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Date: **30th March 2023**

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Client

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Site Address

**137 The Rock
Bury
BL9 0ND**

Document Title

Drainage Strategy Report



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Project Title 137 The Rock, Bury - Drainage Strategy Report
Project No 2882-BCL-00-XX-RP-D-0001
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Revision History

Issue	Date	Status	Prepared By	Signature
P01	30.03.23	First Issue	Lee Meadowcroft BSc (Hons) PgDip MScCHE CEng MStructE MICE IHBC	

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Executive Summary

Item	Brief Description
Development Proposed	The redevelopment of a derelict commercial unit into 10 apartments, 3 new duplex apartments in the rear courtyard and a central, landscaped area/communal gardens & bike storage at 137 The Rock, Bury, BL9 0ND.
Site Area	0.037ha (Redline Area)
Flood Zone Classification	Flood Zone 1 – Low Risk
Geology	At this time a Phase 2 site Investigation has not been undertaken. The British Geological Survey dataset indicates the superficial deposits to be Devensian Till- Diamicton with the Bedrock Geology comprising the Pennine Lower Coal Measures – Mudstone, Siltstone and Sandstone.
Infiltration Rate	The anticipated ground conditions are anticipated to be cohesive and thus unsuitable for infiltration. Furthermore, the proposed development layout does not have sufficient space to enable infiltration features to be located a minimum of 5m from a building or highway, therefore infiltration techniques will not be suitable.
Nearest Watercourses	The River Irwell is located approximately 950m to the west of the site.
Nearest Adopted Sewers and Drainage Networks	The United Utilities sewer records have been reviewed and indicate a 450mm combined water sewer that runs along The Rock in a south westerly direction. An existing 150mm diameter drain serves the current site and outfalls unrestricted to the combined sewer in the Rock.
Surface Water Drainage Strategy and SuDS Hierarchical Approach	The proposed layout precludes the use of infiltration, the nearest watercourse site and there are no nearby surface water sewers. Based on this, the proposed strategy is to outfall to the public combined water sewer in The Rock, via an existing connection.
Existing Discharge Rate	Brownfield with rainfall rate 50mm/hr over a site area of 300m ² = 4.2l/s
Proposed Discharge Rate	Post development impermeable area that can be controlled will reduce to less than 200m ² . Due to the combined outfall and inability to restrict the existing rainwater pipes at the front of the property, the proposal is to discharge unrestricted. This peak rate would still be below 5l/s, considered the minimum rate to reduce risk of blockage.
Allowance for Climate Change	45% - based on a residential development with 100-year design life.
SuDS Methods	Increased Permeable landscaped areas.
Maintenance Responsibility	Property Owners / Maintenance Company.
Foul Drainage Outfall	Via existing connection to combined public sewer in The Rock.

Figure 1: Flood Risk and Drainage Strategy Summary

1.0 Introduction

- 1.1 Brennan Consult has been appointed 21 Living Ltd to prepare this Drainage Strategy Report to support a planning submission for a proposed redevelopment/refurbishment of the existing derelict commercial unit into 10 apartments, 3 duplex apartments in the rear courtyard and a central landscaped area/communal gardens & bike storage is also proposed at 137 The Rock, Bury, BL9 0ND. The assessment has been undertaken in line with Section 10 of the 'National Planning Policy Framework' plus the accompanying Technical Guidance on Flood Risk.
- 1.2 The outline Site Master Plan as indicated in Appendix A provides details of the proposed development intent.
- 1.3 This Drainage Strategy Report has been commissioned by 21 Living Ltd and is specific to their interests in the development proposals as described by the Architectural plan in Appendix A. This report may not be assigned.
- 1.4 The report has been commissioned to identify any drainage related issues associated with the proposed development and any likely constraints that could be imposed. The following issues have been addressed within this report.
- Determine the current surface water drainage regime and assess any potential increase in surface water runoff as a result of the proposed development.
 - Discuss Sustainable Drainage Systems (SuDS) as an option for reducing surface water flood risk and devise an outline drainage layout.
 - Devise an appropriate outline surface water drainage strategy (including calculations where appropriate) to deal with any potential increase in surface water runoff and include for climate change. Include for a reduction in predevelopment discharge rates where possible.
 - Devise an appropriate outline foul water drainage strategy.

2.0 Development Description and Location

2.1 Site Location

2.1.1 The site is referenced in Figure 1, and a site location map is provided in Appendix A.

Item	Brief Description
Project name	The Rock, Bury.
Site address and location	137 The Rock, Bury, BL9 0ND
Council Area	Bury Metropolitan Borough Council
Approximate Grid Reference	OS: 380728, 411023
General Locality	The site is located within the heart of Bury Town Centre.

Figure 1 Site Referencing Information

2.2 Existing Site Description

- 2.2.1 The development site is largely rectangular in plan shape and currently encompasses an unused commercial unit across several floors with a small area of concrete hardstanding at the rear. Pedestrian access is from The Rock to the south east with a gated vehicular access to the rear.
- 2.2.2 The site is also bounded by commercial properties to the east and west with large parking areas to the north with Peel Way dual carriage way just beyond, to the south of the site is a residential block.
- 2.2.3 Figure 2 identifies the overall site location details.



Figure 2: Location plan

2.3 Topography

- 2.3.1 A full topographical survey has been undertaken at the site. The site is relatively flat, falling from 95.56 in the north west to 95.19m in the south.

2.4 Hydrology

- 2.4.1 The closest identified watercourse is The River Irwell is located approximately 950m to the west of the site.

3.0 Flood Risk Review

3.1 Fluvial Flood Risk Review

3.1.1 Figure 3 below locates the site on the Environment Agency's indicative flood plain map. It is clear from this that the red line boundary sits outside of a fluvial generator of flood water from any identified water body or river. It is considered therefore that the site lays outside of the active 100-year and extreme event floodplains, thus lying within 'Flood Zone 1 Classification' in accordance with the National Planning Policy Framework (NPPF) Flood Risk Guidance Notes, i.e. probability of annual fluvial flooding significantly less than 1 in 1000 in any one year (<0.1%). The risk from fluvial flood water is diminished to acceptable levels.



Figure 3 EA Indicative Flood Maps

3.1.2 In addition, the development application boundary is less than 1ha in plan area. In line with criteria set within the NPPF a Flood Risk Assessment is not required to support a planning application if the development is less than 1ha and in Flood Zone 1.

4.0 Drainage Strategy

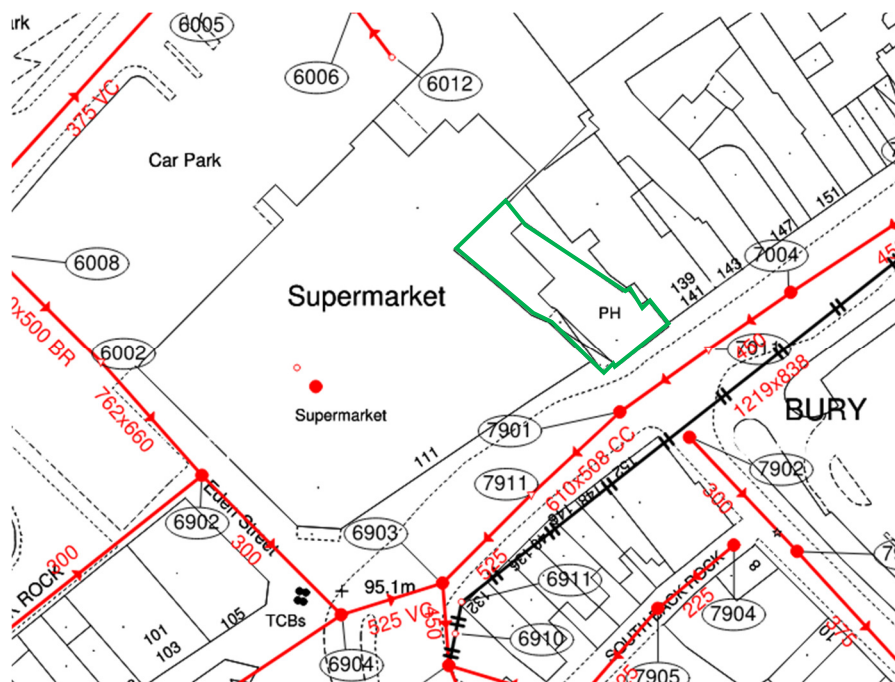
4.1 External Consultation

4.1.1 Brennan Consult have been in contact with United Utilities via a predevelopment drainage enquiry for the development site. At this time their considered response is awaited. In the mean-time it would be anticipated that evidence should be provided that the SuDS Hierarchy has been assessed. Infiltration techniques will not be feasible for the site as the proposed development layout will not allow the location of infiltration features to be a minimum of 5m from a building or highway. The nearest watercourse is the River Irwell, some 950m from the site and there are no nearby surface water sewers. Based on the above, it will be necessary to discharge runoff to the combined water sewer in The Rock.

4.2 Existing Drainage

4.2.1 United Utilities

The United Utilities sewer records have been reviewed and indicate a 450mm combined water sewer that passes along The Rock to the south of the site in a south westerly direction. Refer to Figure 4 below and Appendix E.



4.3 Existing Runoff

- 4.3.1 The current site is developed and can be classed as Brownfield. Figure 5 below defines the existing brownfield runoff rates based on a site impermeable area of 0.30ha.

Existing Site Area (ha)	Average Rainfall Rate (mm/h)	Existing Runoff Rate (l/s)
0.30	50	4.2

Figure 5 Existing Brownfield Runoff Rates

4.4 Geology

- 4.4.1 At this time a Phase 2 site Investigation has not been undertaken. The British Geological Survey dataset indicates the superficial deposits to be Devensian Till- Diamicton with the Bedrock Geology comprising the Pennine Lower Coal Measures – Mudstone, Siltstone and Sandstone. In light of these findings it is considered that infiltration has a small potential to be suitable. However, other elements such as the 5m offset required from foundations & boundary features need to also be taken into consideration. The proposed development layout will not allow the location of infiltration features to be a minimum of 5m from a building or highway, therefore infiltration techniques will not be suitable.

4.5 Hydrological Assessment

- 4.5.1 As discussed in previous sections, a review of the topographical survey, OS Maps and Environment Agency maps would indicate the closest watercourse to be the River Irwell, located 950m to the west of the site.

4.6 Sustainable Drainage Systems (SuDS) Assessment

4.6.1 SuDS Objectives

Sustainable drainage developed in line with the ideals of sustainable development is collectively referred to as Sustainable Drainage Systems (SuDS). At a particular site, these systems are designed both to manage the environmental risks resulting from the urban runoff and to contribute wherever possible to environmental enhancement. SuDS objectives are therefore to minimise the impacts from the development on the quantity and quality of the runoff and maximise amenity and biodiversity opportunities (CIRIA C753, 2015).

4.6.2 SuDS Design Themes

The 'Management Train Approach' should be central to the surface water drainage strategy of the proposed site. The main objective is treatment and control of runoff as near to the source as possible protecting downstream habitats and further enhancing the amenity value of the site. This concept uses a hierarchy of drainage techniques to incrementally reduce pollution, flow rates and volumes of storm water discharge from the site, and is as follows:

- i. **Prevention** – The use of good site design and housekeeping measures to prevent runoff and pollution and includes the use of rainwater reuse / harvesting.
- ii. **Source Controls** – Control of runoff at source or as close to source as possible (e.g. soakaways, green roofs, pervious pavements).
- iii. **Site Control** – Management of water in a local area and can include below ground storage / attenuation, detention basins, large infiltration devices.
- iv. **Regional Control** – Management of water from a site or various sites and can include wetlands and balancing ponds.

4.6.3 SuDS Site Constraints

SuDS techniques are suitable for all sites; therefore, an assessment of the existing site is required so that SuDS limitations can be determined.

- *Land Use Characteristics:* The size and type of development provides the opportunity to include site control SuDS devices only.
- *Site Characteristics:* The proposed site layout does not have the space to enable use of infiltration techniques.
- *Catchment Characteristics:* The site is currently classed as Brownfield with existing positive drainage.
- *Environmental and Amenity Performance:* The inclusion of SuDS within the overall development is a key driver in providing both amenity and habitat creation. SuDS will be considered where feasible. Safety to all future users is paramount and so best practice guidance will be incorporated so that these devices blend into the surrounding without the need for significant safety precautions. Maintenance plans will be prepared for all SuDS devices that are included.

4.6.4 SuDS Methods

Figures 6 and 7 on the following pages provide an assessment of various above and below ground SuDS methods that can provide water quality treatment and management of flows to reduce runoff rates and volumes and whether they can be suitably incorporated at this development site. The purpose of this assessment is to set out options to be considered at the planning stage with consideration to time constraints, viability and lifetime maintenance of the residential development.

Method	Comment	Suitability for Development
Green Roofs	Can be used on suitable low-rise buildings to provide retention, attenuation and treatment of rainwater, and promotes evaporation and local biodiversity.	<u>Not suitable:</u> Proposed roof profile would not enable a green roof to be incorporated.
Water Butts	Plastic tanks placed at the base of rainwater down pipes to collect rainwater runoff from the roof areas.	<u>Suitable:</u> Water Butts have the potential to be installed at downpipes. Subject to Client approval.
Rainwater Harvesting	Rainwater harvesting reduces the total runoff volume from the developed site and reduces treated water consumption.	<u>Not Suitable:</u> - Additional costs of installation would have severe effect on viability of the development. - Running and maintenance costs would not be acceptable to our client and future occupiers. - The ability to restrict peak flow rates and short-term peak volumes is non-existent where a critical storm event occurs. - Limited roof areas.
Infiltration Options	Reduces total run off volume from the development.	<u>Not Suitable:</u> Proposed site layout has insufficient space to allow for infiltration.
Permeable Surfacing (Infiltration)	- Reduces total run off volume from the development. - Can be used to enhance water quality.	<u>Not Suitable:</u> Proposed site layout has insufficient space to allow for infiltration.
Permeable Surfacing (Standard)	- Can be used to enhance quality of runoff water. - Sub-base provides 'source' storage and reduces the volume of storage downstream.	<u>Suitable:</u> - There is potential to install permeable paving without infiltration. Subject to Client approval. - Though noted there are limited external areas and all paths will already fall to the soft landscaping areas.
Swales, basins and ponds	- Provide areas for above ground surface runoff storage. - Swales also allow filtering of particulate matter, improving water quality	<u>Not suitable:</u> No available area for attenuation pond / swales to be allocated.
Bio-Retention	Collect and retain run-off to help improve water quality, prior to discharge in piped system on infiltration.	<u>Not suitable:</u> Space constraints on site do not permit above ground areas for flood storage.

Figure 6 Surface SuDS Methods

Method	Comment	Suitability for Development
Geocellular Storage	- Suitable for sites with insufficient space for basins etc. - Suitable for sites where topography prevents the use of open basins etc. - Can be very effective infiltration devices subject to ground conditions.	<u>Suitable:</u> Potential to be incorporated as part of the offline attenuation measures.
Large Diameter Pipes, Culverts or Tanks	- Suitable for sites with insufficient space for basins etc. - Provide a volume of below ground storage with a high void ratio and good man entry provision to allow for future maintenance and cleaning. - Generally, be suitable for adoption by the statutory water company (e.g. Severn Trent Water).	<u>Not suitable:</u> Oversized pipes more suitable to larger developments where the drainage is adopted.

Figure 7 Sub-Surface SuDS Methods

4.6.5 SuDS Hierarchal Approach

Based on the SuDS assessment in Figure 6 and 7, plus an assessment of the local site conditions, the SuDS hierarchal approach for discharge of surface water at the development site is considered in greater detail below:

Method	Suitability	Suitability for Development
Infiltration to Ground	No	Proposed site layout has insufficient space to allow for infiltration.
Connection to Watercourse	No	Nearest watercourse is 950m to the west.
Connection to Surface Water Sewer	No	No viable surface water sewer in close proximity.
Connection to a Combined Sewer	Yes	Discharge will be to 450mm public combined water sewer in The Rock.

Figure 8 SuDS Hierarchal Approach

4.6.6 SuDS Design Philosophy

The SuDS philosophy for the development site is the promotion of Prevention and Source Control techniques with discharge to the adjacent combined sewer.

The following design philosophy is proposed:

- Surface water treatment using the 'Management Train' approach to remove and isolate contamination at all SuDS facilities prior to conveyance to the local watercourse.
- Water butts to the rear rainwater pipes
- Reduce the impermeable fraction of the post development area by including greater soft landscaping areas.

4.7 Climate Change

4.7.1 In May 2022, the Environment Agency released updated climate change allowances for peak rainfall intensities which should be applied to new developments. Rather than nation-wide allowances, each area will have its own peak rainfall allowances. In the case of the Bury area, this is the Irwell Management Catchment peak rainfall allowances.

4.7.2 Based on the residential nature of the development, a lifespan of circa 100 years is anticipated. Therefore, the potential climate change allowance for the 2070's Central Allowance for residential developments is 45%, which will be included in any hydraulic calculations prepared.

4.8 Outline Surface Water Drainage Strategy

4.8.1 The general principal of the surface water drainage strategy is to collect the runoff from the roof of the existing and new buildings and direct it to a below ground surface water drainage network via water butts located at the base of each one. The new network would then outfall to the existing private drainage network that ultimately outfalls to the 450mm diameter combined water public sewer in The Rock. The available roof area is less than 200m² that could pass through a flow control. As a flow rate of 5l/s is considered the minimum rate to prevent blockage, based on this small area, it is proposed to discharge unrestricted. Furthermore, the existing rainwater pipes at the front of the building will continue to discharge unrestricted directly to the combined sewer. In light of this, no supporting hydraulic calculations have been prepared to support this application.

4.8.2 The proposed private drainage layout for the new development site will be designed in accordance with BS EN 752: 2008 and Building Regulations part H guidance. This is to provide no flooding up to the 30-year storm return period criterion.

4.8.3 Drawing 2882-BCL-000-XX-DR-D-0100 in Appendix C indicates the Drainage Strategy Plan based on the Architects master plan intent.

4.8.6 Any future drainage calculations carried out as part of a site wide drainage strategy or for the development layouts themselves must include the appropriate increase in rainfall to satisfy the future Climate change allowances.

4.9 Pollution Control

- 4.9.1 Silt is to be prevented from entering the drainage system by the use of trapped gullies, channels with silt traps or by the use of Sustainable Drainage techniques. Being a residential building led scheme only, the pollution risk is considered to be very low.

4.10 Maintenance

- 4.10.1 The long-term maintenance of the new drainage and SuDS infrastructure will be with the property owners and a maintenance company in line with best practice guidance. Annual inspections will need to be carried out and clearing of gullies, channel drains, catchpits constructed.

Typically the maintenance regime will be in line with Figure 9 below.

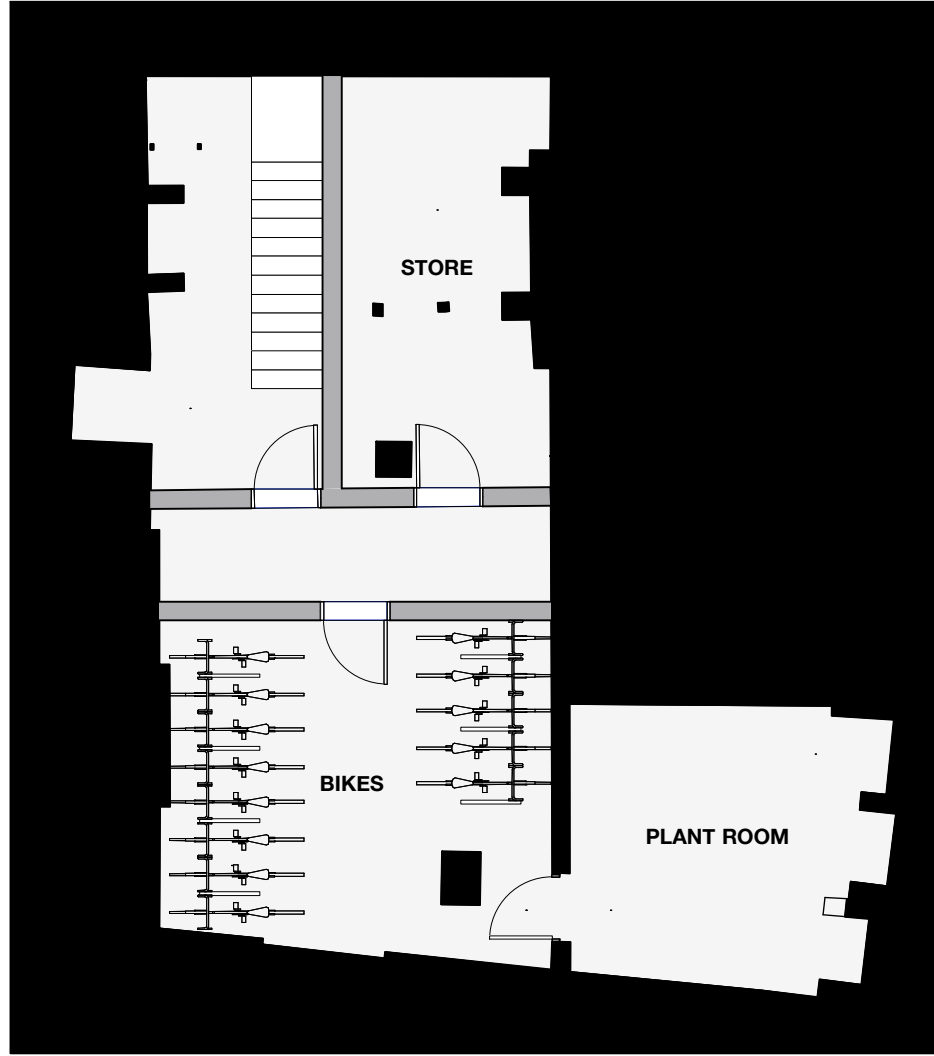
Future Maintenance of the Drainage System			
Responsibility	Feature	Maintenance	Frequency
Property Owners and Management Company	Rainwater gutters, downpipes and above ground drainage.	Regular maintenance and inspections.	Ad-hoc sweeping and emptying of silt and debris required. Annual visual inspections to check for damage/leaks.
	Pipes, sewers & manholes.	Regular maintenance / removal of blockages and debris.	Annual inspection and removal of silts if required.

Figure 9 Outline Management and Maintenance Strategy

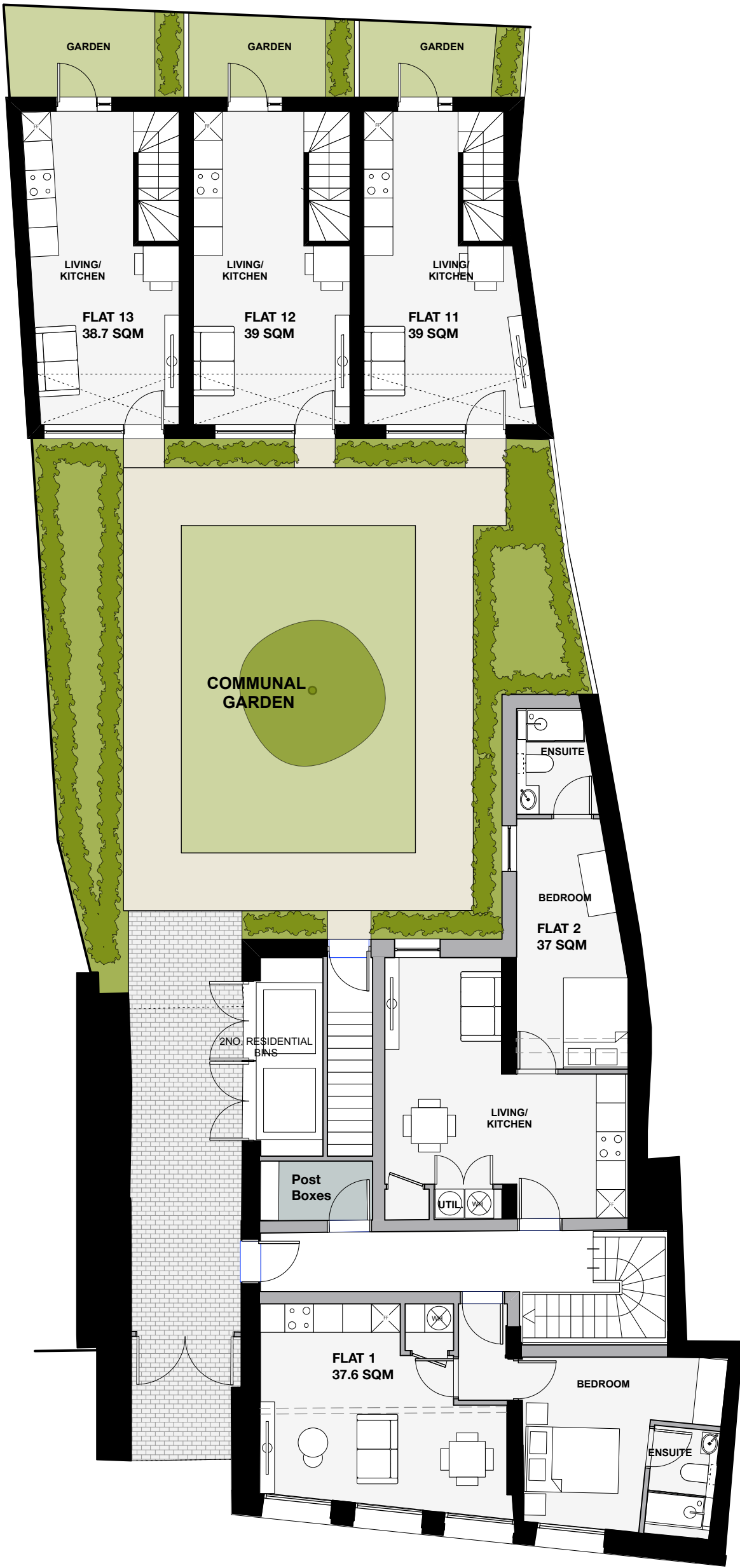
4.11 Foul Water Strategy

- 4.11.1 The foul water drainage strategy is to construct a new foul water drainage network to collect foul flows from the properties and discharge to the 450mm combined public sewer in The Rock via the existing connection.
- 4.11.2 The proposed private drainage layout for the new development site will be designed in accordance with BS EN 752: 2017 and Building Regulations Part H guidance.
- 4.11.3 An indicative foul water drainage layout can be found on the drainage strategy drawing in Appendix C.

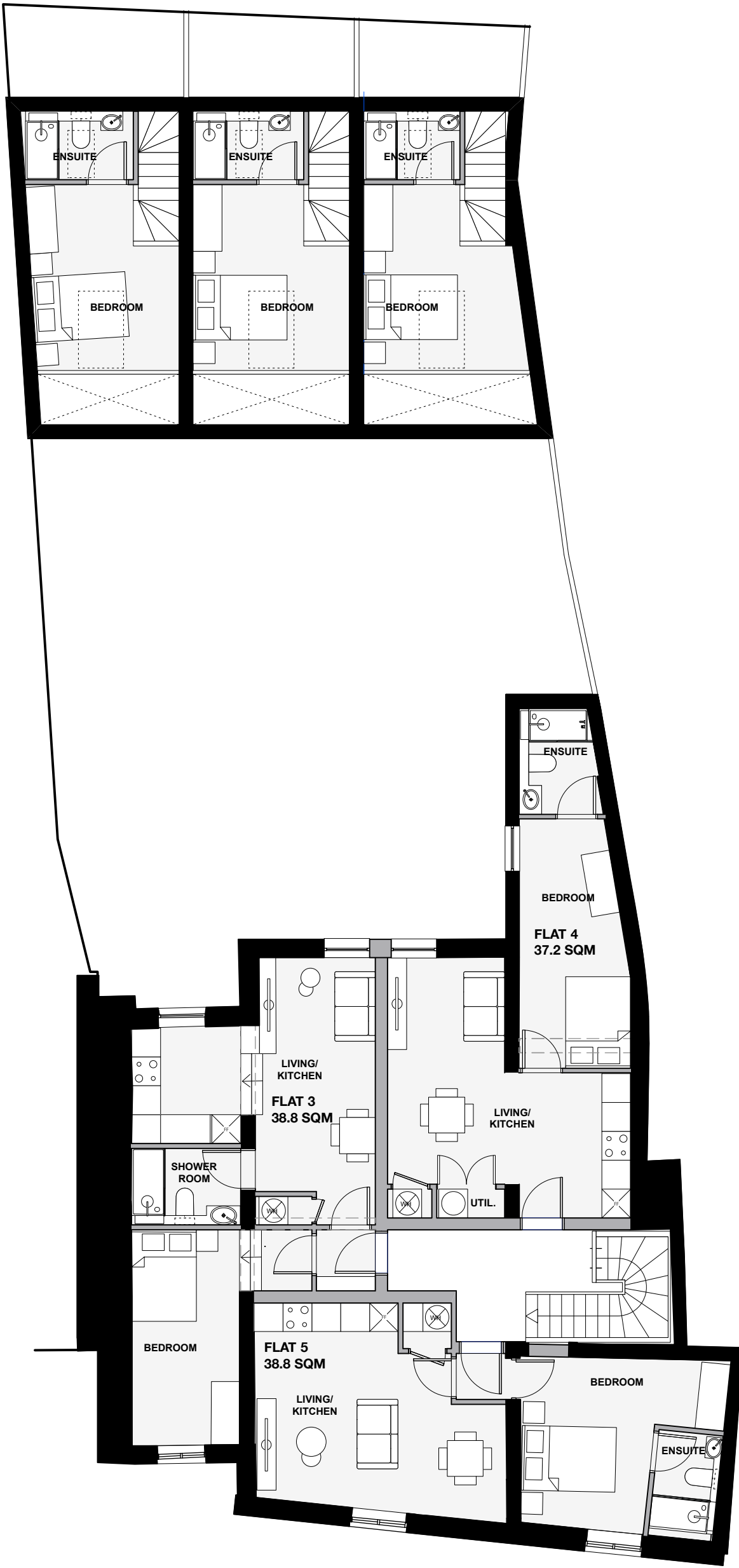
Appendix A – Architects Drawings



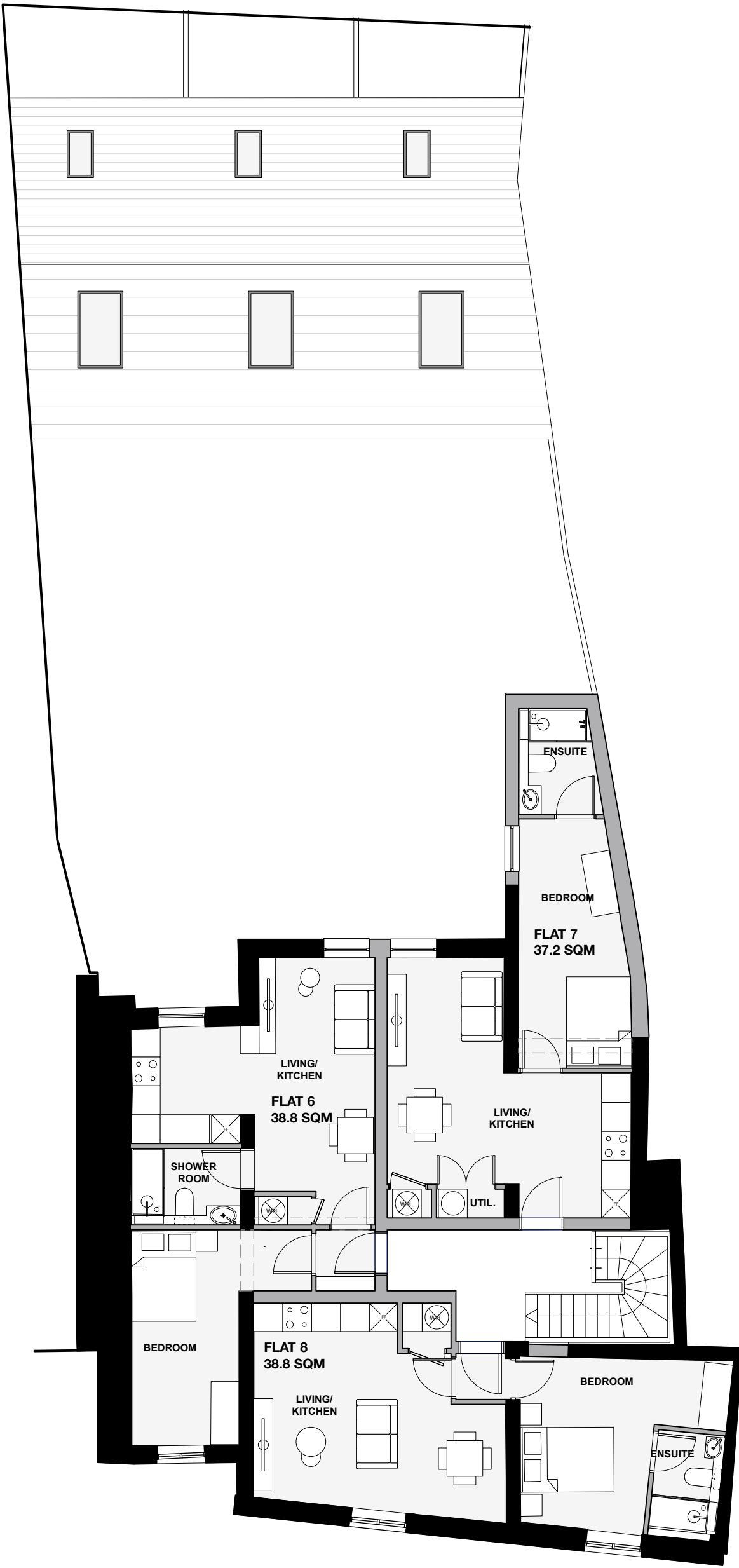
BASEMENT FLOOR PLAN



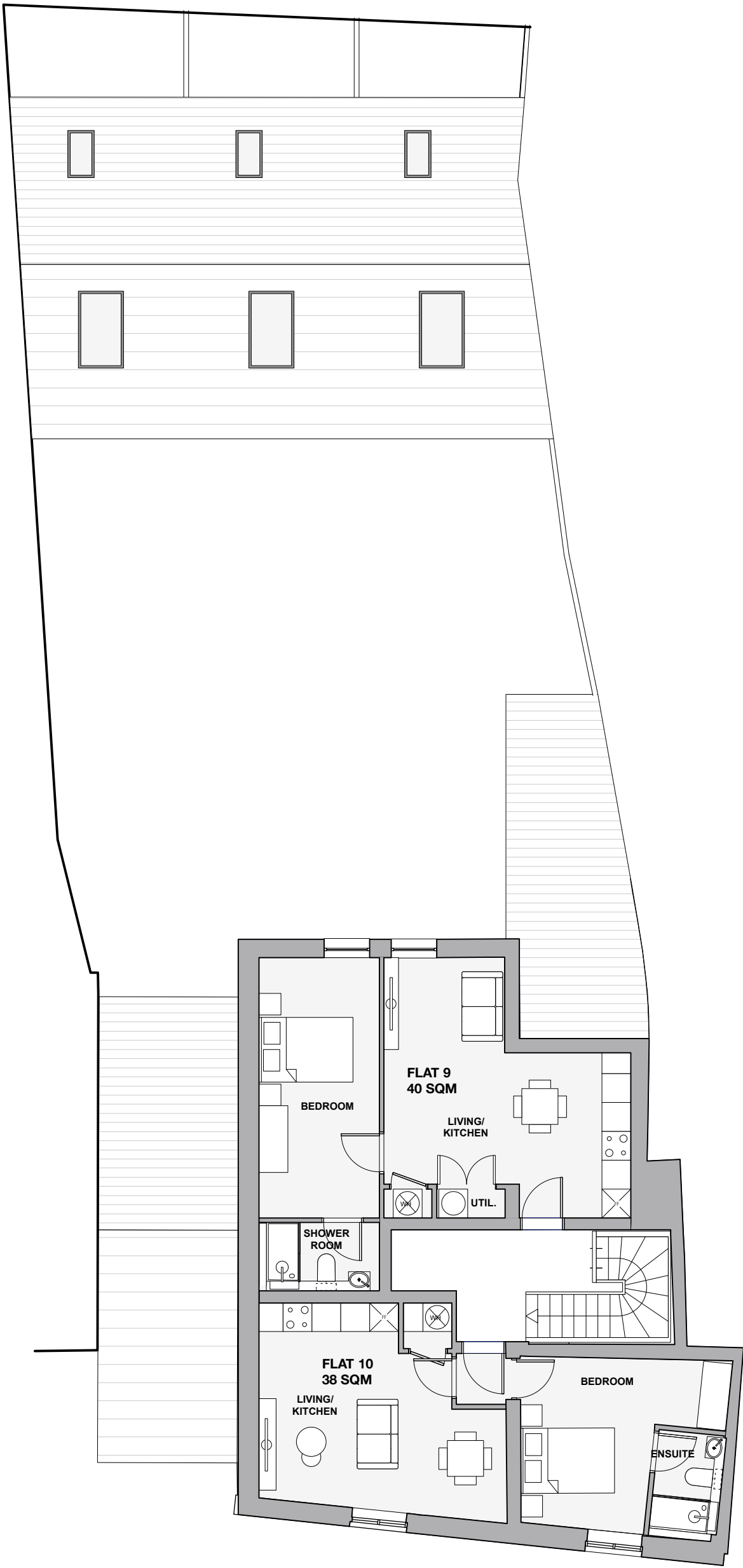
GROUND FLOOR PLAN



FIRST FLOOR PLAN

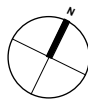


SECOND FLOOR PLAN



THIRD FLOOR PLAN

PROPOSED FLOOR PLANS
1:100 @ A3



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IMPORTANT NOTES:

— DENOTES NEW WALLS

REVISION	DATE	DESCRIPTION

CLIENT: 21 LIVING	
PROJECT: PROPOSED RESIDENTIAL DEVELOPMENT	
ADDRESS: 137 THE ROCK, BURY	
DRAWING TITLE: PROPOSED PLANS	
SCALE: 1:100 @ A1	DATE: NOVEMBER 2022
DRAWING NO: A750_P_11	

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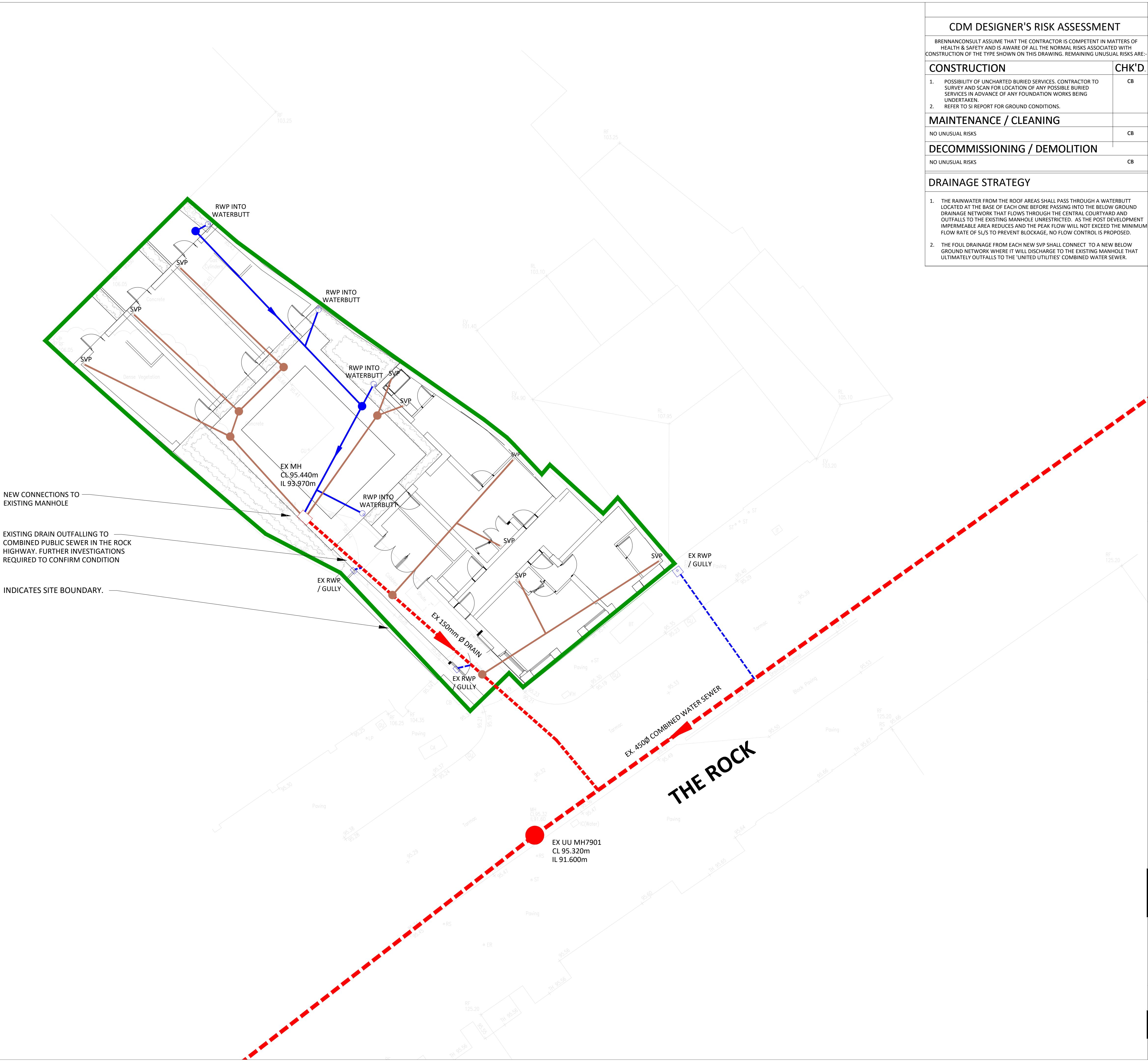


Appendix B – Topographical Survey

Project Title 137 The Rock, Bury - Drainage Strategy Report
Project No 2882-BCL-00-XX-RP-D-0001
Date 30th March 2023



Appendix C – Brennan Consult Drawings



CDM DESIGNER'S RISK ASSESSMENT		THIS DRAWING AND ITS CONTENTS ARE STRICTLY THE COPYRIGHT OF BRENNANCONSULT LTD
BRENNANCONSULT ASSUME THAT THE CONTRACTOR IS COMPETENT IN MATTERS OF HEALTH & SAFETY AND IS AWARE OF ALL THE NORMAL RISKS ASSOCIATED WITH CONSTRUCTION OF THE TYPE SHOWN ON THIS DRAWING. REMAINING UNUSUAL RISKS ARE:-		GENERAL NOTES
CONSTRUCTION	CHK'D	1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ASSOCIATED DRAWINGS. ANY DISCREPANCY TO BE RAISED PRIOR TO CONSTRUCTION. ANY CONSTRUCTION WORKS WHICH COMMENCE BEFORE THESE DRAWINGS ARE APPROVED ARE AT THE RISK OF THE BUILDING CONTRACTOR. 2. ALL DIMENSIONS ARE IN MILLIMETERS (mm). DO NOT SCALE FROM THIS DRAWING, WORK TO STATED DIMENSIONS ONLY. 3. BUILDING CONTRACTOR TO ENSURE ALL WORKS COMPLY WITH THE CURRENT EDITION OF THE BUILDING REGULATIONS. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH APPROVED DOCUMENT REGULATION 7. 4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN, FABRICATION, ERECTION AND REMOVAL OF ALL TEMPORARY WORKS AND SHALL PROVIDE ALL TEMPORARY BRACING AS NECESSARY TO MAINTAIN STRUCTURAL STABILITY DURING CONSTRUCTION. 5. IF THE CONTRACTOR CONSIDERS THAT HE DOES NOT HAVE SUFFICIENT INFORMATION TO SAFELY COMPLETE THE WORKS DETAILED ON THIS DRAWING, HE SHOULD CONTACT THE ENGINEER.
1. POSSIBILITY OF UNCHARTED BURIED SERVICES. CONTRACTOR TO SURVEY AND SCAN FOR LOCATION OF ANY POSSIBLE BURIED SERVICES IN ADVANCE OF ANY FOUNDATION WORKS BEING UNDERTAKEN. 2. REFER TO SI REPORT FOR GROUND CONDITIONS.	CB	
MAINTENANCE / CLEANING		
NO UNUSUAL RISKS	CB	
DECOMMISSIONING / DEMOLITION		DRAINAGE NOTES
NO UNUSUAL RISKS	CB	

DRAINAGE STRATEGY	DRAINAGE NOTES
1. THE RAINWATER FROM THE ROOF AREAS SHALL PASS THROUGH A WATERBUTT LOCATED AT THE BASE OF EACH ONE BEFORE PASSING INTO THE BELOW GROUND DRAINAGE NETWORK THAT FLOWS THROUGH THE CENTRAL COURTYARD AND OUTFALLS TO THE EXISTING MANHOLE UNRESTRICTED. AS THE POST DEVELOPMENT IMPERMEABLE AREA REDUCES AND THE PEAK FLOW WILL NOT EXCEED THE MINIMUM FLOW RATE OF 5L/S TO PREVENT BLOCKAGE, NO FLOW CONTROL IS PROPOSED. 2. THE FOUL DRAINAGE FROM EACH NEW SVP SHALL CONNECT TO A NEW BELOW GROUND NETWORK WHERE IT WILL DISCHARGE TO THE EXISTING MANHOLE THAT ULTIMATELY OUTFALLS TO THE 'UNITED UTILITIES' COMBINED WATER SEWER.	1. ALL PRIVATE DRAINAGE WITHIN THE SITE IS TO COMPLY WITH THE REQUIREMENTS OF BS EN 752 AND BUILDING REGULATIONS PART H. 2. DETAILS OF EXISTING SEWERS SHALL BE CONFIRMED BY THE CONTRACTOR ON SITE PRIOR TO THE COMMENCEMENT OF WORKS. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY. THE CONTRACTOR SHOULD CHECK THE LEVELS OF ALL NEW OUT FALLS IN RELATION TO EXISTING SEWERS PRIOR TO ANY CONSTRUCTION TO ENSURE THE PROPOSED DESIGN CAN BE ACHIEVED. 3. THE CONTRACTOR SHALL ASCERTAIN THE DEPTHS, SIZES AND LOCATIONS OF ALL SERVICES TO BE CROSSED BEFORE EXCAVATION COMMENCES. ANY CONFLICT IN

INDICATES NEW FW DRAINAGE	INDICATES EXISTING CW DRAINAGE
INDICATES NEW SW DRAINAGE	INDICATES EXISTING SW DRAINAGE
INDICATES SITE BOUNDARY	
ALL MANHOLES TO BE CONCRETE ENCASED PPIC'S UNO, ● ● ●	
ALL MANHOLE COVERS TO BE B125 LOAD RATING TO PEDESTRIAN AREAS	

DRAINAGE LEGEND	
INDICATES NEW FW DRAINAGE	INDICATES EXISTING CW DRAINAGE
INDICATES NEW SW DRAINAGE	INDICATES EXISTING SW DRAINAGE
INDICATES SITE BOUNDARY	
ALL MANHOLES TO BE CONCRETE ENCASED PPIC'S UNO, ● ● ●	
ALL MANHOLE COVERS TO BE B125 LOAD RATING TO PEDESTRIAN AREAS	

P01	PRELIMINARY ISSUE	PG	29.03.23	LM
REV	REVISION DESCRIPTION	BY	DATE	CHECKED



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137 THE ROCK,
BURY

RESIDENTIAL DEVELOPMENT
DRAINAGE STRATEGY PLAN

Status
PRELIMINARY

Project No.	Originator	Zone	Level	Type	Role	Drawing No.	Revision
2882	BCL	00	XX	DR	D	0100	P01

Scale	Size	Drawn	Date	Checked	Passed
1:100	A1	PG	MAR 23	LM	CB

Appendix D – United Utilities Pre-Development Response