scale surface water modelling exercise	1:5,000 @ A3	Date: 04/10/2022
	PDR Limited			Drawn: CE	Checked: JP
	Figure 005c			Rev A	



	Client:	10 GUN STREET, READING, RG1 2JR Risk of Flooding from Reservoirs - Maximum Flood Extent	0 250 500 m Contains Environment Agency information © Environment Agency and database right 2022. Contains Ordnance Survey data © Crown copyright and database right 2022.	1:5,000 @ A3	Date: 04/10/2022
	PDR Limited			Drawn: CE	Checked: JP
	Figure 006			Rev A	



	Client:	10 GUN STREET, READING, RG1 2JR EA Ground Water Source Protection Zones	0250500 m Contains Environment Agency information © Environment Agency and database right Contains Ordnance Survey data © Crown copyright and database right 2022.	1:5,000 @ A3	Date: 04/10/2022
	PDR Limited			Drawn: CE	Checked: JP
	Figure 007			Rev A	



	Client:	10 GUN STREET, READING, RG1 2JR EA Recorded Historic Flood Extents	 Contains Environment Agency information © Environment Agency and database right Contains Ordnance Survey data © Crown copyright and database right 2022. Historic Flood Map shows the maximum extent of all individual Recorded Flood Outlines from river, the sea and groundwater springs and shows areas of land that have previously been subject to flooding in England. Recorded Flood Outlines shows all EA records of historic flooding from rivers, the sea, groundwater and surface water	1:5,000 @ A3	Date: 04/10/2022
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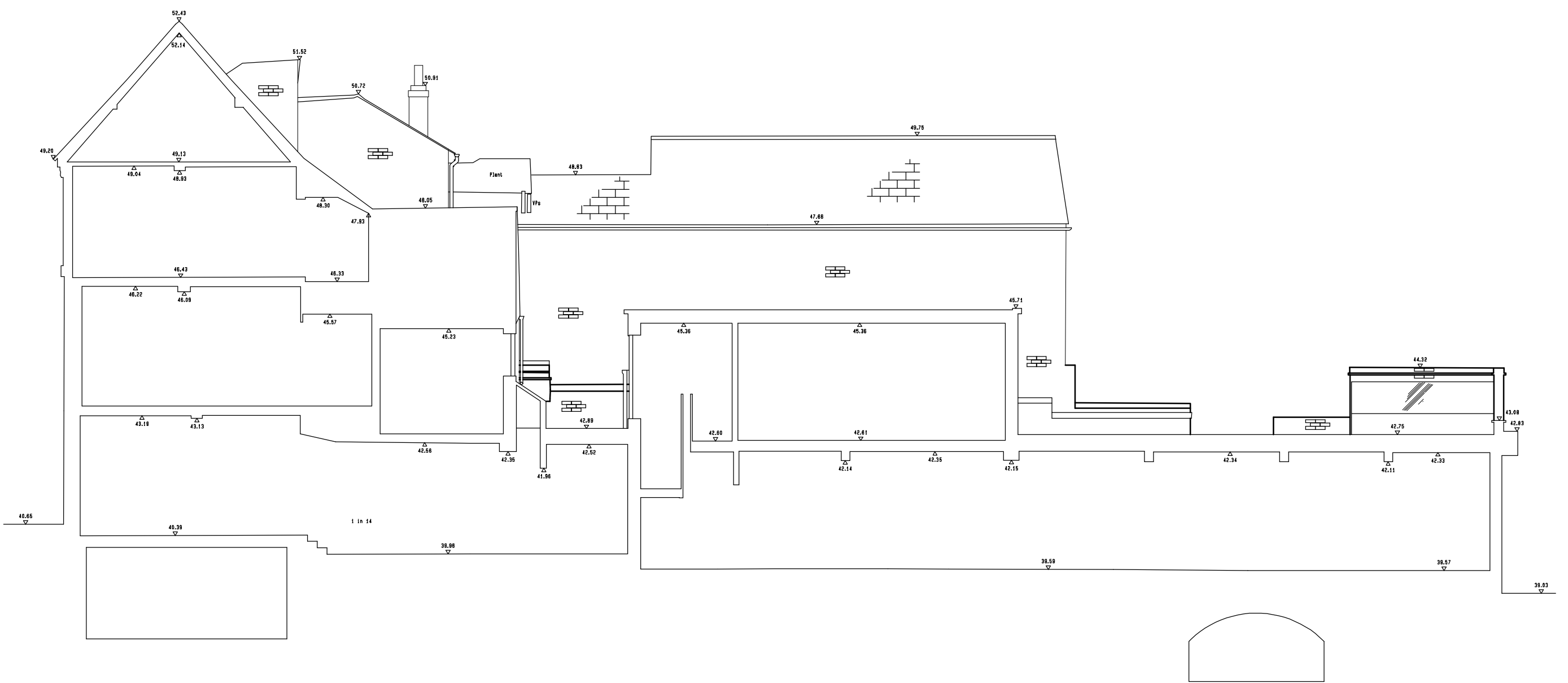
Appendix B Surveys

Metrix Surveys

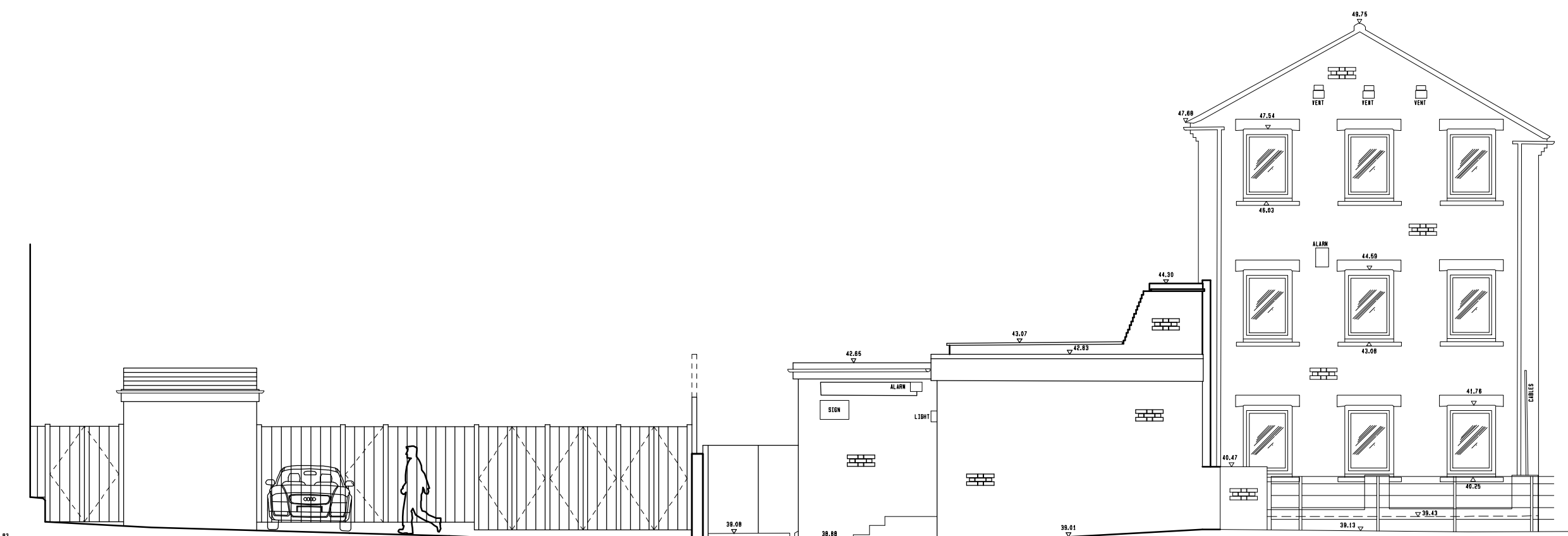
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- Holy Brook Underground River Survey (Drawing Number: B4014/113)
- Holy Brook Sections (Drawing Number: B4014/114)



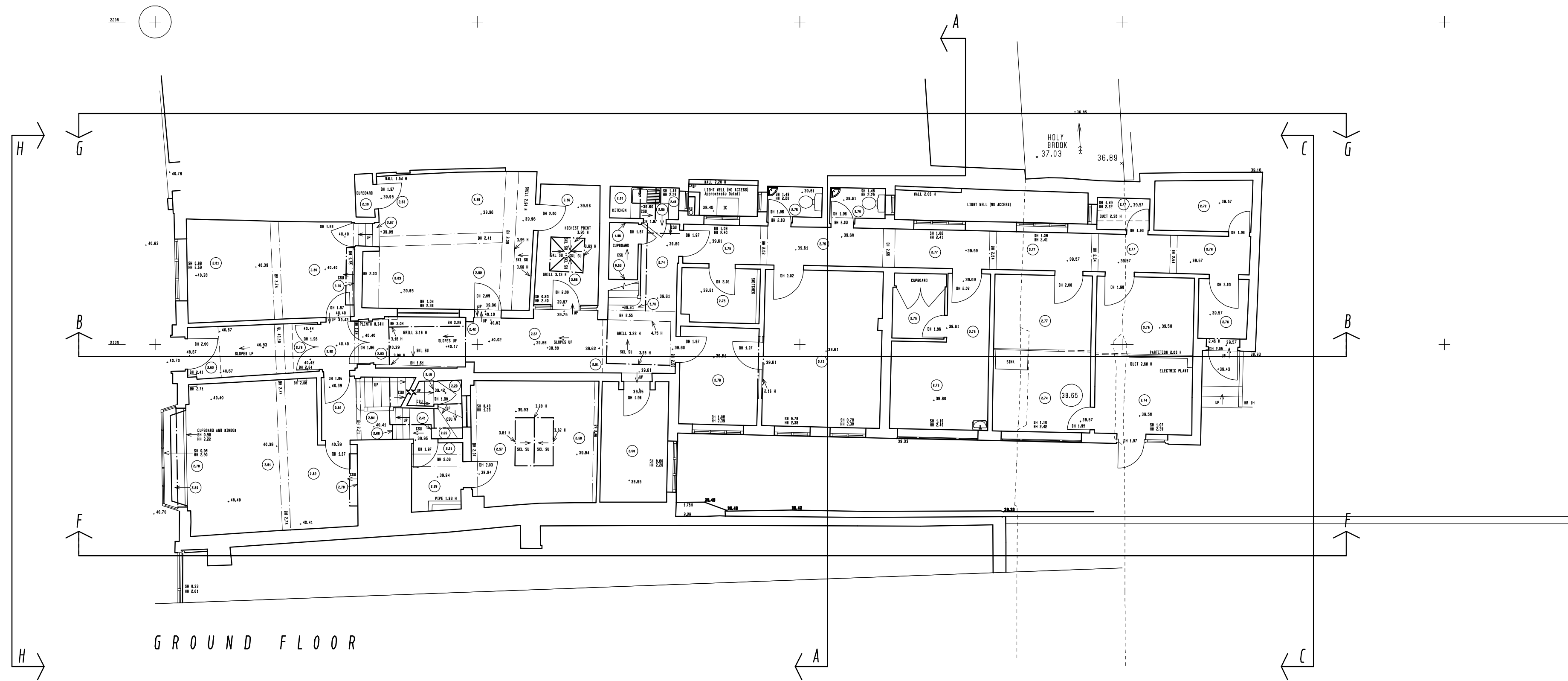
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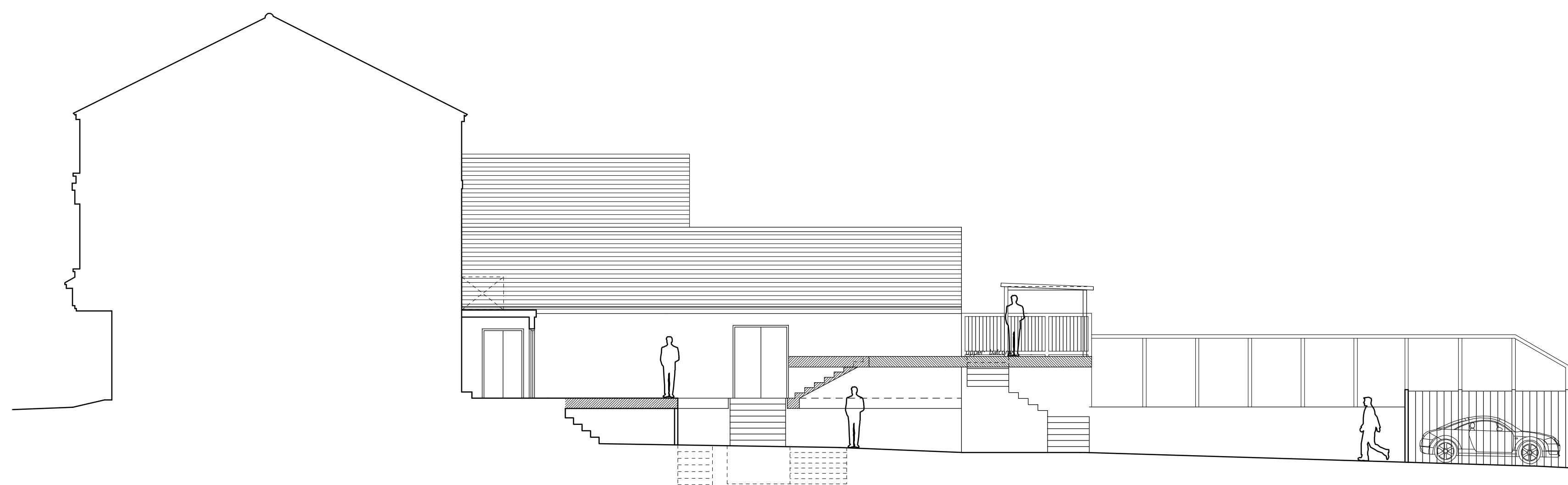
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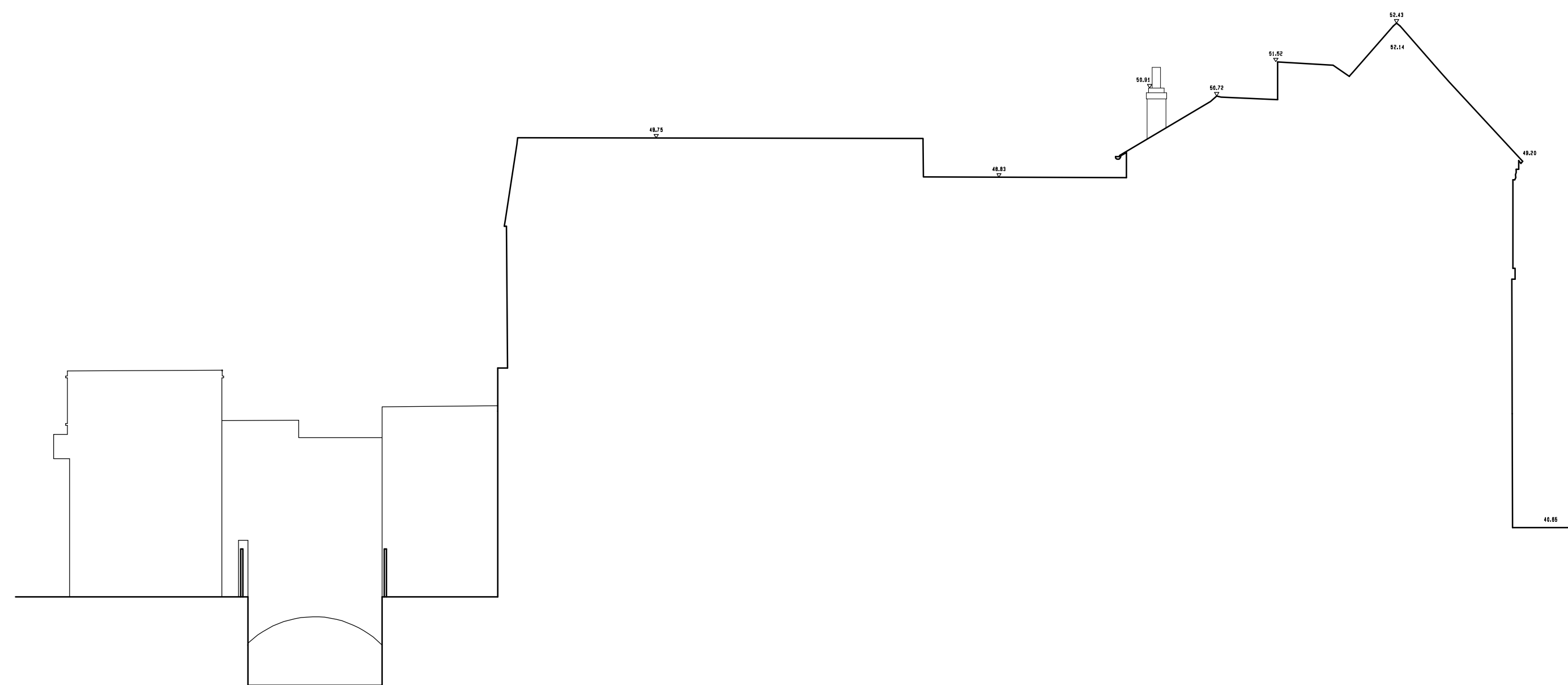
REAR ELEVATION C



GROUND FLOOR



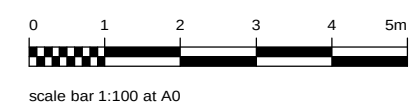
Elevation F



Elevation G



FRONT ELEVATION H



Issue Revision Date

alan brown design

TEL: 07535 642589 E-MAIL: alanbrown@hotmail.com

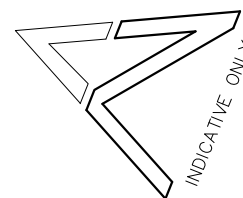
Project: NO 10 GUN STREET
READING

Title: EXISTING ELEVATIONS

Client: NO 10 GUN STREET

Date: MAY 15 Scale: 1:100 at A3 Drawn By:

Drawing No. 003 Rev. C



NUMBER 12

HOLY
BROOK

△ S6
39.144

THE ORACLE
CENTRE

Coordinate Table				
Station	Easings	Northings	Level	Description
S4	161.049	155.573	39.507	Nail
S5	147.853	210.408	38.881	Nail
S6	140.903	222.766	39.144	Nail
S7	143.569	205.695	38.856	Nail
S12	149.840	207.377	38.840	Nail
S13	133.974	210.607	39.598	Nail
06	159.516	200.082	38.949	Nail

Note

This survey data has been prepared for the client detailed below an agreed specification. Unless otherwise agreed in writing the liability of Metrix Surveys Ltd is limited to the client or his appointed agent and does not extend to use beyond the limitation of the specification.

Survey is based on an arbitrary grid.

All levels are related to Newlyn datum.
Located on No.1 Gun Street, NW corner W face, Reading.
QSRM value 41.58m.

All levels on kerb lines are channel levels unless noted otherwise

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Abbreviations (Where Applicable)

AL	Air Conditioning Unit
BP	Black Paving
Conc	Concrete
FWMH	Foul Water Manhole
SPL	Springing point level
TOW	Top of Wall
USB	Underside of beam level

Rev Suffix	Revision Details	Initial	Date

Surveyed by	
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LAND AND BUILDING SURVEYORS

26 St Wilfreds Cottages

Ansley Lane

Old Arley

Coventry

CV7 8FT

Tel: 01676 54111
Fax: 01676 54100

Fax: 01676 542132
Email: postbox@metrixsurveys.com

Website: www.metrixsurveys.com

Client:	
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PURPLE TURTLE
9 GUN STREET
READING
BERKSHIRE
RG1 2JR

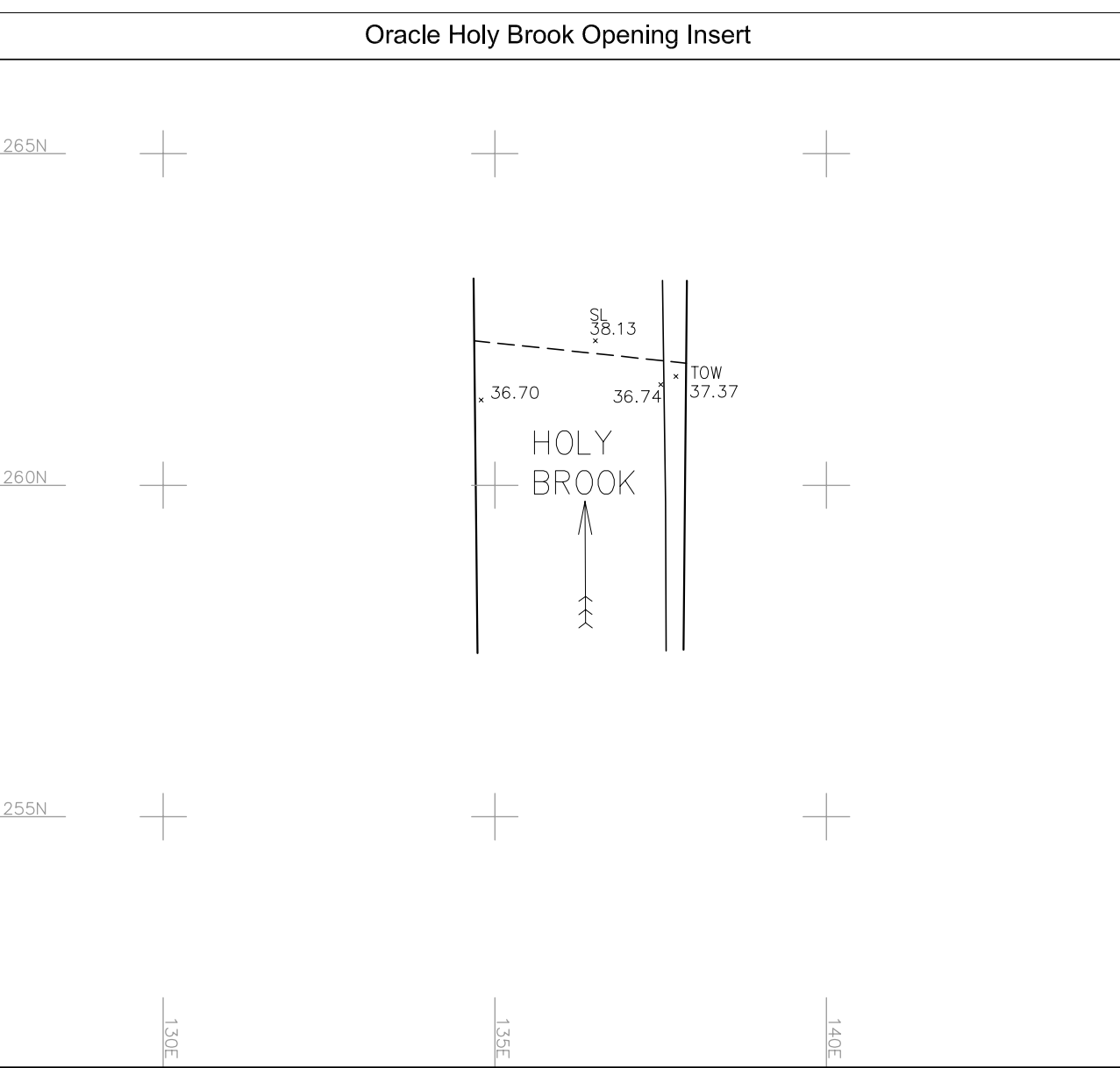
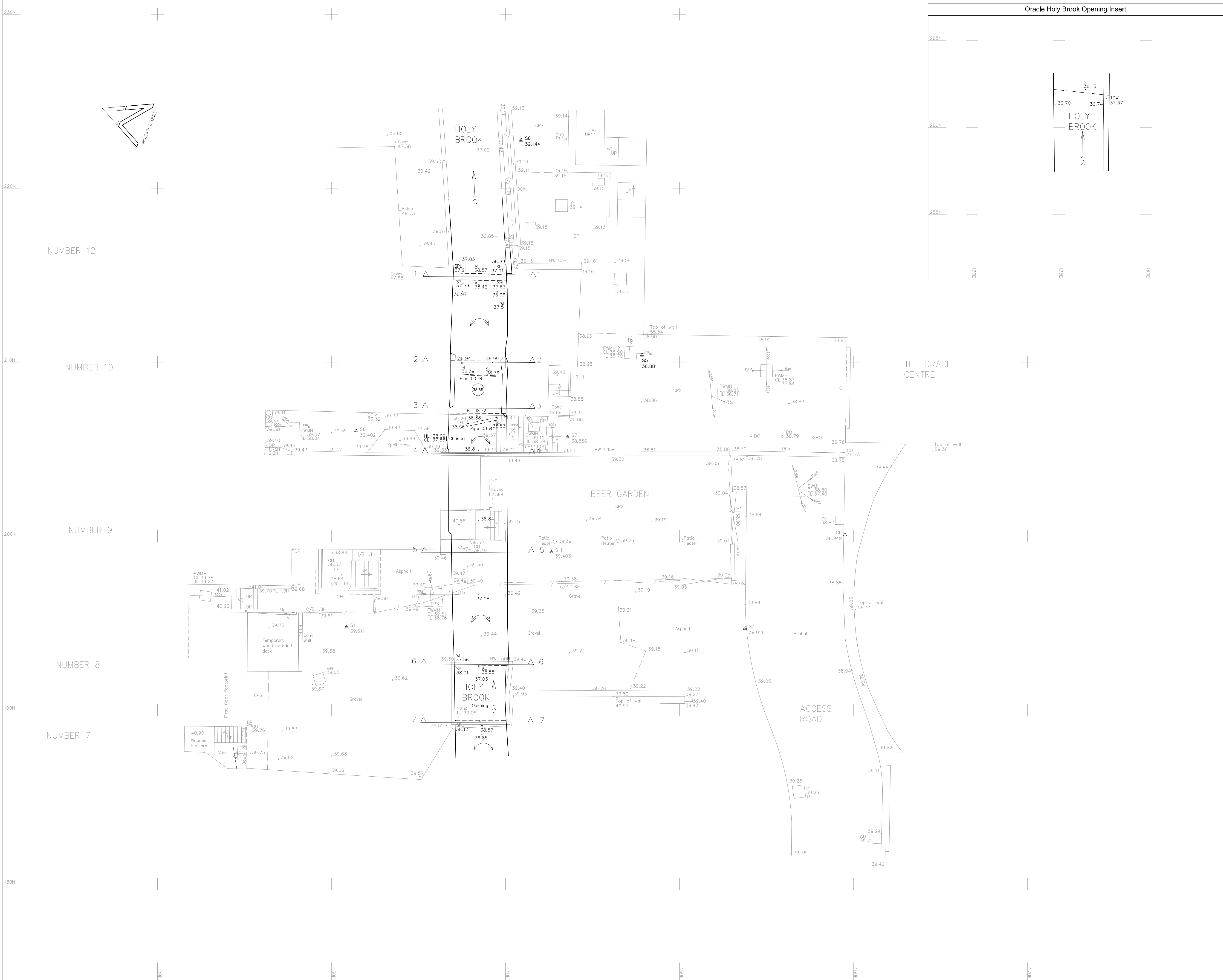
Job Title:

SURVEY AT
NO. 10 GUN STEET
READING

Drawing Title:

POST DEMOLITION TOPOGRAPHIC SURVEY

Drawing No: 10059T/100			Rev Suffix:
Drawn: PB	Checked: DR	Scale: 1:50	Date: SEPTEMBER 20
Job No: 10059T		Sheet: 1 of 1	Sheet Size: A1



Coordinate Table				
Station	Eastings	Northings	Level	Description
S1	100.000	200.000	40.865	Nail
S2	99.446	208.896	40.871	Nail
S3	153.771	194.698	39.011	Nail
S4	181.049	155.573	39.507	Nail
S5	147.853	210.408	38.881	Nail
S6	140.903	222.766	39.144	Nail
S7	143.569	205.695	38.856	Nail
S8	131.415	206.041	39.402	Peg
S9	100.124	146.131	41.854	Nail
S10	130.858	194.772	39.611	Nail
S11	142.636	199.091	39.403	Nail
G6	159.516	200.082	38.949	Nail

Note

This Survey data has been prepared for the client detailed below to an agreed specification and does not extend to use beyond the limitations of the specification.

Survey is based on an arbitrary grid.

All levels are related to Newlyn datum.
Located on No 1 Gun Street, NW corner W face, Reading.
OSBM value 41.58m.

River survey overlayed onto drawing B4014-100A.

Abbreviations (Where Applicable)	
AL	Arch Level
BL	Beam Soffit Level
CL	Cill Level
HL	Head Level
SL	Soffit Level
SPL	Springing Point Level
TOW	Top of Wall
WL	Water Level
(1.90)	Ceiling Level

Rev Suffix	Revision Details	Initial	Date

Surveyed by

MATRIX SURVEYS
LAND AND BUILDING SURVEYORS

26 St Wilfreds Cottages
Ansley Lane
Old Arley
Coventry
CV7 8FT
Tel: 01676 541157
Email: postbox@metrixsurveys.com
Website: www.metrixsurveys.com

Client:

PURPLE TURTLE
9 GUN STREET
READING
BERKSHIRE
RG1 2JR

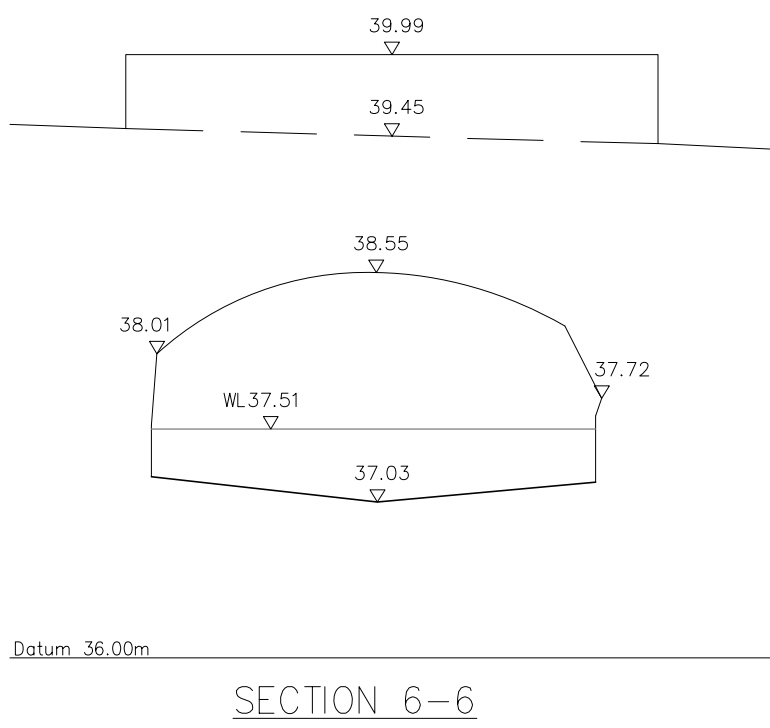
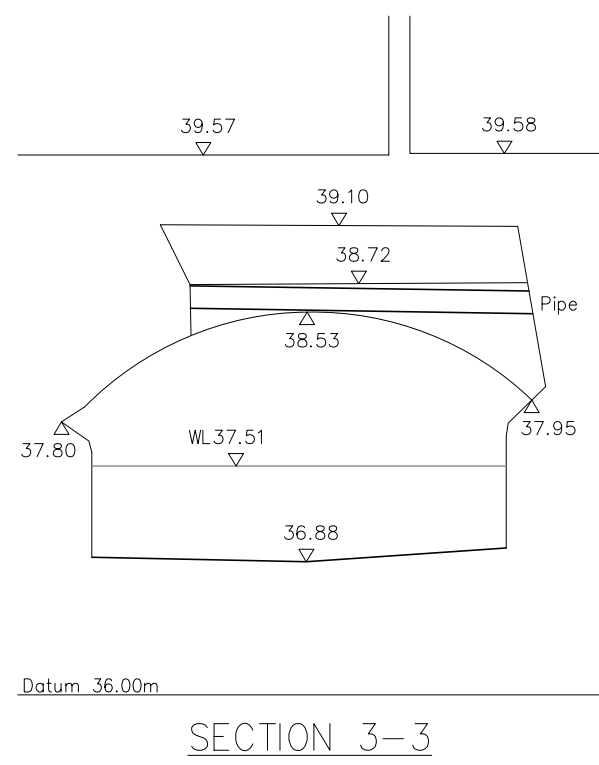
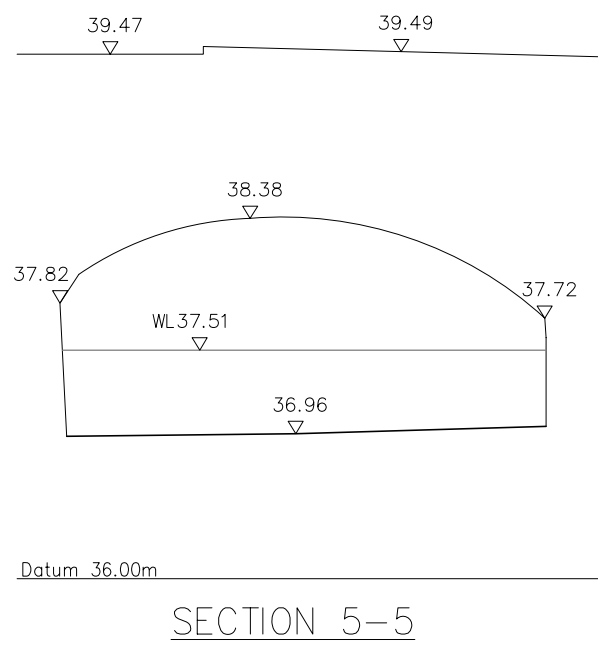
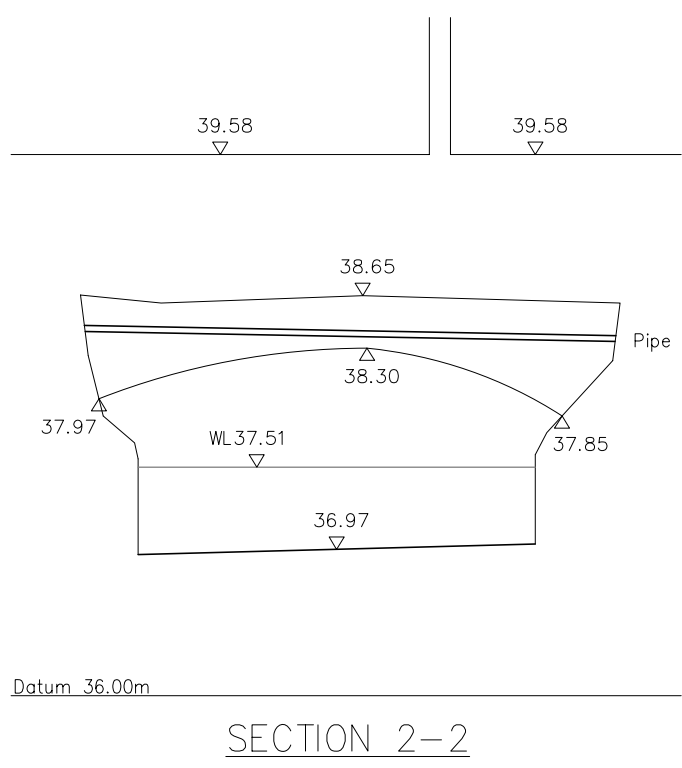
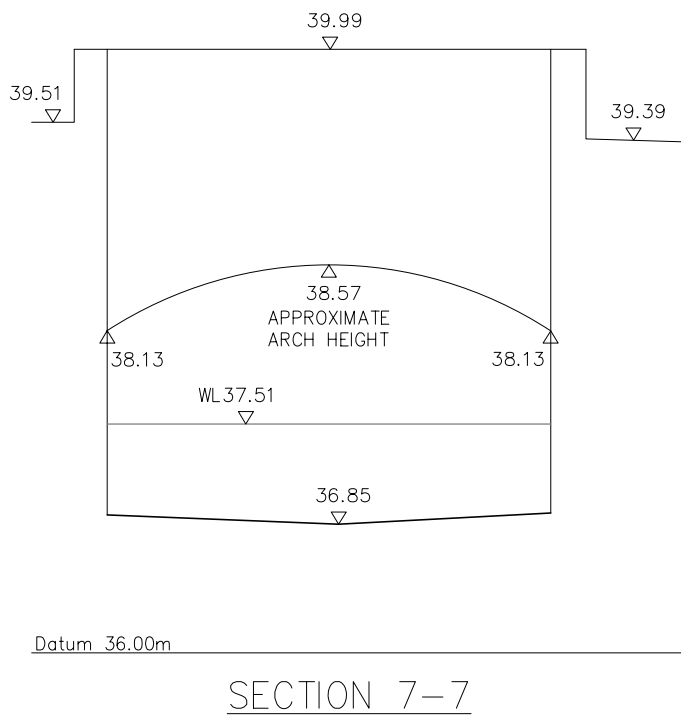
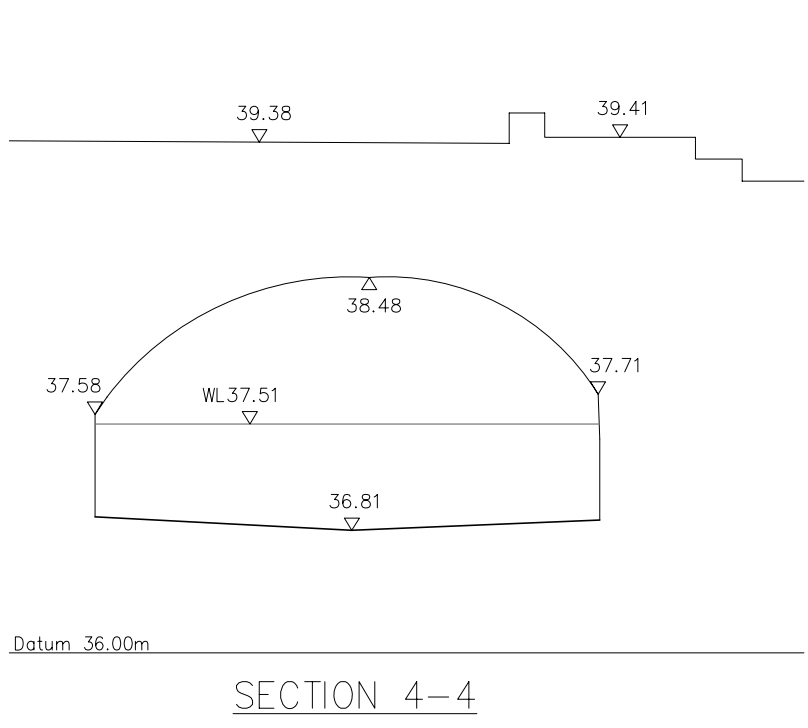
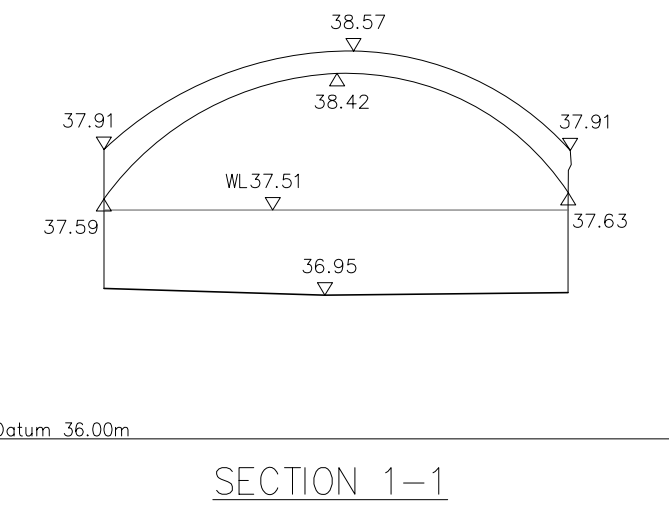
Job Title:

**SURVEY
OF
7, 8, 9 & 1 GUN ST, READING**

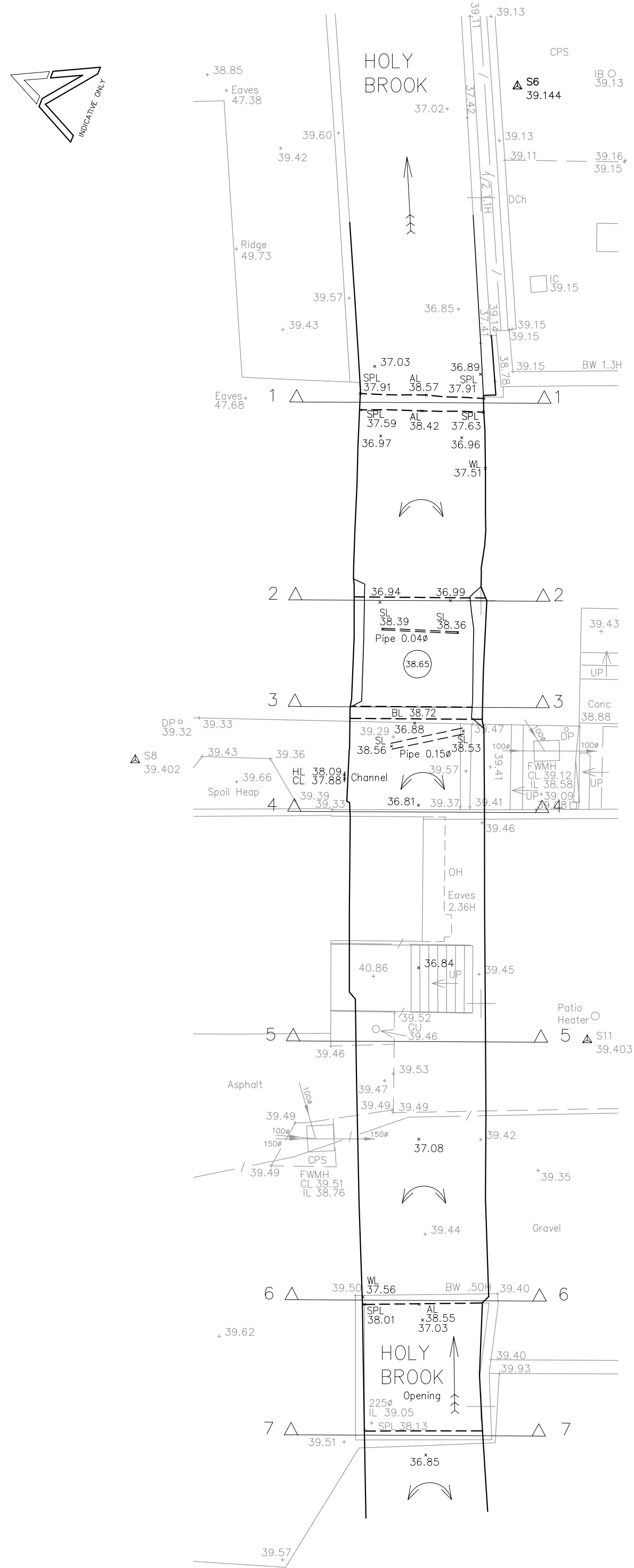
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**HOLY BROOK
UNDERGROUND RIVER SURVEY**

Drawing No:		Rev Suffix:	
B4014/113			
Drawn:	Checked:	Scale:	Date:
PB	DR	1:100	MARCH 2008
Job No:		Sheet:	Sheet Size:
B4014		1 of 1	A1



Location Plan (1:100)



Coordinate Table				
Station	Eastings	Northings	Level	Description
S1	100.000	200.000	40.865	Nail
S2	99.446	208.896	40.871	Nail
S3	153.771	194.698	39.011	Nail
S4	181.049	155.573	39.507	Nail
S5	147.853	210.408	38.881	Nail
S6	140.903	222.766	39.144	Nail
S7	143.569	205.695	38.856	Nail
S8	131.415	206.041	39.402	Peg
S9	100.124	146.131	41.854	Nail
S10	130.858	194.772	39.611	Nail
S11	142.636	199.091	39.403	Nail
G6	159.516	200.082	38.949	Nail

Note

This Survey data has been prepared for the client detailed below to an agreed specification and does not extend to use beyond the limitations of the specification.

Survey is based on an arbitrary grid.

All levels are related to Newlyn datum.
Located on No 1 Gun Street, NW corner W face, Reading.
OSBM value 41.58m.

River survey overlayed onto drawing B4014-100A.

Abbreviations (Where Applicable)

AL	Arch Level
BL	Beam Soffit Level
CL	Cill Level
HL	Head Level
SL	Soffit Level
SPL	Springing Point Level
TOW	Top of Wall
WL	Water Level
(1.90)	Ceiling Level

Rev Suffix	Revision Details	Initial	Date

Surveyed by

MATRIX SURVEYS
LAND AND BUILDING SURVEYORS

26 St Wilfreds Cottages
Ansley Lane
Old Arley
Coventry
CV7 8FT
Tel: 01676 541157
Email: postbox@metrixsurveys.com
Website: www.metrixsurveys.com

Client:

PURPLE TURTLE
9 GUN STREET
READING
BERKSHIRE
RG1 2JR

Job Title:

SURVEY
OF
7, 8, 9 & 1 GUN ST, READING

Drawing Title:

HOLY BROOK
SECTIONS

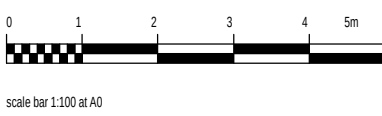
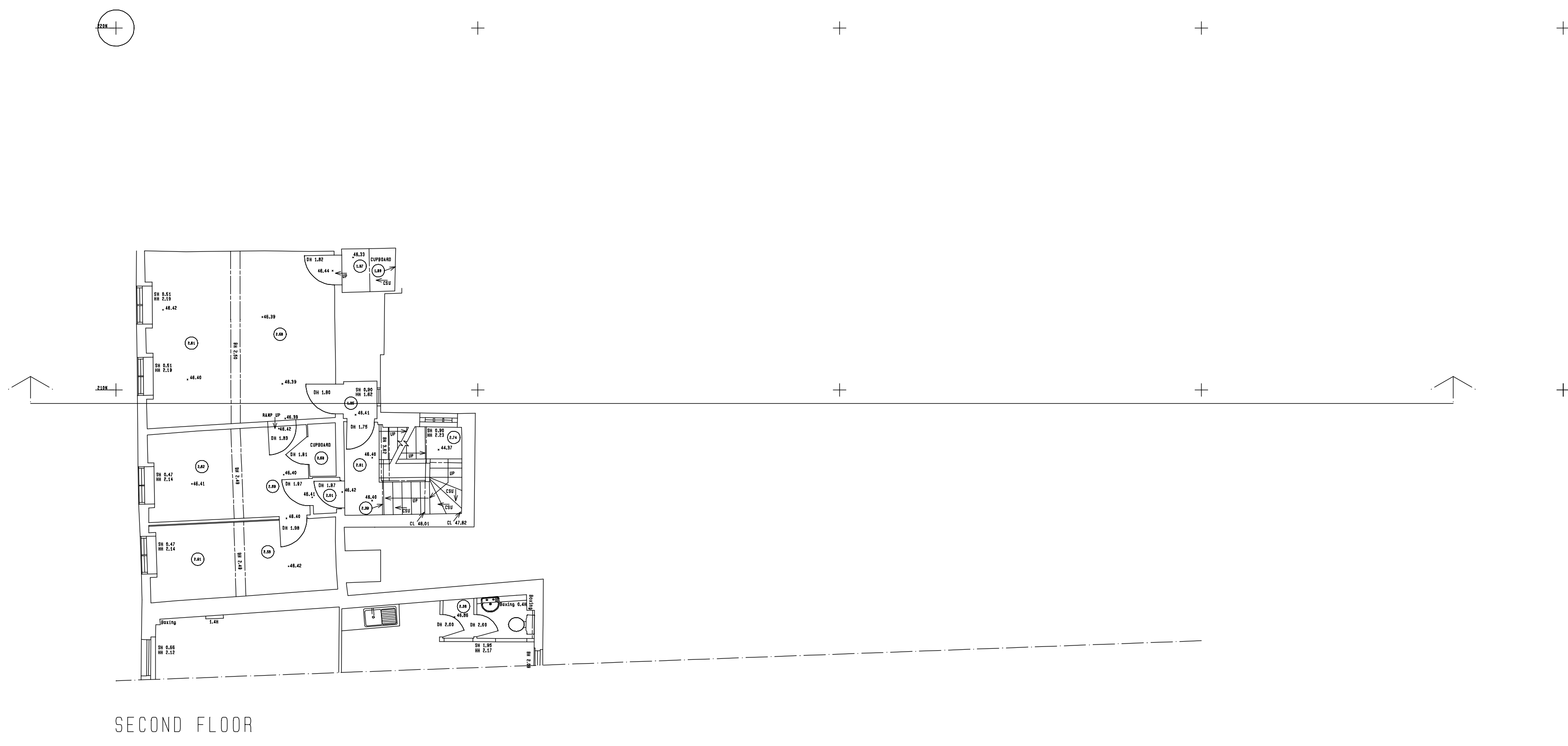
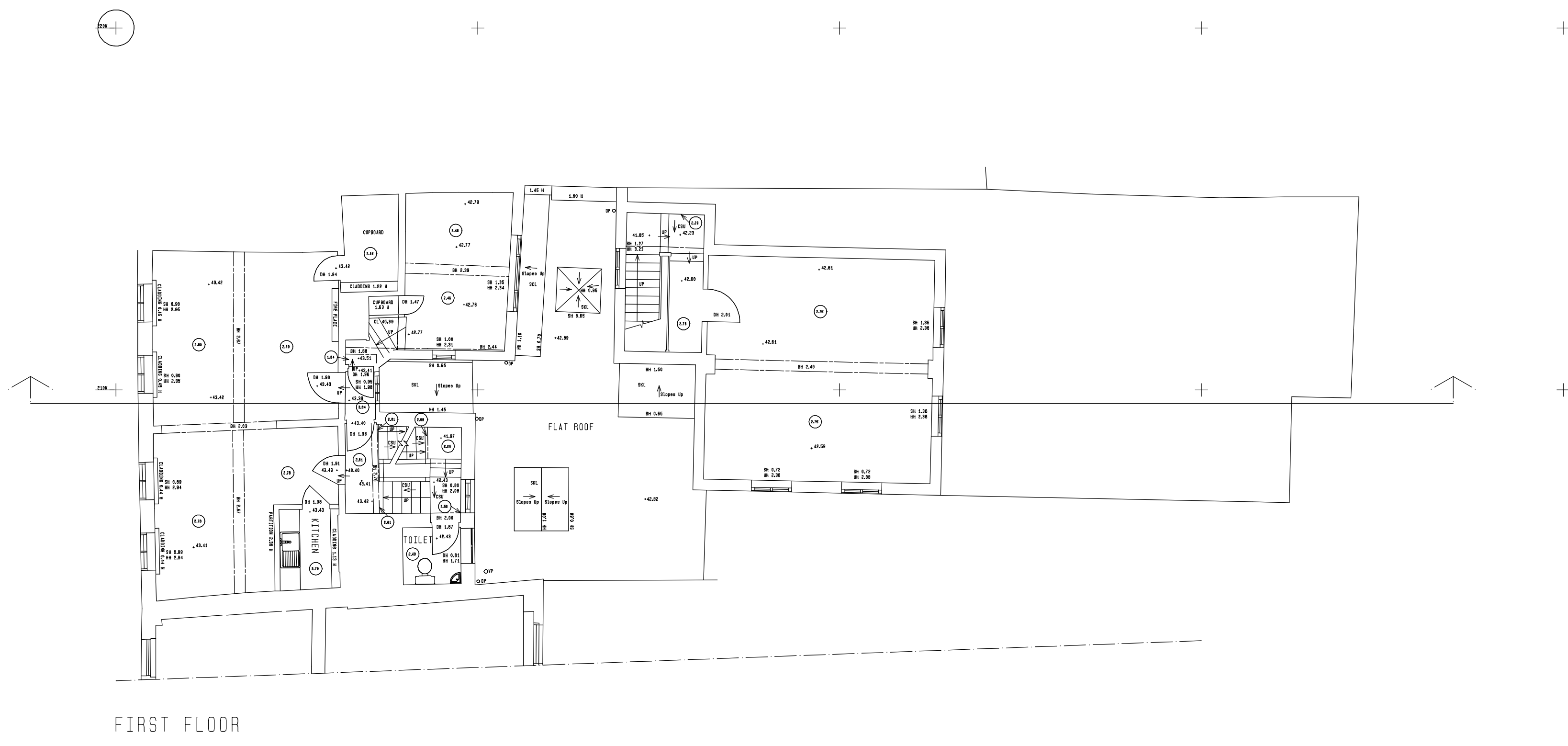
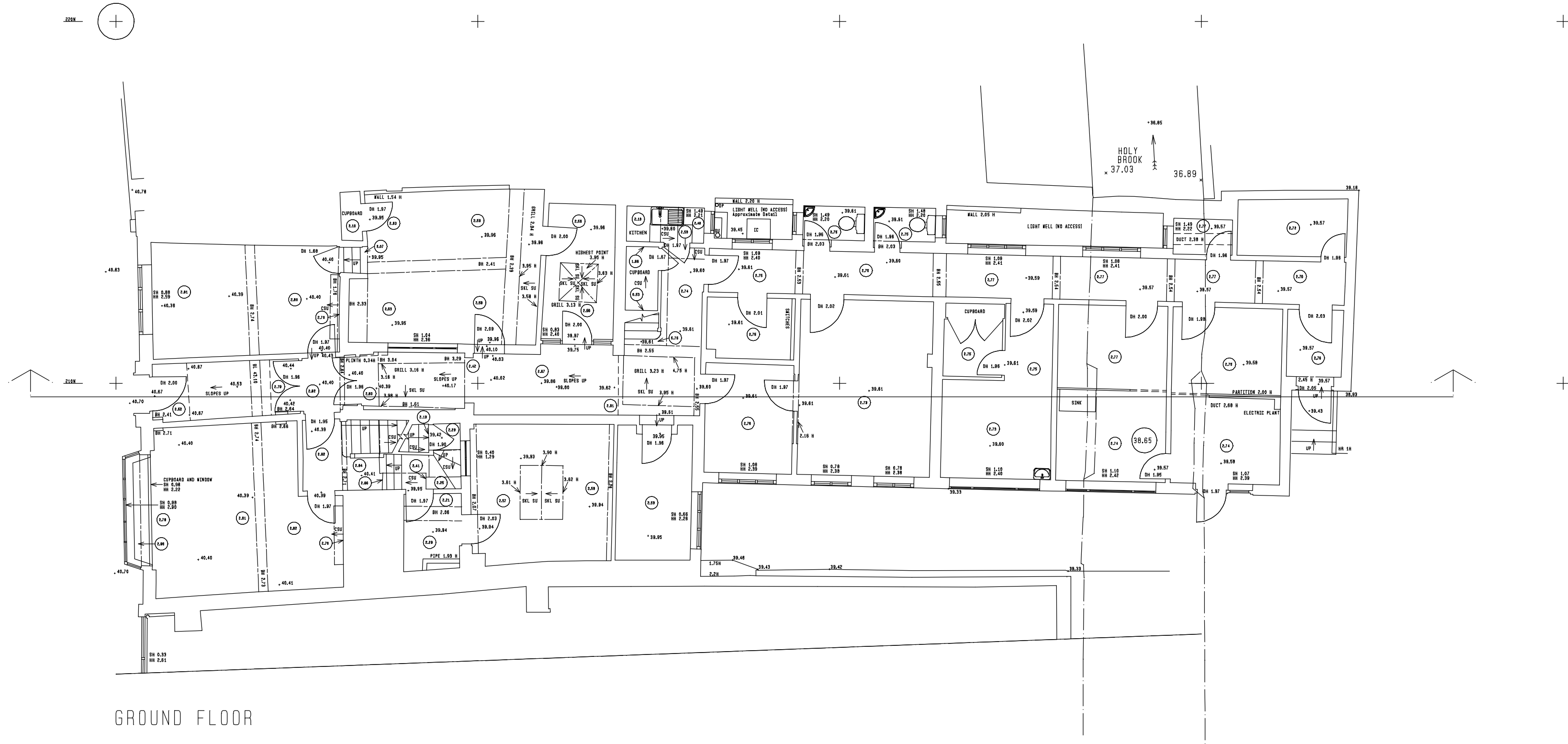
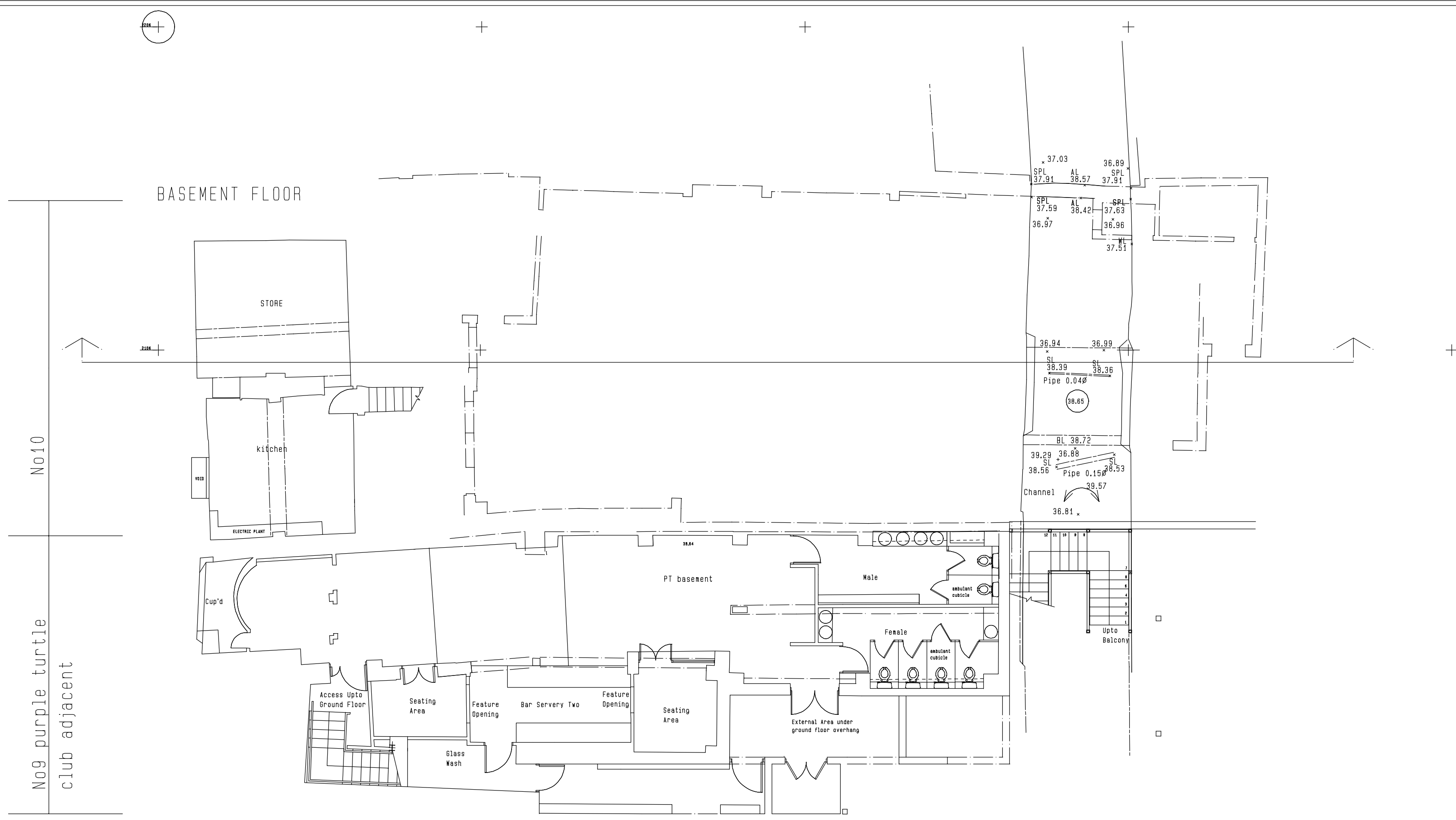
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Appendix C Development Proposals

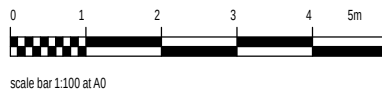
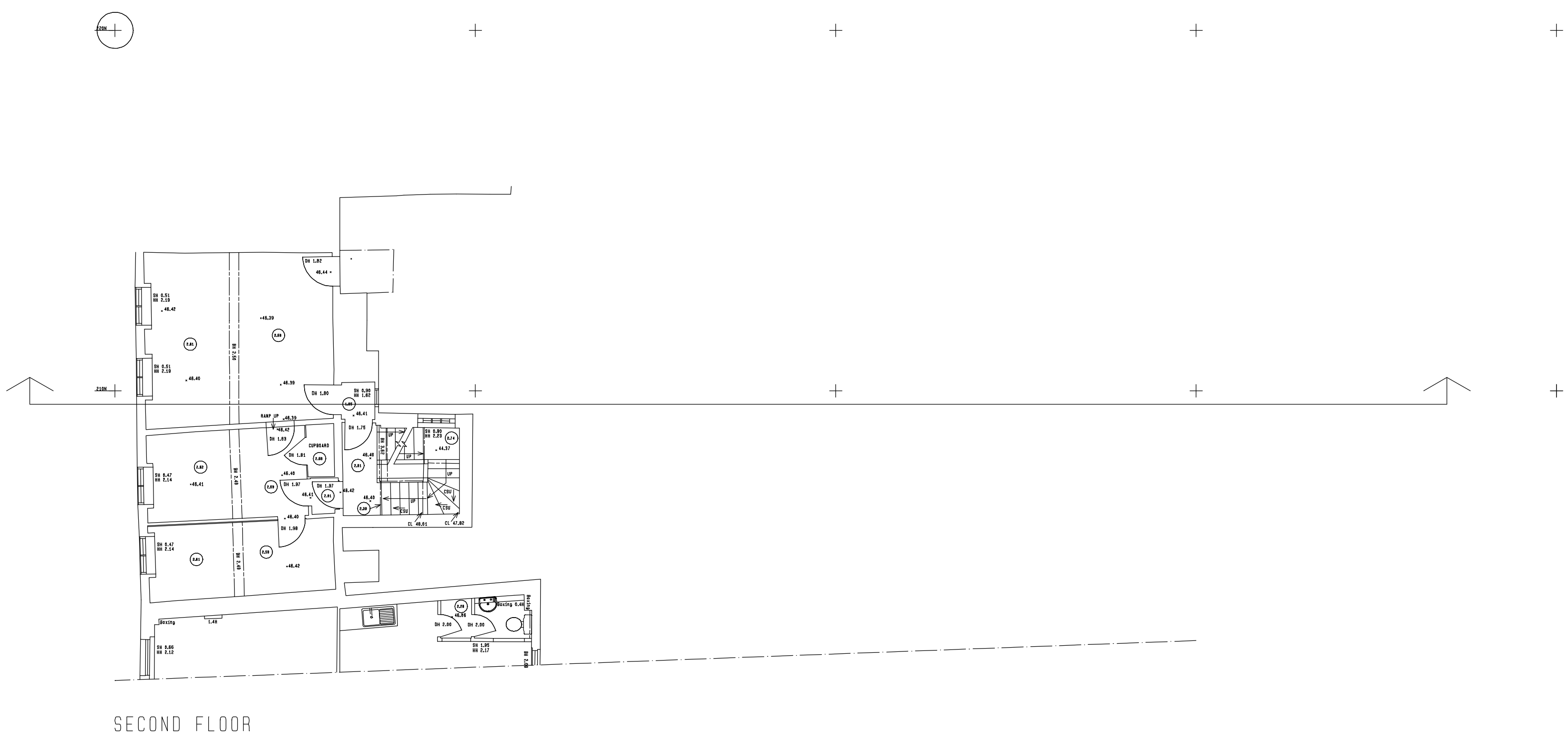
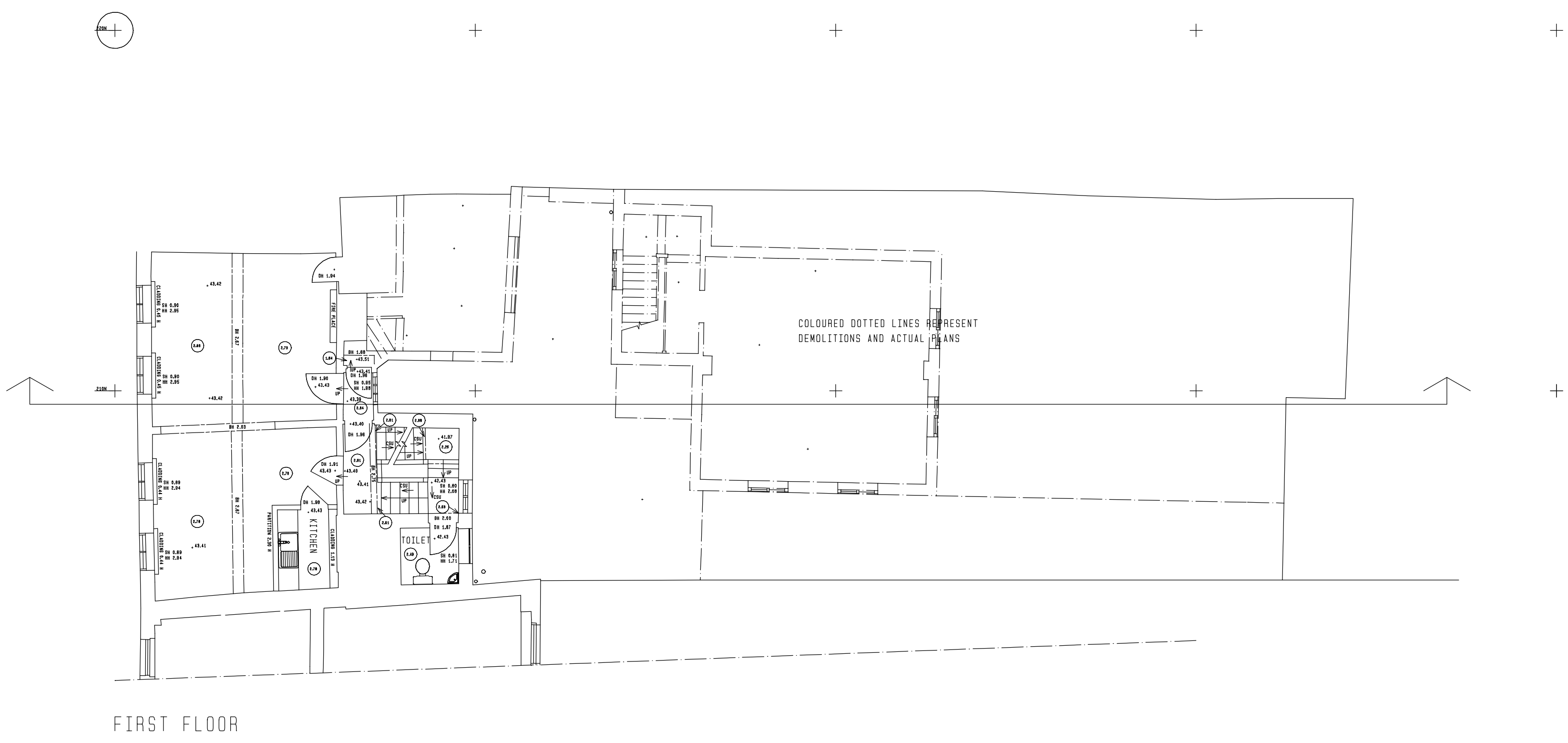
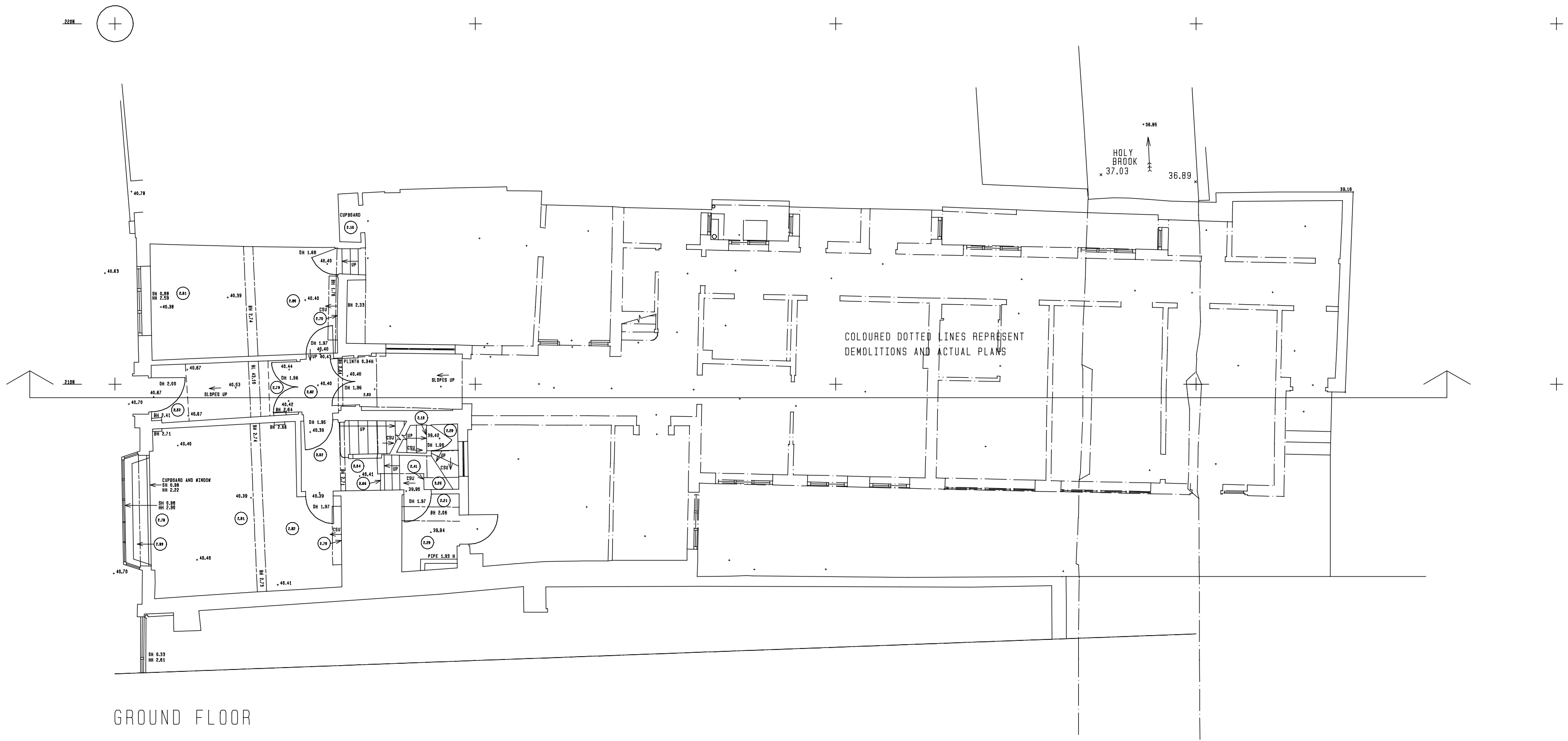
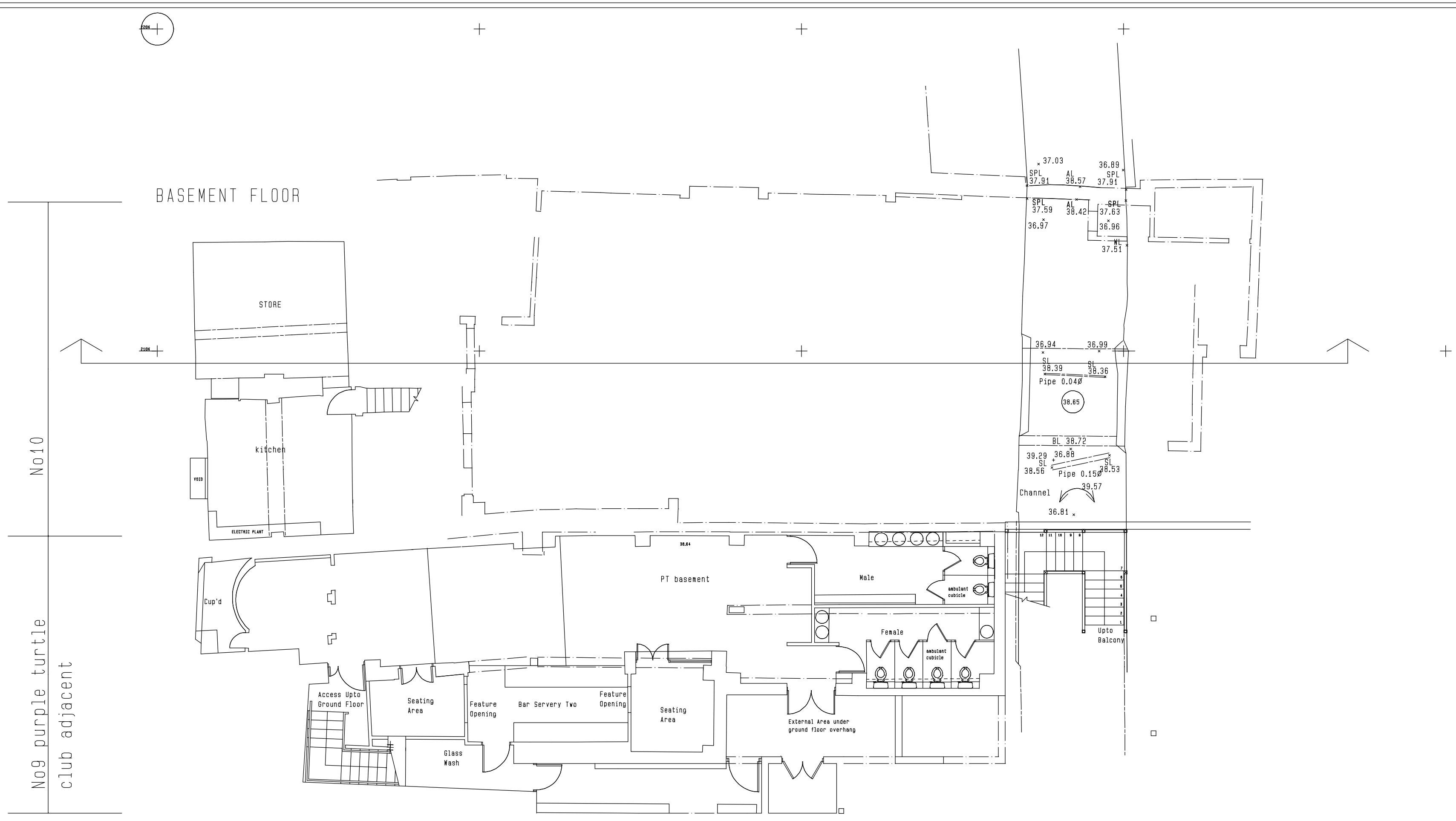
Alan Brown Associates
All pre-fixed 1114/

- 201 Existing Plans – Pre-demolition
- 201 Existing Plans – With demolition
- 202 Proposed Plan
- 203 Existing Elevations – Pre-demolition
- 203 Existing Elevations – With demolition
- 204 Proposed Elevations and Sections
- 205 Existing Site Plan
- 206 Proposed Site Plan

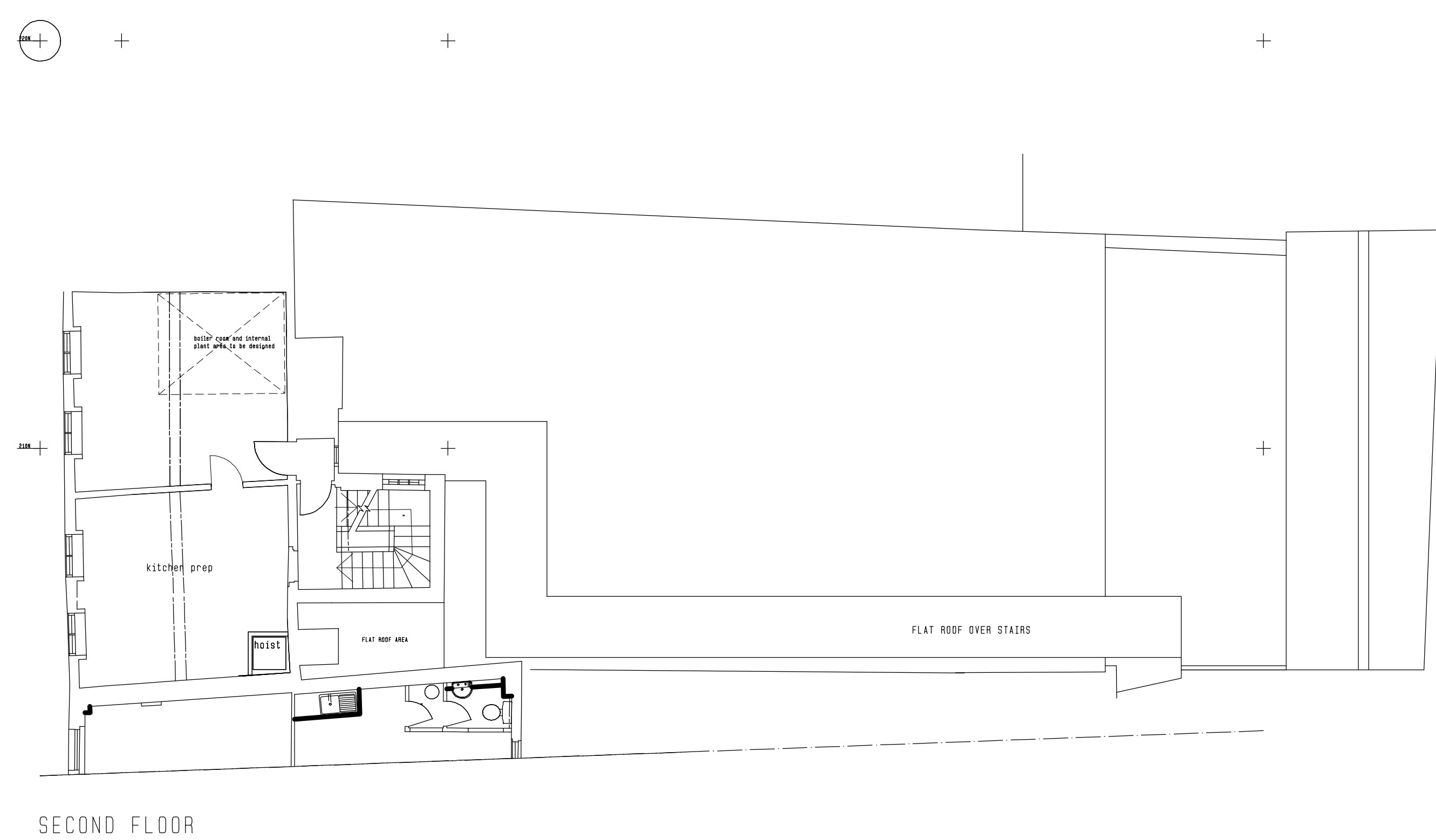
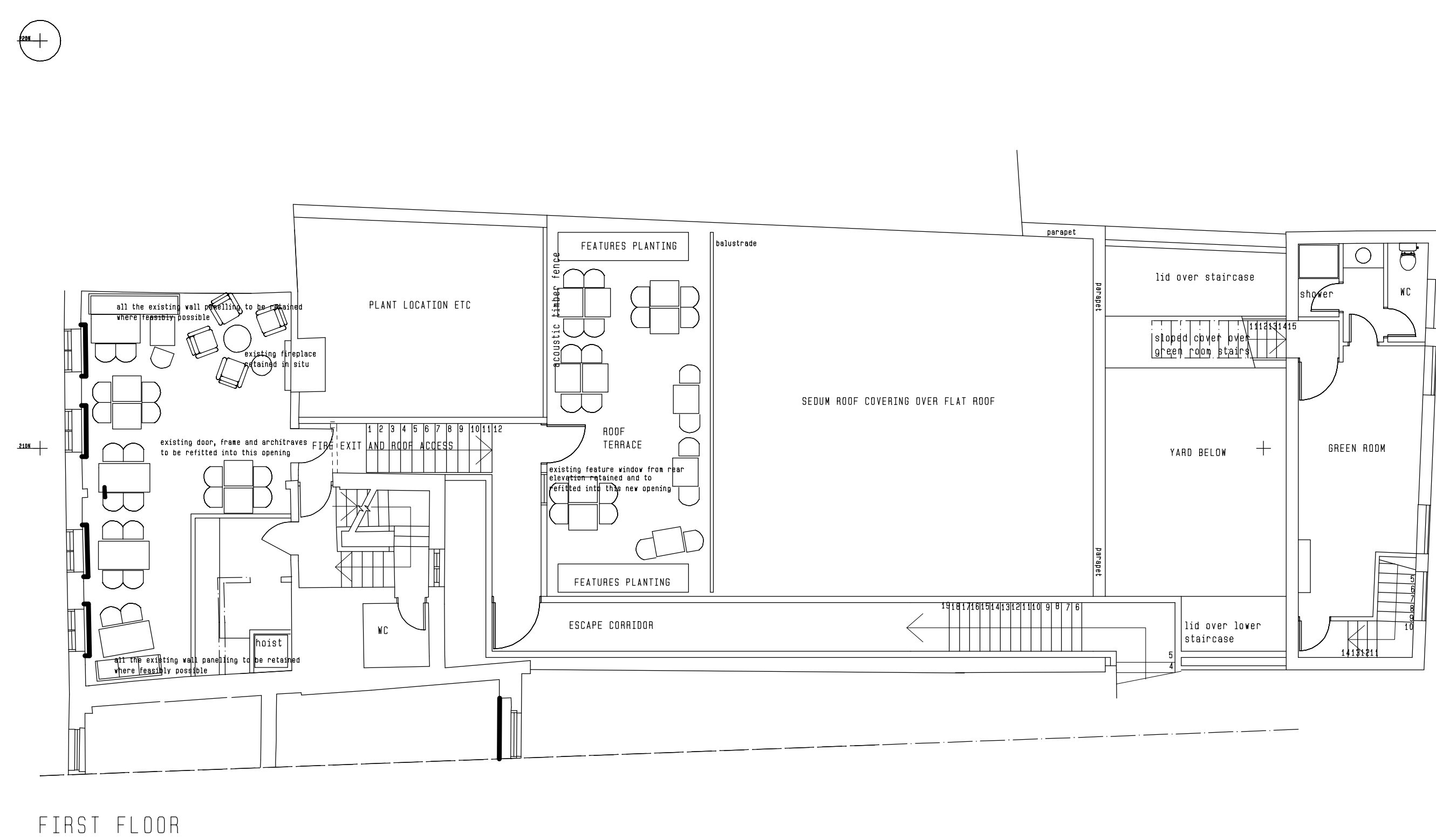
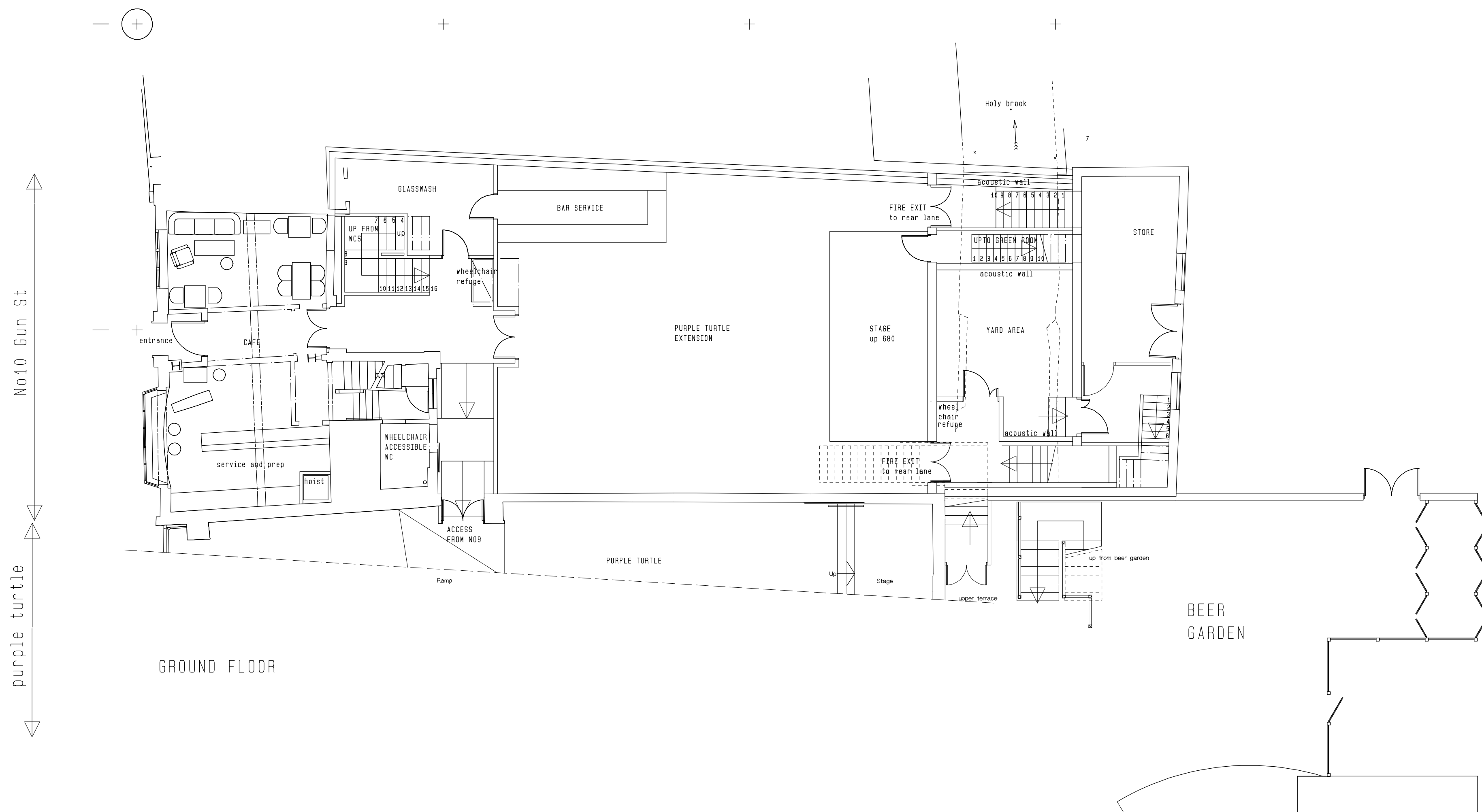
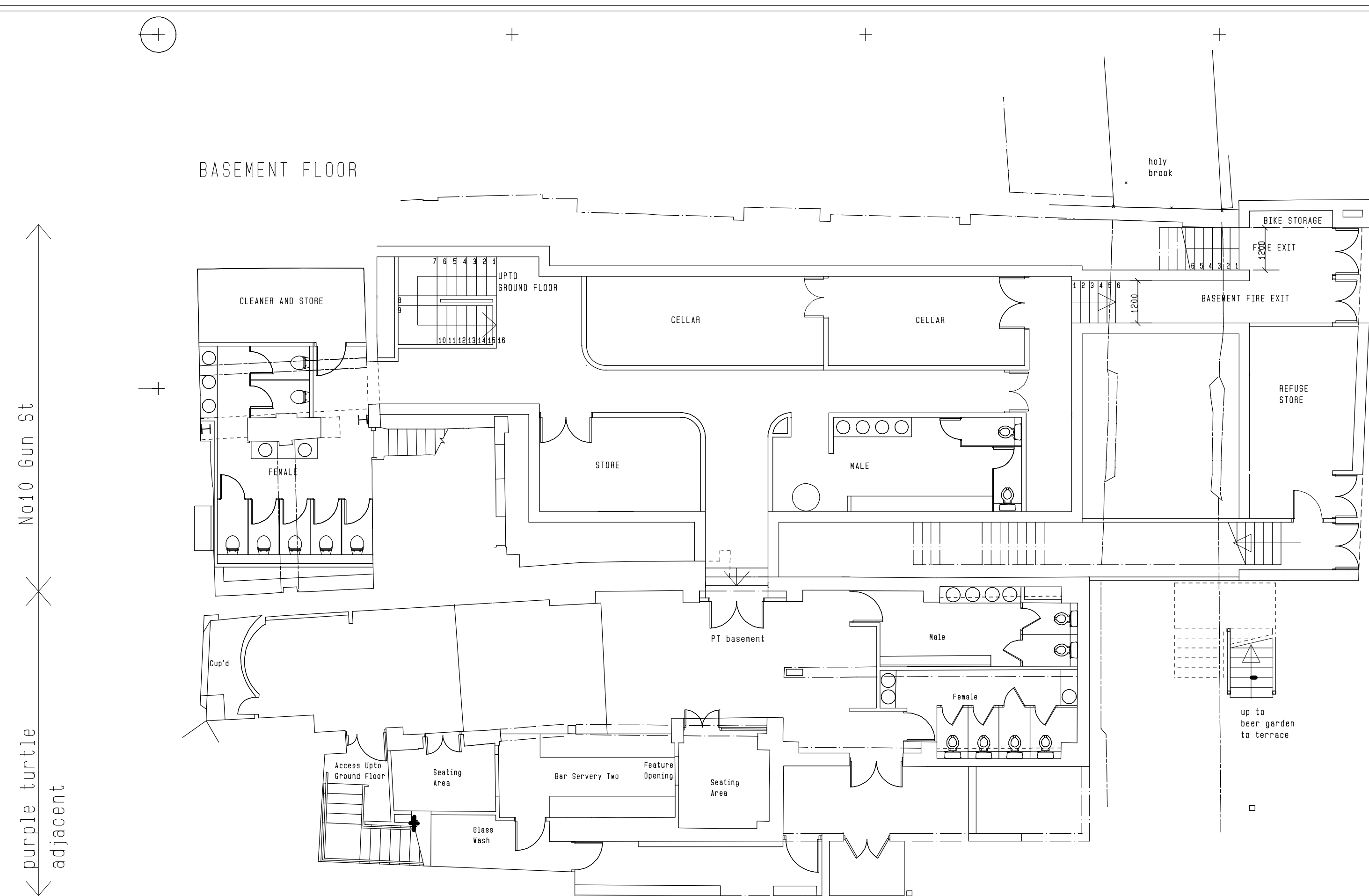
ALL DEMOLITIONS TO BE CARRIED OUT BEFORE ANY WORK COMMENCES
ANY DISCREPANCIES TO BE REPORTED TO THE SUPERVISING OFFICER



Issue Revision Date		
alan brown design		
TEL: 07535 642589 E-MAIL: alambrown@hotmail.com		
Project: No 10 Gun street reading		
Title: Existing Plans pre demolition		
Client: No 10 Gun street		
Date: Aug 2022	Scale: 1:100 at A0	Drawn By:
Drawing No. 201 - 1114	Rev. -	



Issue	Revision	Date
alan brown design		
TEL: 07595 642589 E-MAIL: alambrown@hotmail.com		
Project: No 10 Gun street reading		
Title: Existing Plans with demolitions		
Client: No 10 Gun street		
Date	Scale	Drawn By
aug 2022	1:100 at A0	
Drawing No.	201 - 1114	Rev.



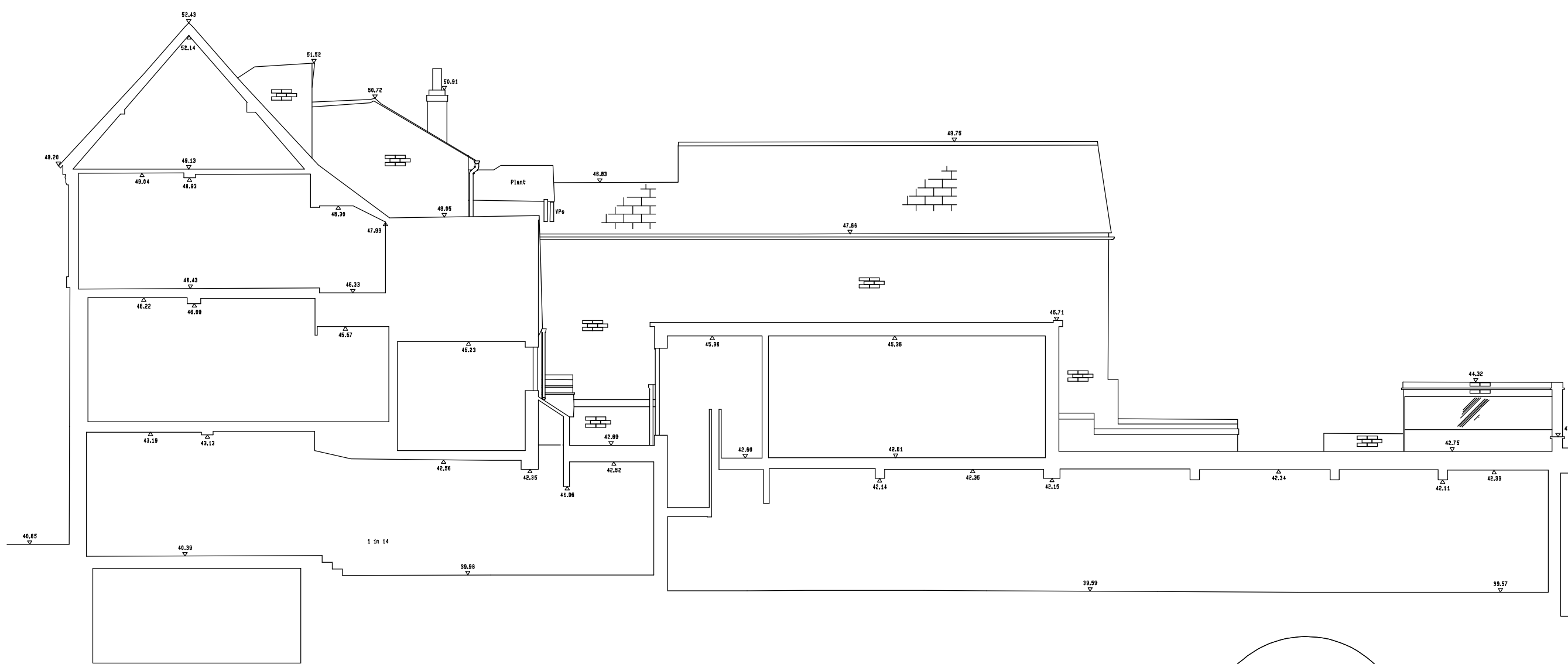
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alan brown design		
TEL: 07535 642589 E-MAIL: alanbrown@hotmail.com		
Project: No 10 Gun street reading		
Title: Proposed Plans		
Client: No 10 gun street		
Date	Scale	Drawn By
aug 22	1:100 at A0	
Drawing No.	02 - 1114	Rev. 8

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ANY DISCREPANCIES TO BE REPORTED TO THE SUPERVISING OFFICER

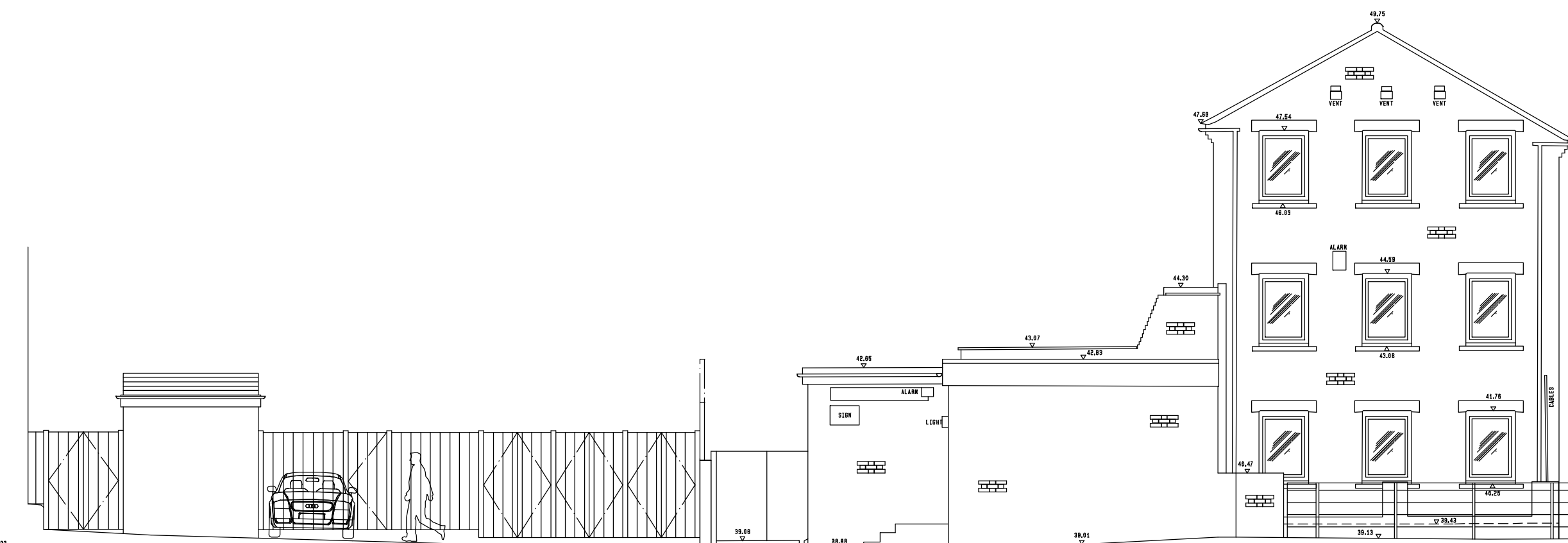


adjacent property no 9 gun street no 10 gun street adjacent property

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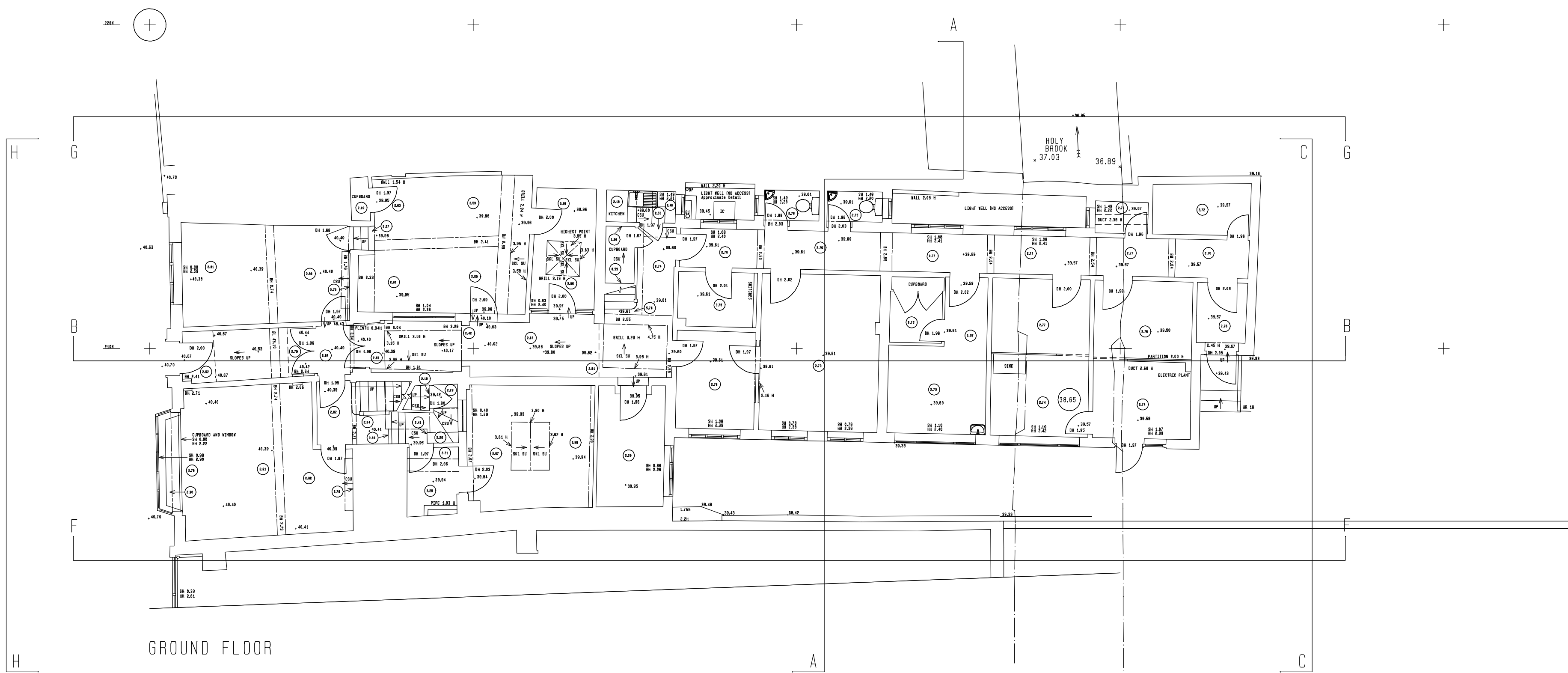


SECTION/ELEVATION B



adjacent property no 9 gun street no 10 gun street adjacent property

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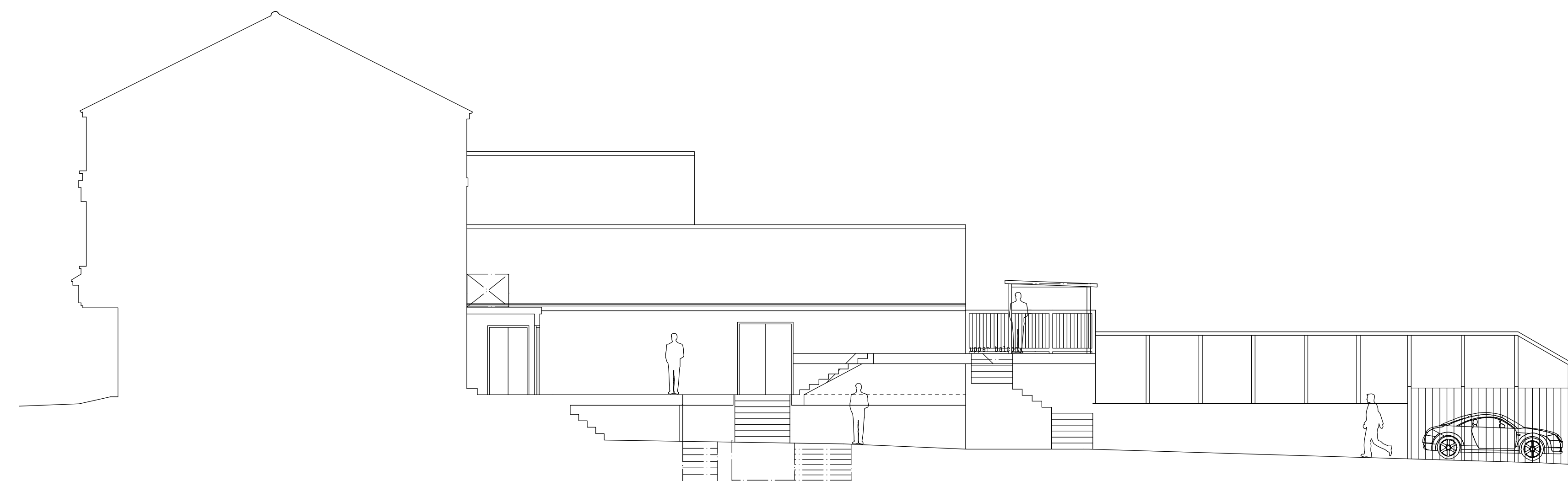


GROUND FLOOR

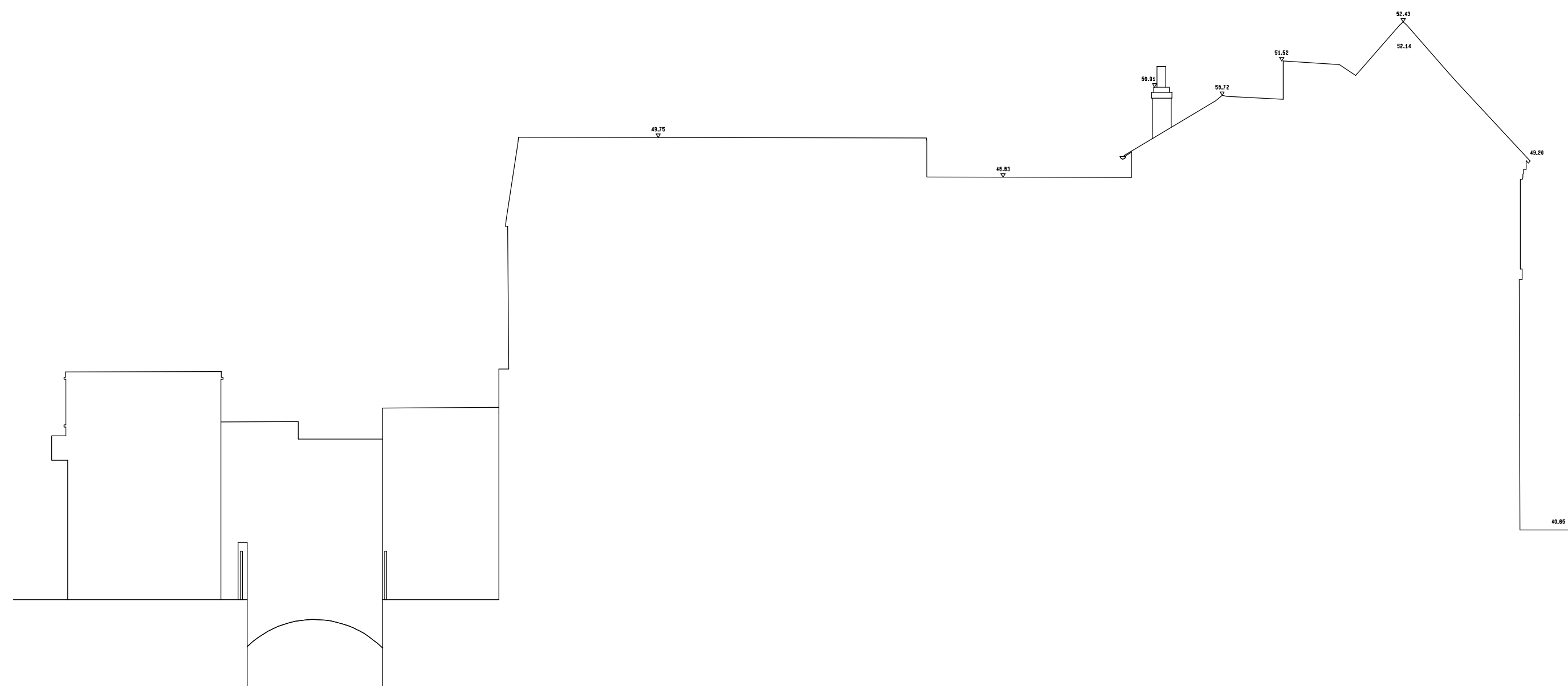


no 10 gun street no9 gun street adjacent property

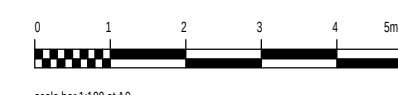
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Elevation F



Elevation G

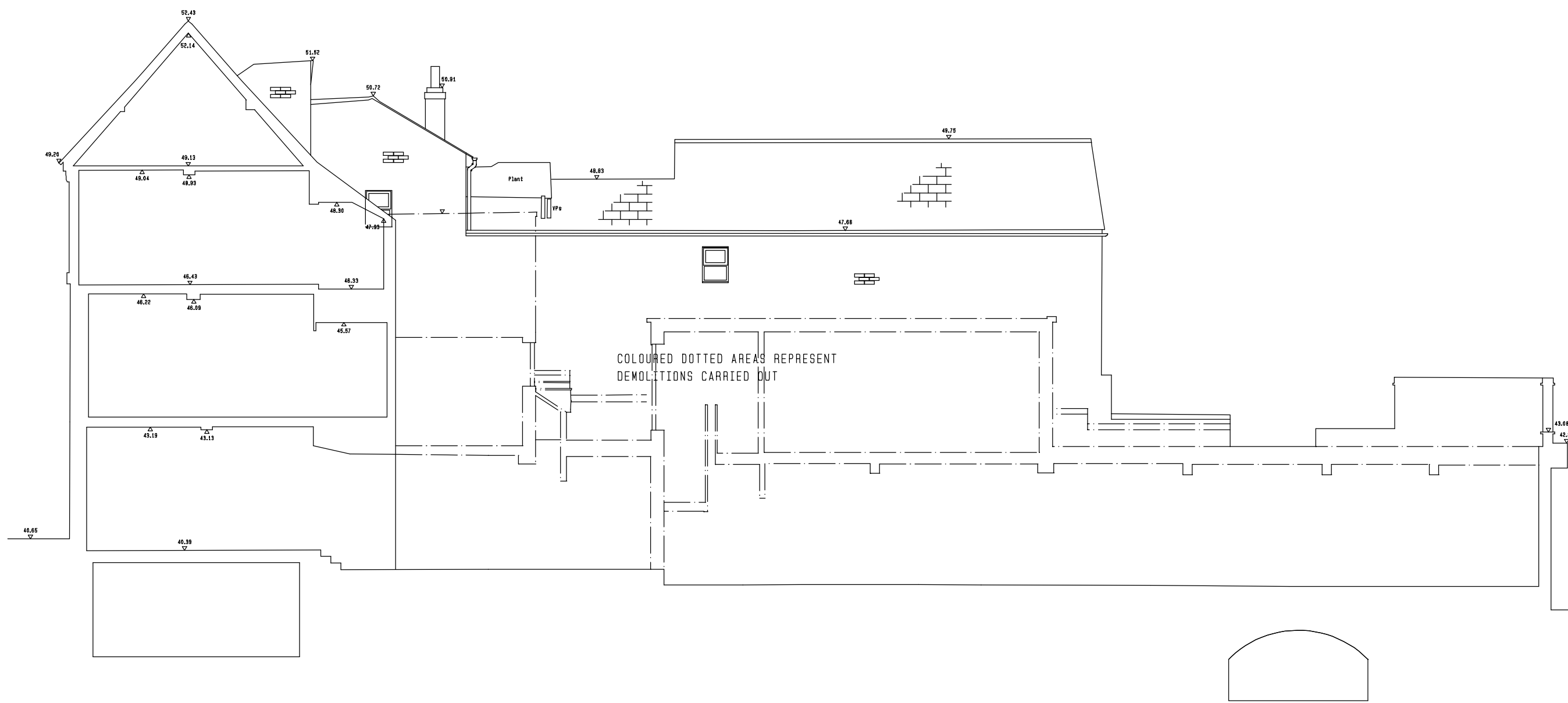


Issue	Revision	Date
alan brown design		
TEL: 07535 642589 E-MAIL: alanbrown@hotmail.com		
Project: NO 10 GUN STREET READING		
Title: EXISTING ELEVATIONS PRE DEMOLITION		
Client: NO10 GUN STREET		
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Drawn By		
Drawing No.	203 - 1114	Rev. .

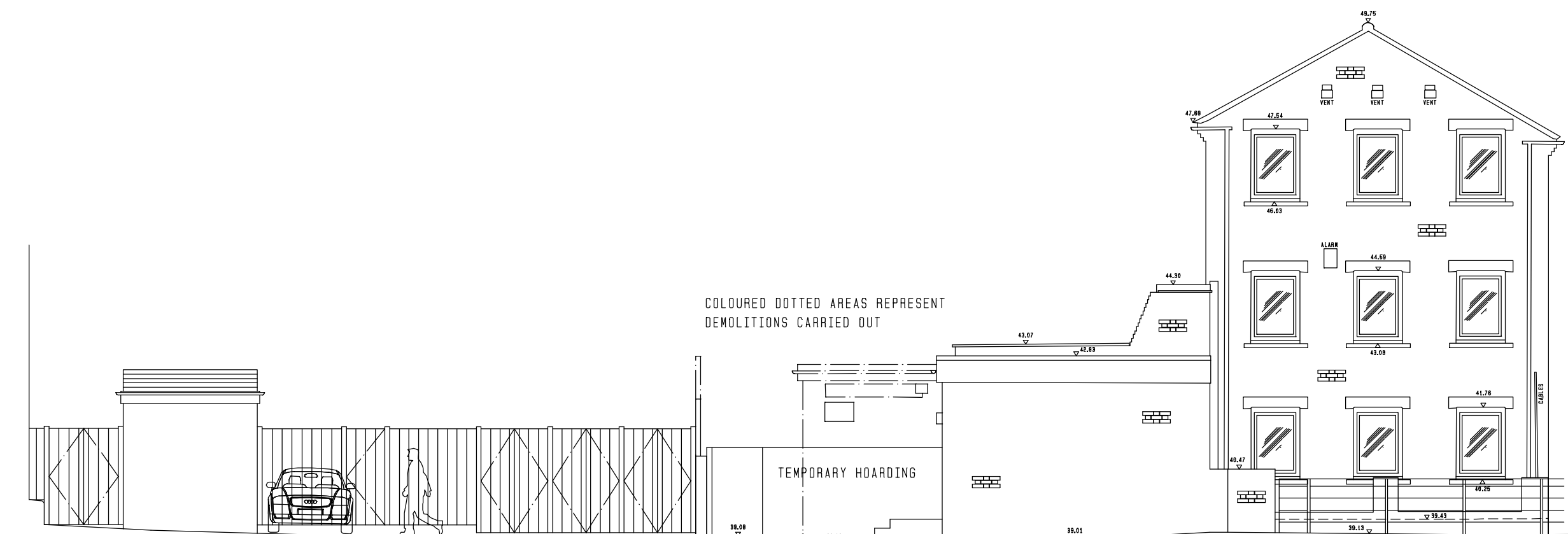


adjacent property no 9 gun street no 10 gun street adjacent property

REAR ELEVATION A

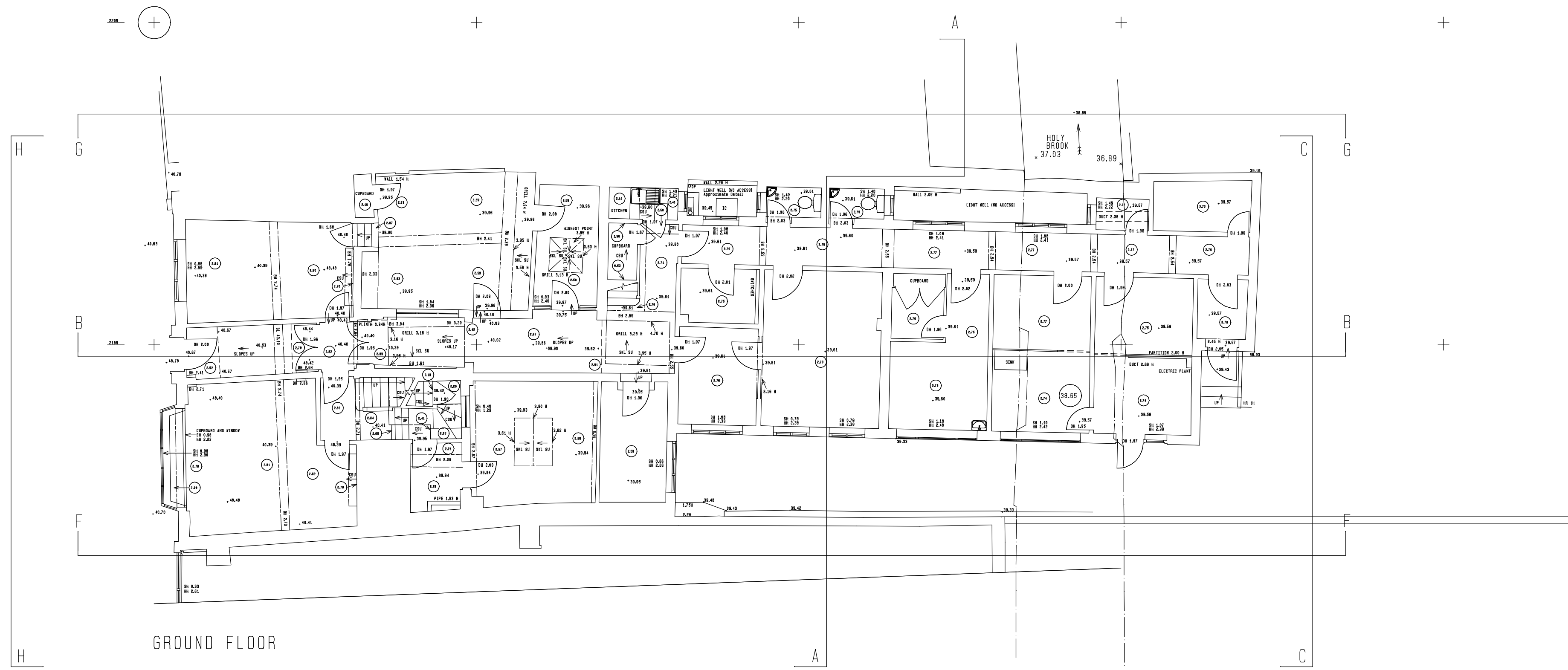


SECTION/ELEVATION B



adjacent property no 9 gun street no 10 gun street adjacent property

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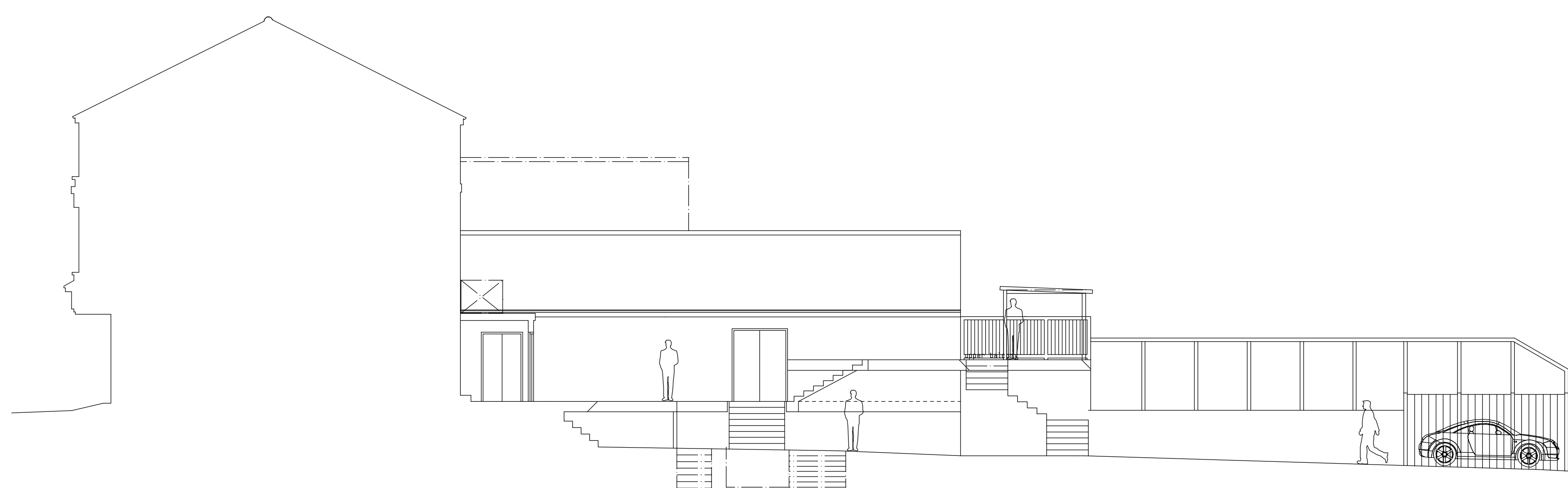


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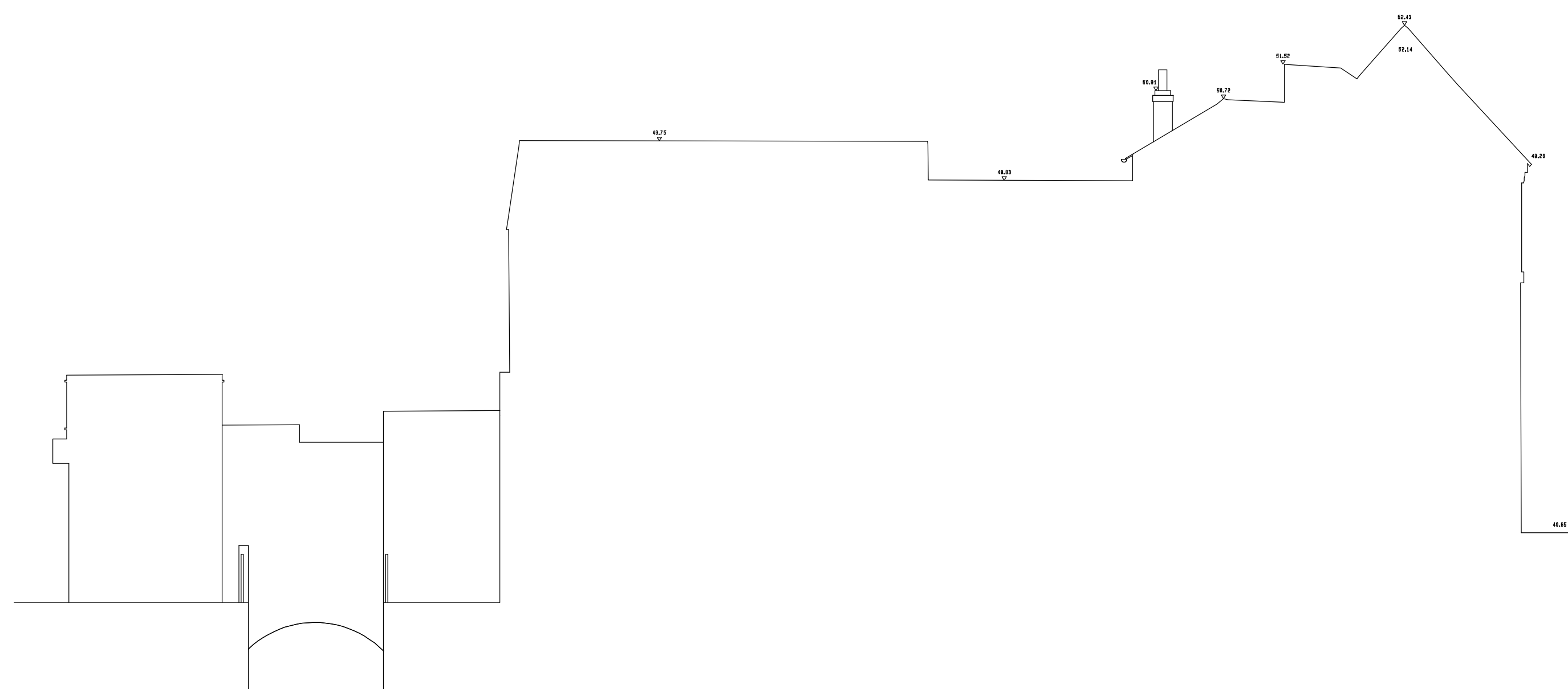


no 10 gun street no 9 gun street adjacent property

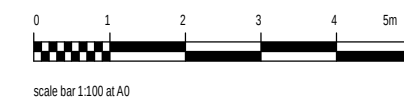
FRONT ELEVATION H



Elevation F



Elevation G



Issue	Revision	Date
-------	----------	------

alan brown design

TEL: 07535 642589 E-MAIL: alanhbrown@hotmail.com

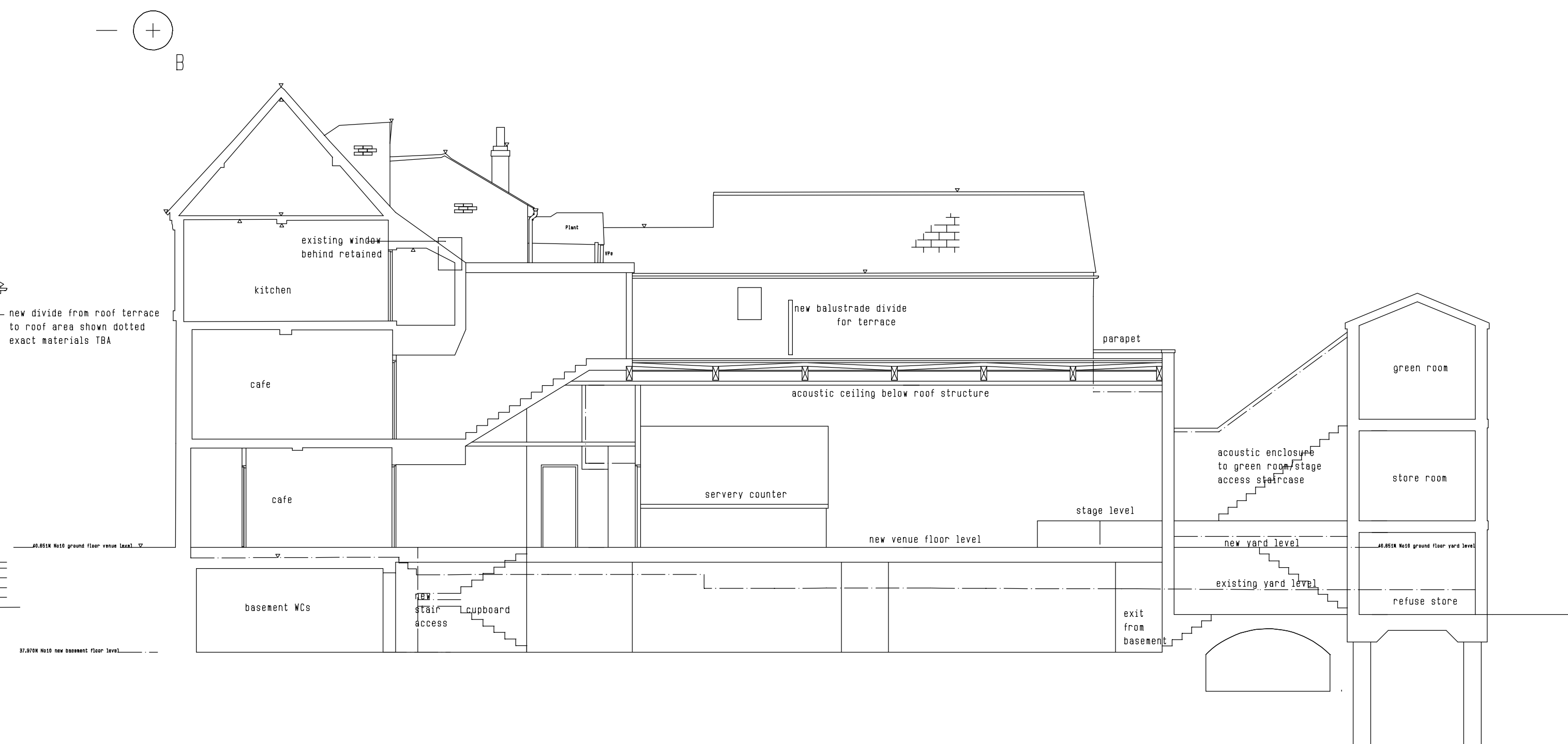
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NO 10 GUN STREET
READING

Title:
EXISTING ELEVATIONS
WITH DEMOLITIONS

Client: NO10 GUN STREET

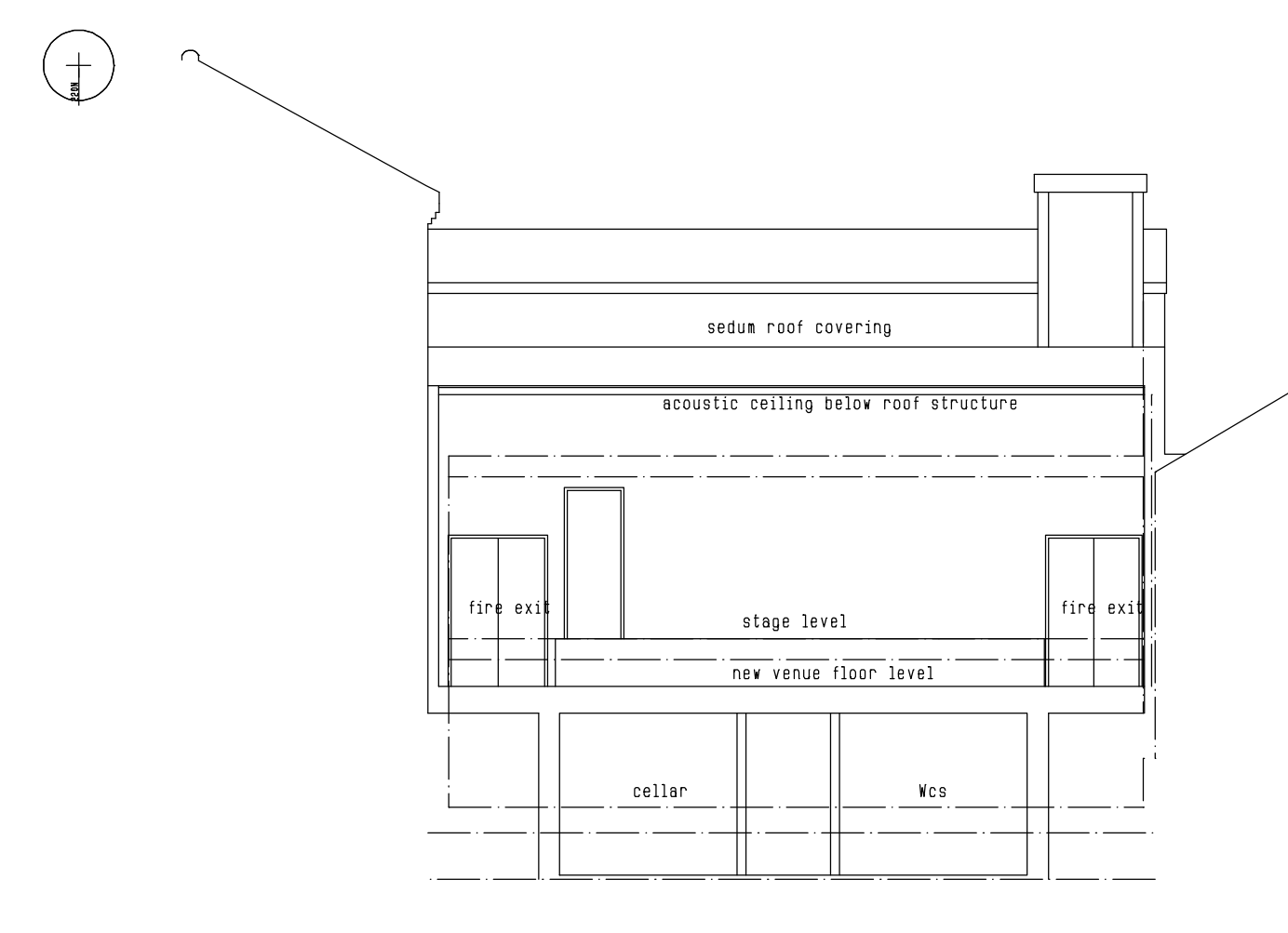
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Drawing No. 203 - 1114 Rev. -

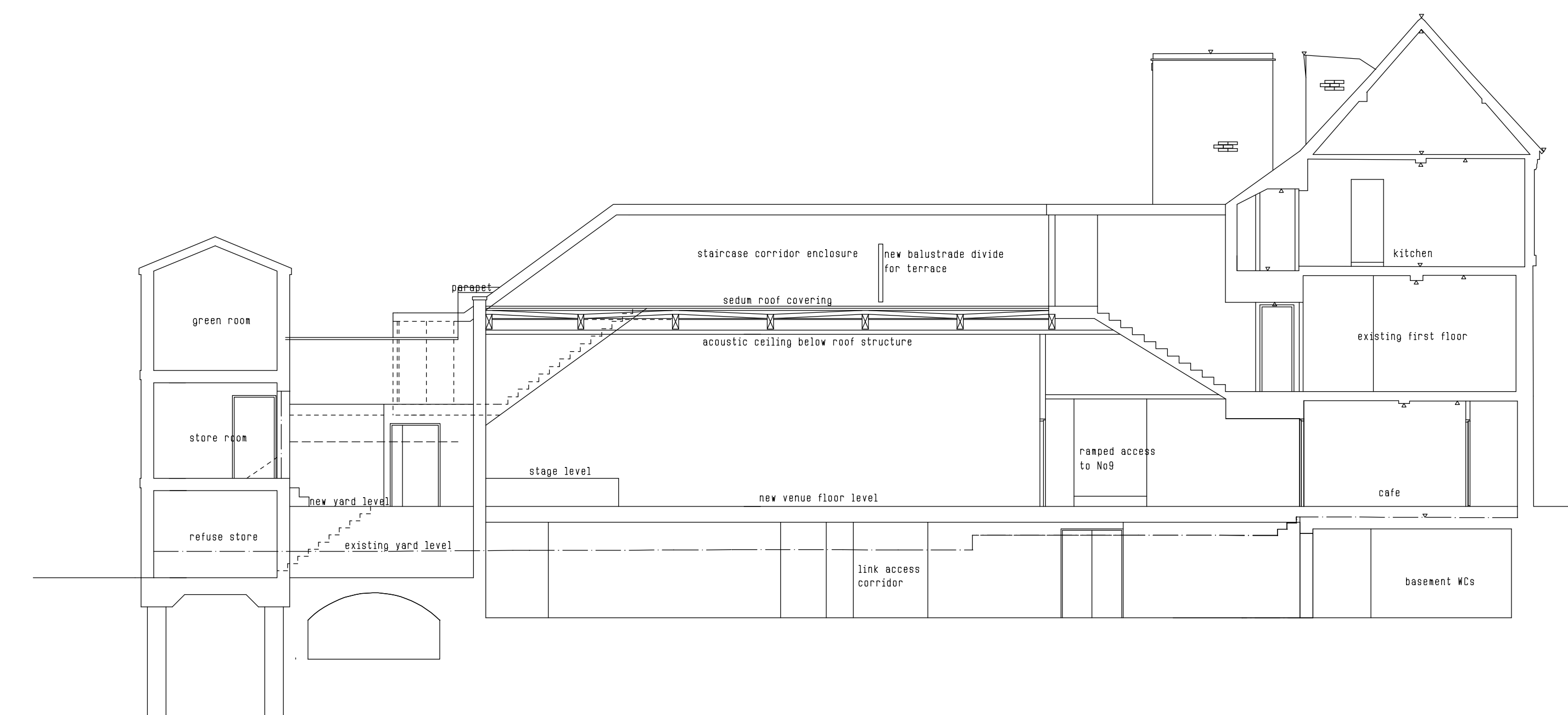
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GROUND FLOOR

BEER
GARDEN



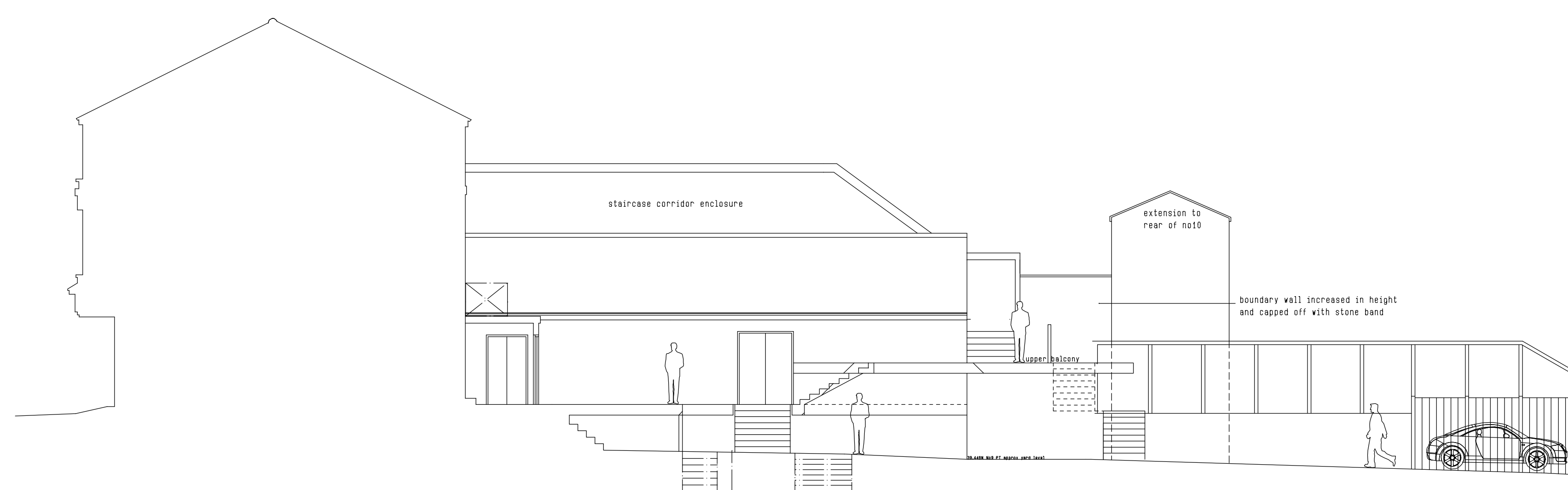
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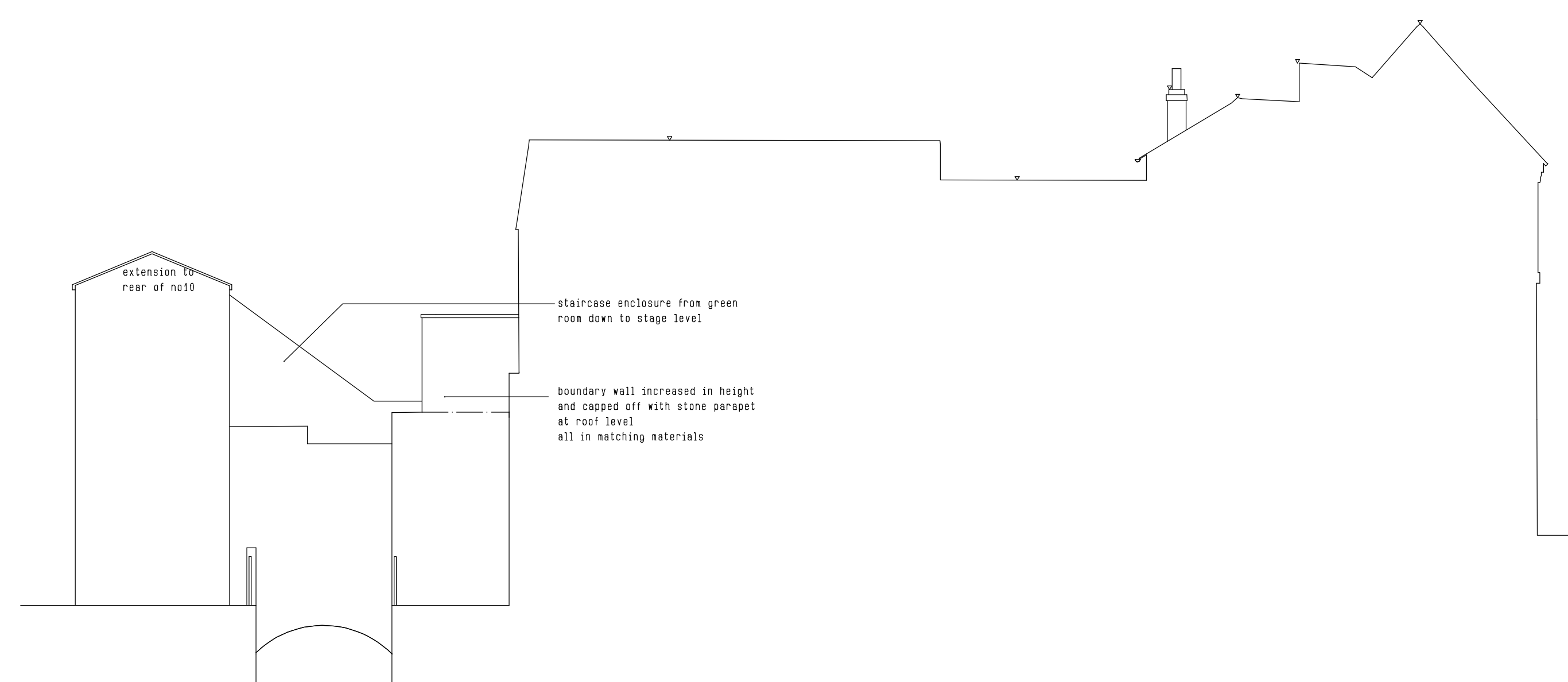
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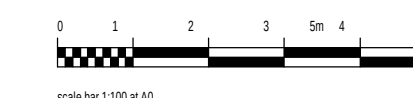
FRONT ELEVATION H



ELEVATION F



ELEVATION G



alan brown design

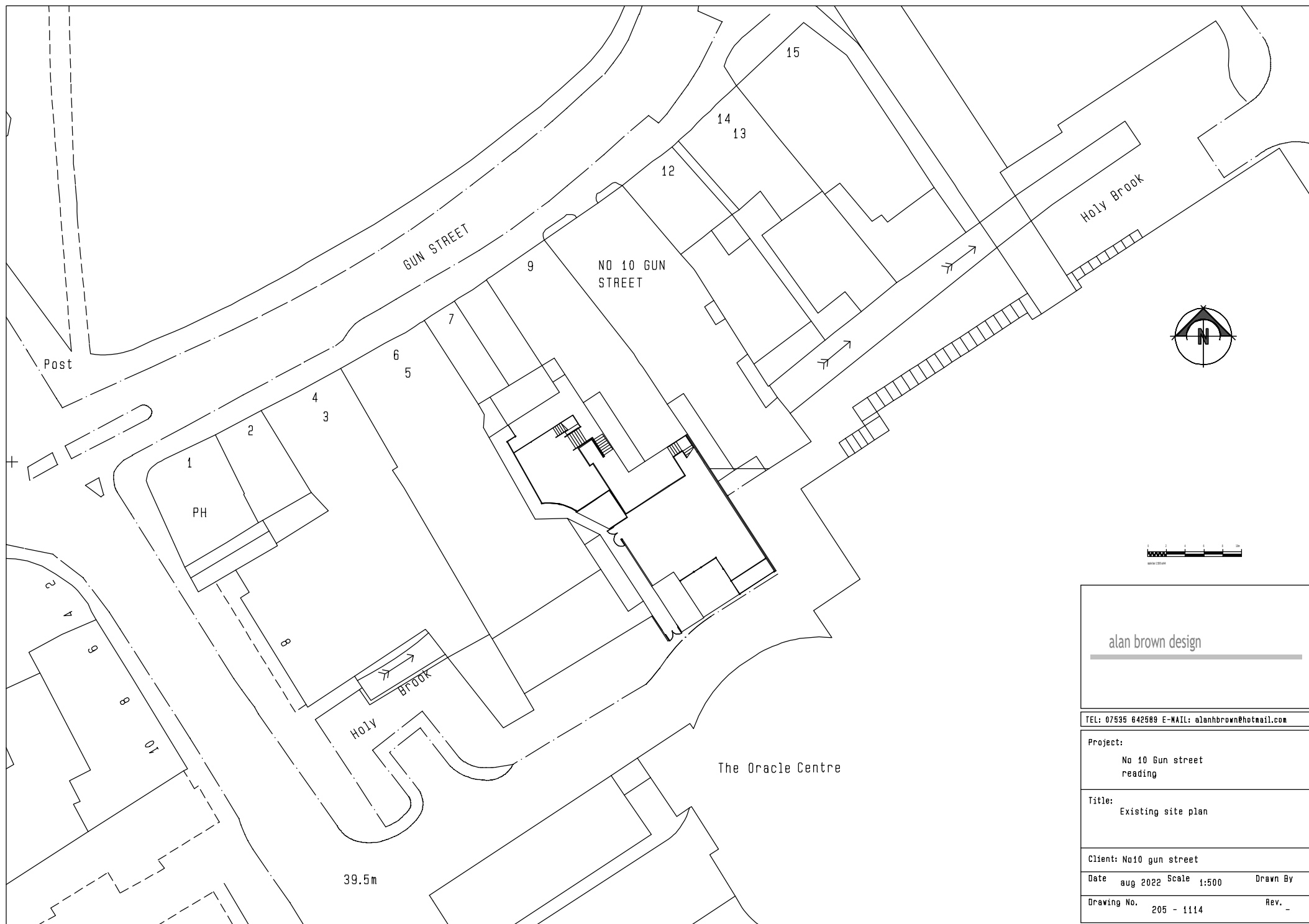
TEL: 07535 642589 E-MAIL: alanbrown@hotmail.com

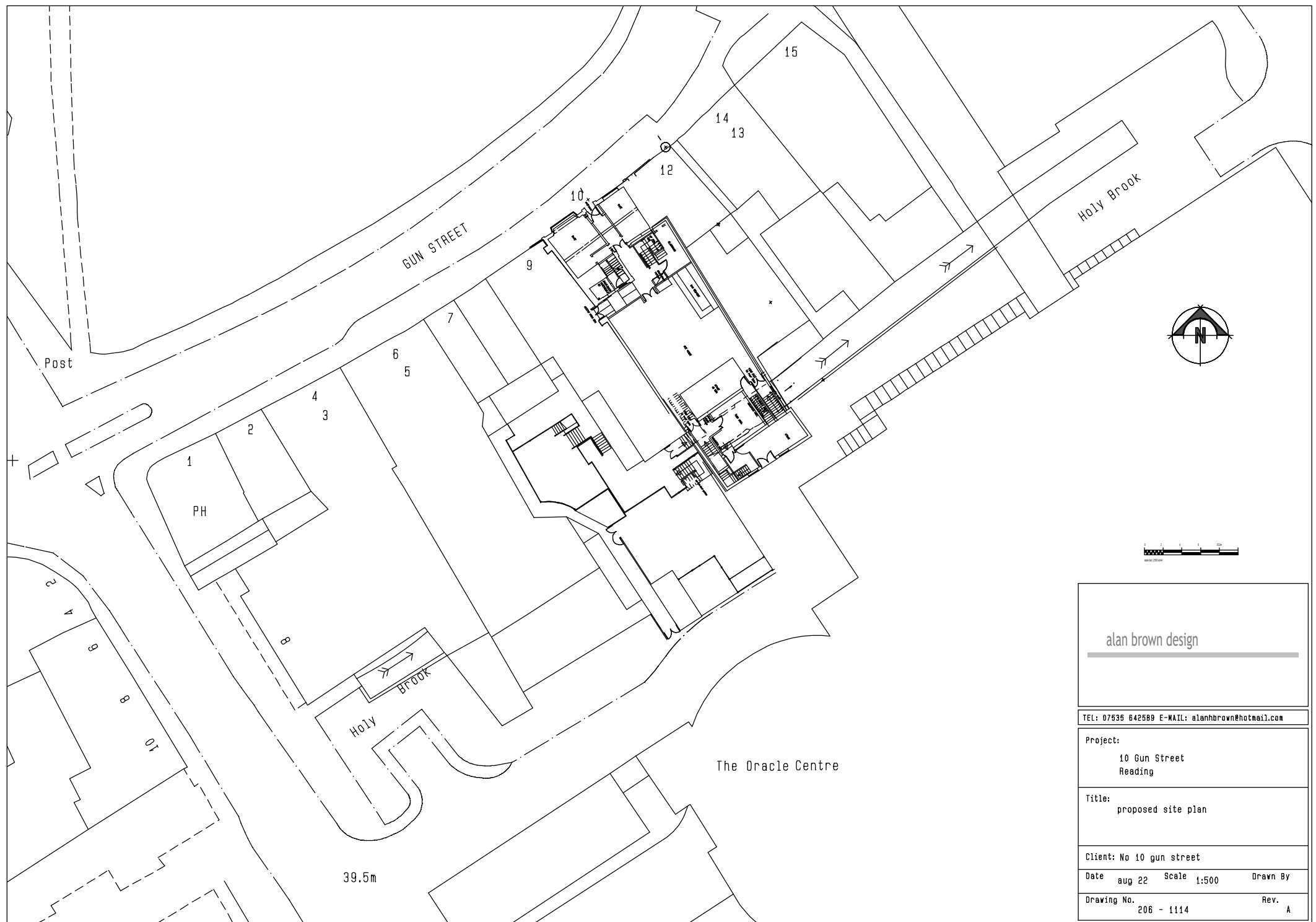
Project:

NO 10 GUN STREET
READING

Title: PROPOSED ELEVATIONS SECTIONS

Client: PROPERTY REV RENTAL LTD		
Date	Scale	Drawn By
aug 22	1:100 at A0	
Drawing No.		Rev.
204 - 1114		0





Appendix D Hydraulic Modelling Outputs

Holy Brook Data Extracted from Environment Agency Lower Kennet Modelling Study 2018
(Refer to FRA Section 4.4 for node locations on Holy Brook)

Present Day Fluvial Flood Levels.

Water Levels (m AOD – Present Day – Annual Exceedance Probability (AEP))							
Node	50% AEP	20% AEP	5% AEP	3.33% AEP	1.33% AEP	1% AEP	0.1% AEP
HOLY2_0633.1	37.931	37.937	37.948	37.950	37.955	37.956	38.170
HOLY2_0624.1	37.913	37.920	37.930	37.932	37.937	37.938	38.153
HOLY2_0601.1	37.841	37.847	37.858	37.860	37.865	37.865	38.075
HOLY2_0601.2	37.834	37.841	37.851	37.853	37.858	37.859	38.070
HOLY2_0579.1	37.559	37.564	37.574	37.576	37.580	37.581	37.775
HOLY2_0551.1	37.483	37.489	37.499	37.501	37.506	37.506	37.712
HOLY2_0551.2	37.444	37.451	37.461	37.463	37.468	37.468	37.678

Climate Change Fluvial Flood Levels.

Water Levels (m AOD) – Climate Change (CC) – Annual Exceedance Probability (AEP)				
Node	1% AEP + CC (+15%)	1% AEP + CC (+25%)	1% AEP + CC (+35%)	1% AEP + CC (+70%)
HOLY2_0633.1	37.985	38.050	38.129	38.282
HOLY2_0624.1	37.968	38.033	38.112	38.265
HOLY2_0601.1	37.894	37.958	38.036	38.185
HOLY2_0601.2	37.888	37.952	38.030	38.180
HOLY2_0579.1	37.607	37.667	37.739	37.895
HOLY2_0551.1	37.535	37.599	37.673	37.840
HOLY2_0551.2	37.497	37.563	37.639	37.809