

BANNERS GATE

CIVIL, STRUCTURAL AND
TRANSPORTATION ENGINEERS

Barratt / David Wilson Homes North West

Kingsway Rochdale

Plot W

Flood Risk Assessment

December 2019

Revision Schedule

Kingsway Rochdale, Plot W
Flood Risk Assessment
19216

Rev	Date	Details	Prepared by	Reviewed by	Approved by
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1 INTRODUCTION

1.1 Background Information

- 1.1.1 Banners Gate was commissioned by Barratt / David Wilson Homes North West to undertake a Flood Risk Assessment in support of a residential development within Plot W of the Kingsway Business Park in Rochdale.
- 1.1.2 Outline Planning Permission for the Kingsway Business Park, consisting of General and Light Industrial Uses (Classes B1 & B2); Offices in the Use Class B1; Distribution and Storage Uses (Class B8); Research and Development Facilities in Use Class B1; Car Show-rooms (Sui Generis Use); Hotels in Use Class C1; Ancillary Retail and Leisure in Use Classes A1-A5 and D2; and Residential in Use Class C3, was granted by Rochdale Metropolitan Borough Council under application number 14/00542/OUT in August 2014.

1.2 Summary of 2014 Flood Risk Assessment

- 1.2.1 BWB Consulting prepared a Flood Risk Assessment on behalf of Wilson Bowden Developments to support an Outline Planning Application for a 75ha Parcel within the wider 170ha Business Park development.
- 1.2.2 The Report concluded that the proposed development was not at significant flood risk, although Plots U and S could be at residual risk under a Rochdale Canal spill or breach scenario.
- 1.2.3 The existing on-site surface water drainage system, constructed as part of an earlier development, was designed to accommodate the 1 in 100 year return period event. The design assumed that the developable areas contributing to the strategic attenuation storage basins were 100% impermeable. Surface water ultimately discharges into the Stanney Brook at Greenfield equivalent rates agreed with the Environment Agency.
- 1.2.4 The Report stated that as the existing surface water drainage infrastructure was designed to the 1 in 100 year standard an estimated additional 15.86m³ per contributing hectare of additional on-plot storage would be required to mitigate the potential impacts of climate change. Actual volumes and methods of providing the storage would be considered at the detailed design stage for each plot.

1.3 Outline Planning Permission

- 1.3.1 The following, drainage related, conditions were attached to the Outline Planning Permission:

13) Prior to being discharged to any watercourse, surface water sewer, soakaway system or the drainage attenuation ponds within the Stanney Brook Greenspace Corridor, all surface water drainage from impermeable parking areas, roadways and hardstandings for vehicles, including HGVs and other service vehicles, external storage areas and any petrol stations shall be passed through an oil interceptor of a design and capacity compatible with the site being drained, in accordance with details to have been first submitted and approved in writing by the Local Planning Authority.

14) No drainage from the proposed development shall discharge into the motorway drainage system, nor shall any proposed drainage system be installed within the site to adversely affect the motorway drainage system.

31) Development shall not take place on each plot hereby permitted until such time as a scheme for that plot to regulate surface water run-off with appropriate allowance for climate change has been submitted to, and approved in writing by, the Local Planning Authority.

The scheme shall be fully implemented and subsequently maintained, in accordance with the timing / phasing arrangements embodied within the scheme, or within any other period as may subsequently be agreed, in writing, by the Local Planning Authority.

34) There shall be no discharge of foul or contaminated water from the site into either groundwater or any surface waters, whether direct or via soakaways.

35) No building in any phase of development, as identified in the Schedule of Development and on the drawing no. 2013-233/102 Revision A – Masterplan Parameters Plan shall be occupied until such time as adequate sewerage infrastructure has been provided within the site to serve that phase of the development.

38) The site shall be drained on a separate system for the disposal of foul and surface waters.

1.4 Study Objectives and Methodology

1.4.1 The objectives of this Report are as follows:

- Determine likely sources of flooding,
- Assess the proposals in the context of the National Planning Policy Framework,
- Propose an appropriate drainage strategy, and
- Determine appropriate mitigation and / or protection measures.

1.4.2 The methodology followed in the preparation of this report included the following:

- Investigation of the flood risk within and external to the Site,
- Consideration of post-development storm water run-off and identification of a means of storm water disposal, and
- Consideration of storm events up to and including the 100 year return period, including climate change, and calculation of the required volume of attenuation storage, where applicable.

1.4.3 This Report deals with environmental issues as they are impacted by flooding, other impacts on the environment are not considered. Existing sources of flood risk have been assessed, including groundwater and urban drainage systems.

1.4.4 Although the scope of this Report does not include detailed design, outline drainage calculations were performed for assessing the level of risk and general feasibility and are therefore indicative only.

1.5 Policy Background

1.5.1 In accordance with the 'National Planning Policy Framework' (NPPF) a site-specific Flood Risk Assessment is required for:

- Proposals of 1 hectare or greater in Flood Zone 1,
- All proposals for new development (including minor development and change of use) in Flood Zones 2 and 3, or in an area within Flood Zone 1 which has critical drainage problems (as notified to the Local Planning Authority by the Environment Agency),
- Where proposed development, or a change of use to a more vulnerable class, may be subject to other sources of flooding.

1.5.2 The site-specific Flood Risk Assessment should demonstrate how flood risk will be managed now and over the development's lifetime, taking climate change into account, and with regard to the vulnerability of its users.

- 1.5.3 The Department for Communities & Local Government publishes online Planning Practice Guidance to the NPPF, which is regularly updated, to provide additional guidance to ensure the effective implementation of the planning policy as set out in the NPPF.

1.6 Climate Change

- 1.6.1 The following Table shows current anticipated changes in extreme rainfall intensity in small and urban catchments.

Table 1.6: Peak rainfall intensity allowance in small and urban catchments

Applies across all of England	Total potential change anticipated		
	2015 to 2039	2040 to 2069	2070 to 2115
Upper end	10%	20%	40%
Central	5%	10%	20%

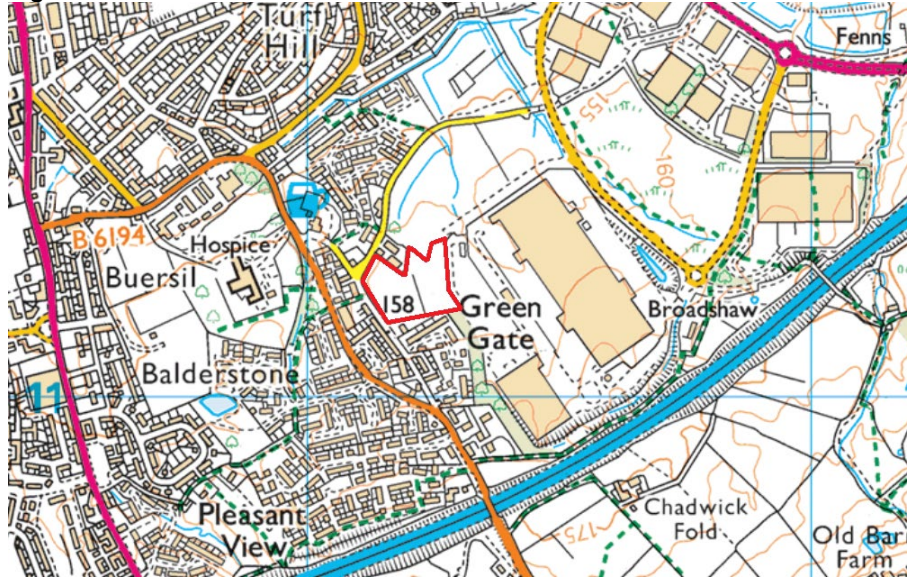
- 1.6.2 For Flood Risk Assessments, and Strategic Flood Risk Assessments, both the Central and Upper end allowances are to be considered so that the range of the impact can be assessed.
- 1.6.3 The design horizon of the proposed development is beyond 2070 and therefore peak rainfall intensity has, where applicable, been increased by 20% and 40%.

2 SITE (PLOT W) DETAILS

2.1 Location

- 2.1.1 Plot W is located at the western edge of Kingsway Business Park at approximate National Grid Reference SD912112 and post code OL16 4PT.
- 2.1.2 The approximate Site boundary is shown outlined red in Figure 2.1 below.

Figure 2.1: Site Location Plan



2.2 Description

- 2.2.1 Plot W has a total area of approximately 1.8 hectares and is bounded to the north by dwellings and Plot J2, to the south by dwellings (Verdant Way), to the east by Plot J1, and to the west by Broad Lane.
- 2.2.2 Ground levels generally fall from the centre of the Site (159mAOD) to both the northeast (157mAOD) and northwest (155mAOD). A Topographical Survey drawing¹ is presented in Appendix I.

2.3 Local Watercourses

- 2.3.1 The Stanney Brook, a designated 'main river', is located approximately 1.2km to the northeast of the Site.

2.4 Underlying Geology

- 2.4.1 The 1:50,000 British Geological Survey Maps show the Site to be underlain by:
- Superficial Deposits: Hummocky (Moundy) Glacial Deposits, Devensian – Diamicton,
 - Bedrock Geology: Pennine Lower Coal Measures Formation – Mudstone, Siltstone and Sandstone.

2.5 Groundwater

- 2.5.1 No site-specific groundwater data is currently available.

¹ Geomatic Surveys Limited Drawing No: 02043/01

3 FLOOD RISK ASSESSMENT

3.1 Fluvial Flood Risk

- 3.1.1 The Environment Agency's indicative Flood Map for Planning, as shown in Figure 3.1 below, shows the site to be located entirely within a 'Very Low' flood risk area (Flood Zone 1).

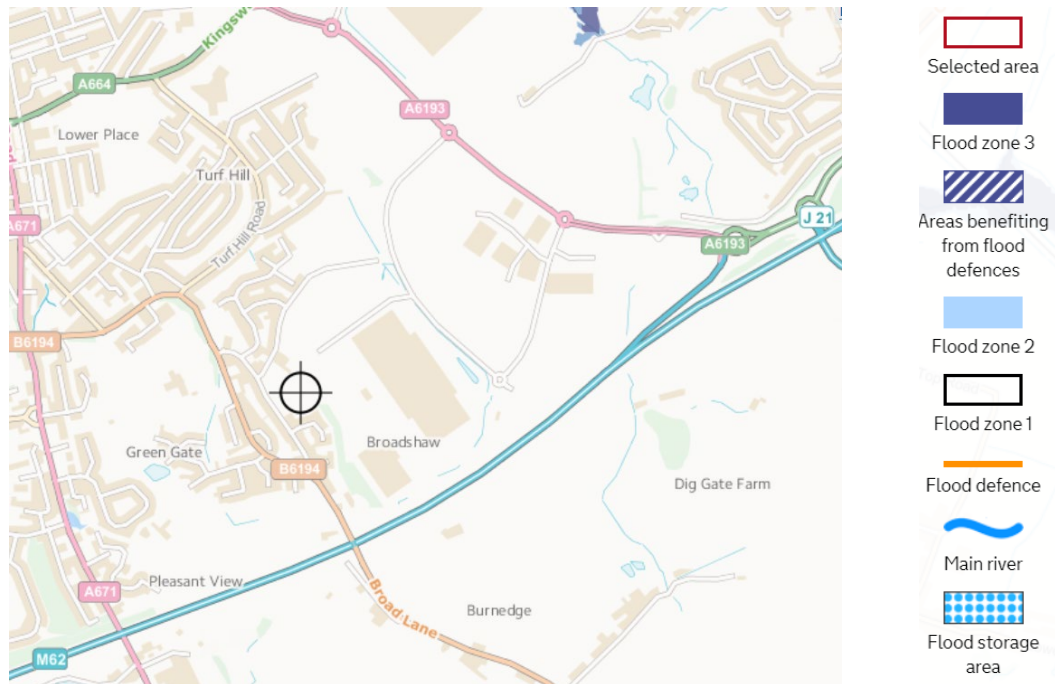


Figure 3.1: Environment Agency Indicative Fluvial Flood Map

- 3.1.2 The definitions of each flood zone are as follows:

Table 3.1: Flood Zone Definitions

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. (Not separately distinguished from Zone 3a on the Flood Map).

3.2 Pluvial Flood Risk

- 3.2.1 The Environment Agency's indicative Surface Water Flood Map, as shown in Figure 3.2 below, shows the site to be located entirely within a 'Very Low' flood risk area.

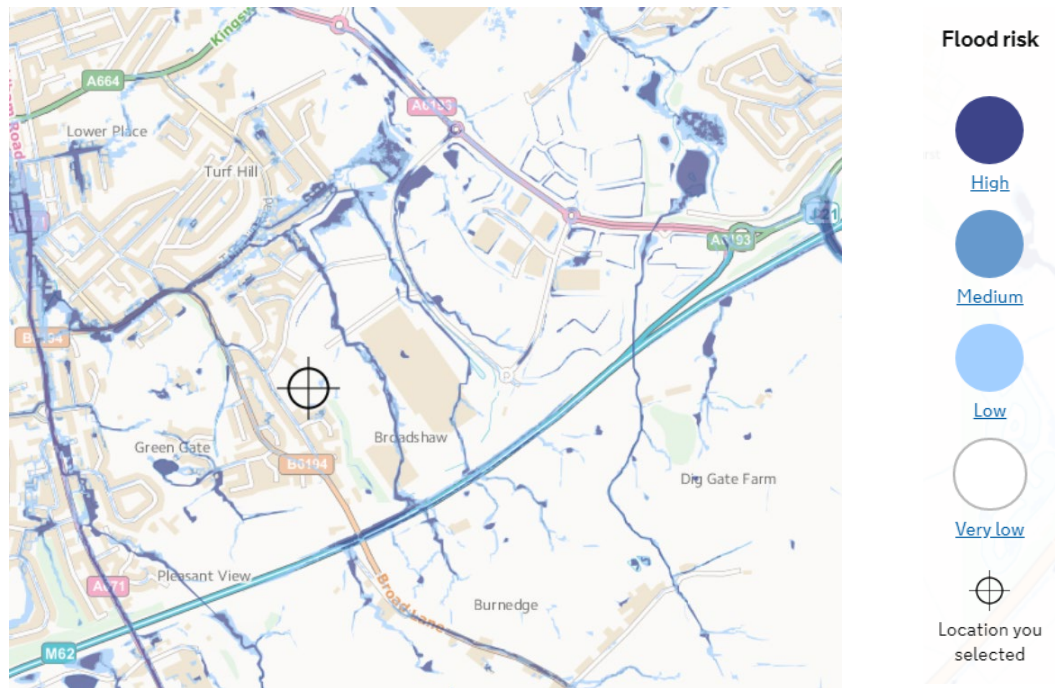


Figure 3.2: Environment Agency Indicative Surface Water Flood Map

3.3 Flood Risk from other Sources

Source	Flood Risk			
	Very Low	Low	Medium	High
Tidal	x			
Reservoir	x			
Sewer	x			
Groundwater		x		

Table 3.3: Flood Risk from other Sources

3.4 Potential Sources of Flooding

3.4.1 The most likely potential source of flooding to the Site is:

- Surface water runoff generated by the development; this is considered in more detail in Section 5.

4 THE DEVELOPMENT PROPOSALS

4.1 Site Layout

- 4.1.1 A residential development of 70 dwellings is proposed, as shown on the Layout drawing² included in Appendix I.
- 4.1.2 It is proposed the vehicular access(es) to the Site is via Broad Lane and not through the business park road network.

4.2 Proposed Levels

- 4.2.1 Where possible, proposed levels will resemble existing. However, it is anticipated that some earthworks operations will be necessary to facilitate roads and drainage.
- 4.2.2 A Schematic External Works Plan³ is included in Appendix I.

4.3 Area Take-off

- 4.3.1 The following table summarises the preliminary area take-off for the pre-and post-developed Sites based upon the Topographical Survey and Proposed Site Layout drawings presented in Appendix I; this is subject to change during detailed design.

Table 4.3: Preliminary Area Take-Off

Category	Area Take-off	
	Pre-Developed Site (ha)	Post-Developed Site (ha)
Impermeable Area	0.00	0.85
Permeable Area	1.77	0.92
Developable Area	1.77	1.77

- 4.3.2 The approximate existing and proposed impermeable areas equate to 0% and 48% respectively.

4.4 Existing Drainage

- 4.4.1 The site-wide drainage infrastructure constructed during an earlier phase included a surface water sewer that crosses the Site, close and parallel to the eastern boundary. This sewer is shown, with an appropriate easement over, on the proposed layout drawing included in Appendix I.
- 4.4.2 Based upon the current layout this sewer will be located within rear gardens. It would be prudent to divert this sewer to the front of plots 42-52 to facilitate future maintenance activities.

² Barratt / David Wilson Homes Drawing SK08

³ Banners Gate Drawing No: 19216 / SK01

5 SURFACE WATER DRAINAGE STRATEGY

5.1 Introduction

- 5.1.1 For the purposes of this Report it is proposed that stub-connections provided within the site-wide drainage infrastructure are used to service the Site. However, site investigations should be commissioned to establish if infiltration techniques would be a viable drainage solution. If so, the surface water drainage strategy should be revised accordingly.
- 5.1.2 As vehicular accesses are to be provided from Broad Lane it is anticipated that a small portion of proposed highway runoff will need to be directed to the public sewerage, or highway drainage, within Broad Lane.

5.2 Proposed Peak Runoff Rates

- 5.2.1 It is understood the existing site-wide drainage infrastructure has been designed to the 1 in 100 year return period standard with attenuation storage being provided at two strategic locations and the developable area's being 100% impermeable.
- 5.2.2 Whilst no climate change allowances were made within the design of the site-wide infrastructure this has been offset by the robust impermeable area allowances and thus we consider, for Plot W which has an estimated impermeable area of 48%, no additional on-site attenuation storage will be required to cater for the impacts of climate change. Consequently, an unrestricted discharge is proposed.
- 5.2.3 The permissible rate of runoff for any connections into any drainage within Broad Lane should be agreed with United Utilities and/or the Lead Local Flood Authority.

5.3 Water Quality

- 5.3.1 The details of any water treatment components within the site-wide drainage infrastructure are unknown. It is therefore recommended that these details are obtained or alternatively provision is made within the on-plot drainage network to provide an appropriate level of treatment.
- 5.3.2 In accordance with Table 26.2 of CIRIA Report C753 'The SuDS Manual' the pollution hazard level for the proposed development is 'Low' and therefore a simple index approach can be applied to ensure minimum water quality requirements are achieved.
- 5.3.3 The pollution hazard indices for the proposed development are summarised in Table 5.3.

Land Use	Total Suspended Solids	Metals	Hydrocarbons
Roofs	0.2	0.2	0.05
Driveways/road	0.5	0.4	0.4

Table 5.3: Pollution Hazard Indices (CIRIA Report C753 Table 26.2)

- 5.3.4 At the detailed design stage care must be taken to ensure appropriate treatment components are provided and the proposed mitigation indices exceed the land use pollution hazard.

5.4 Exceedance Flows

- 5.4.1 It is recommended that exceedance flow paths are considered at an early stage and where practicable the proposed layout modified to minimise risk to properties and access routes. In locations where this is deemed unfeasible, suitable mitigation measures must be adopted.

6 FOUL WATER DRAINAGE STRATEGY

- 6.1 The proposed development will produce a foul water effluent of a domestic nature only.
- 6.2 For the purposes of this Report it is proposed that stub-connections within the site-wide drainage infrastructure, to the northwest of the Site, are used to service the Site. A gravity drainage solution is considered feasible.

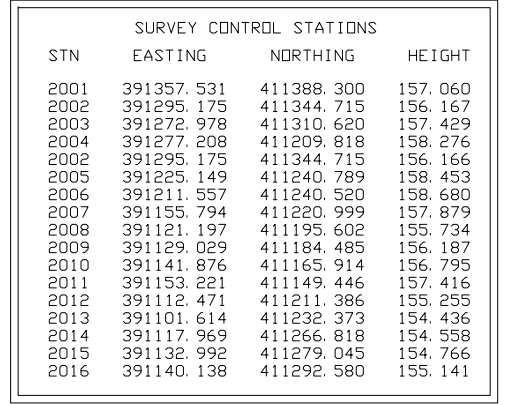
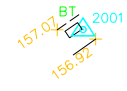
7 CONCLUSIONS

- 7.1 A residential development of 70 dwellings is proposed within Plot W of the Kingsway Business Park.
- 7.2 Outline Planning Permission for the Business Park, which included a residential element, was granted in August 2014.
- 7.3 Plot W is shown to be located within Flood Zone 1 and to be at allow risk of flooding from all sources.
- 7.4 Foul and surface water flows will generally be directed to the Kingsway Business Park drainage infrastructure, at uncontrolled rates. Surface water attenuation storage is provided within two strategic basins near to the Stanney Brook.
- 7.5 Site specific infiltration testing has confirmed that the use of infiltration techniques as the primary method of storm water disposal is inappropriate.
- 7.6 The updated surface water drainage strategy remains in accordance with the previously approved drainage strategy.

8 RECOMMENDATIONS

- 8.1 Site investigation should be commissioned to establish if infiltration techniques would be a viable drainage solution.
- 8.2 Permissible discharge rates for any surface water drainage not connected to the Kingsway Business Park system will need to be agreed with United Utilities and the Lead Local Flood Authority.
- 8.3 Consideration should be given to diverting the surface water sewer crossing the Site, to facilitate future maintenance activities.
- 8.4 Exceedance flow paths should be considered at an early stage and where practicable the proposed layout modified to minimise risk to properties and access routes.

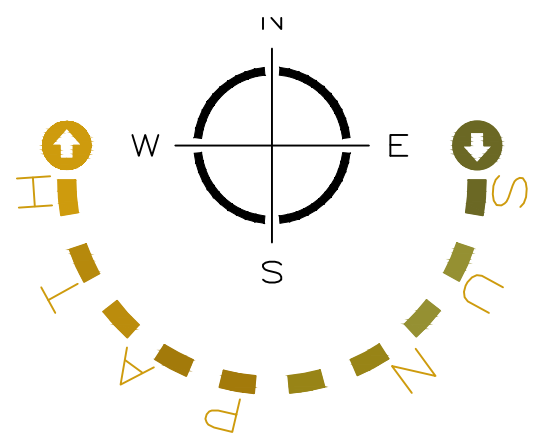
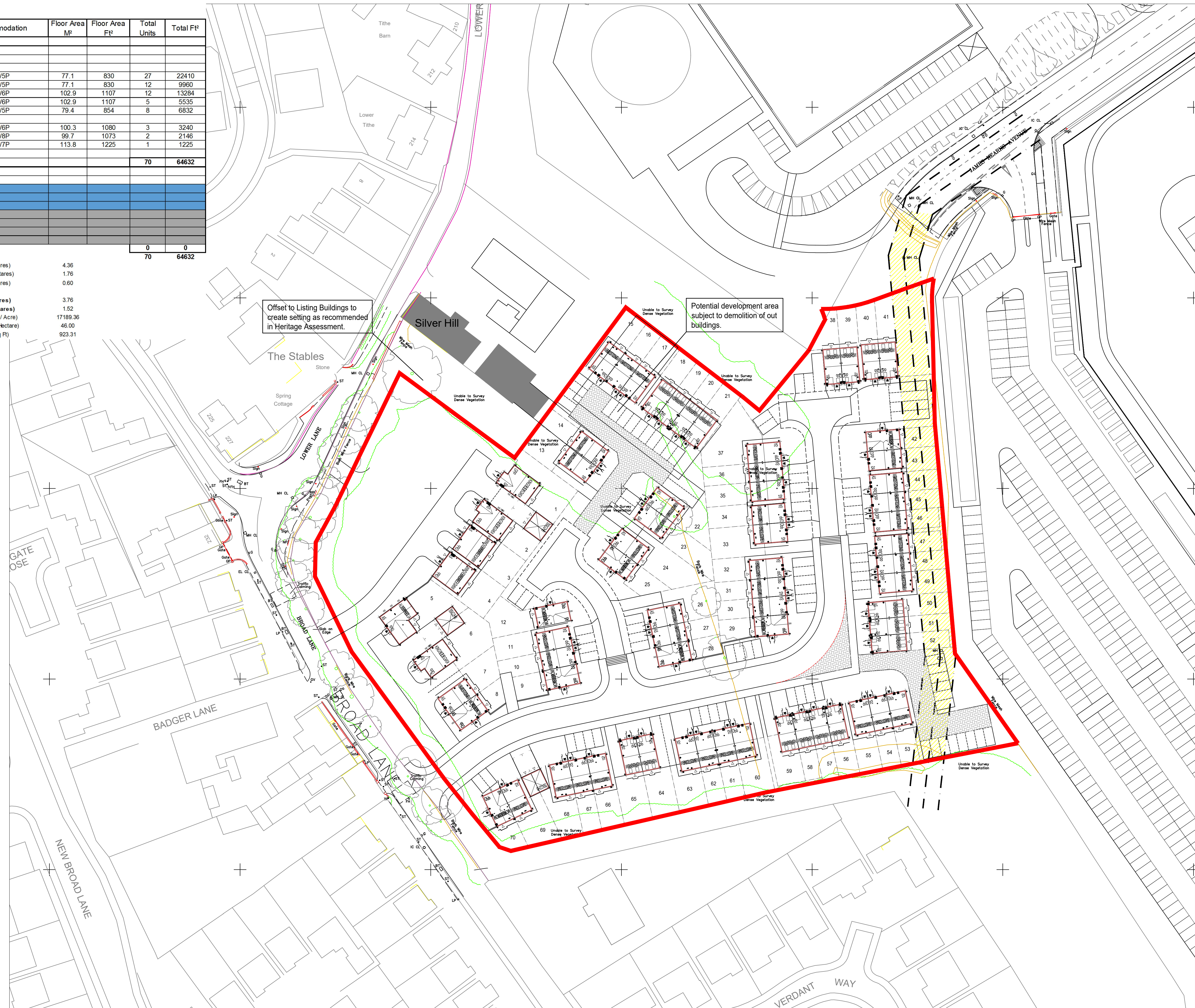
APPENDIX I – SUPPORTING INFORMATION



AV Air Valve
B Backsight
Bd Boland
BM Benchmark
BS Back Sight
BT Inspection Chamber
BU Bulb
C Cold
CATV Cable TV Cover
CC Cover
CF Chair Line Fence
CFL Concrete Flying Shot
ECS Electricity Control Box
F Flying Level Line
ER Earthing Rod
F Tower Shot
FI Fire Hydrant
FL Floor Level
GH Greenhouse
GP Gas Post
GV Gas Valve
G Gully
H Inspection Chamber
H Level
H Level
H Level
K Junction Box
LP Lump Pump
L Level
M Marker Post
M Metal Store Material
NP Street Name Plate
P Post
PB Post Box
P Pipe
M Parking Meter
P/P Post & Rail Fence
P/P Post & Wire Fence
PE Electrically Piped
RD Reading Eye
R/R Reading Ridge Level
R/R Reading Street Sight
R/R Retaining Wall
R/R Reinforcing Pipe
SC Step Crack
S Scaffolding
SP Sign Post
ST Stop Tap
SV Stop Valve
SV Stop Valve
TC Traffic Crossing
T Telephone Call Box
T Trial Hole
T Threshold Level
TOW Top of Wall Level
UP Underpinning Level
U Upper Floor Level
W Water Meter
W Water Valley Level

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Parcel Area	(Acres)	4.36
Parcel Area	(Hectares)	1.76
Total POS, Undevelopable & SSR	(Acres)	0.60
Developable	(Acres)	3.76
Developable	(Hectares)	1.52
Coverage	(Sq Ft / Acre)	17189.36
Density	(Units/Hectare)	46.00
Av. Unit Size	(Sq Ft)	923.31



Key:

Rev	Amendment	Drawn/Date:

The logo for Barratt Homes features a stylized tree icon inside a square frame on the left. To the right of the frame, the word 'BARRATT' is written in a large, bold, sans-serif font, with 'HOMES' in a smaller, similar font below it. A horizontal line separates the two words.

Project
PLOT - W
KINGSWAY
ROCHDALE

Drawing Title

SKETCH 08

Status
For Comment

Scale
1:500 @ A1

Date
11/18

Drawn By
CW

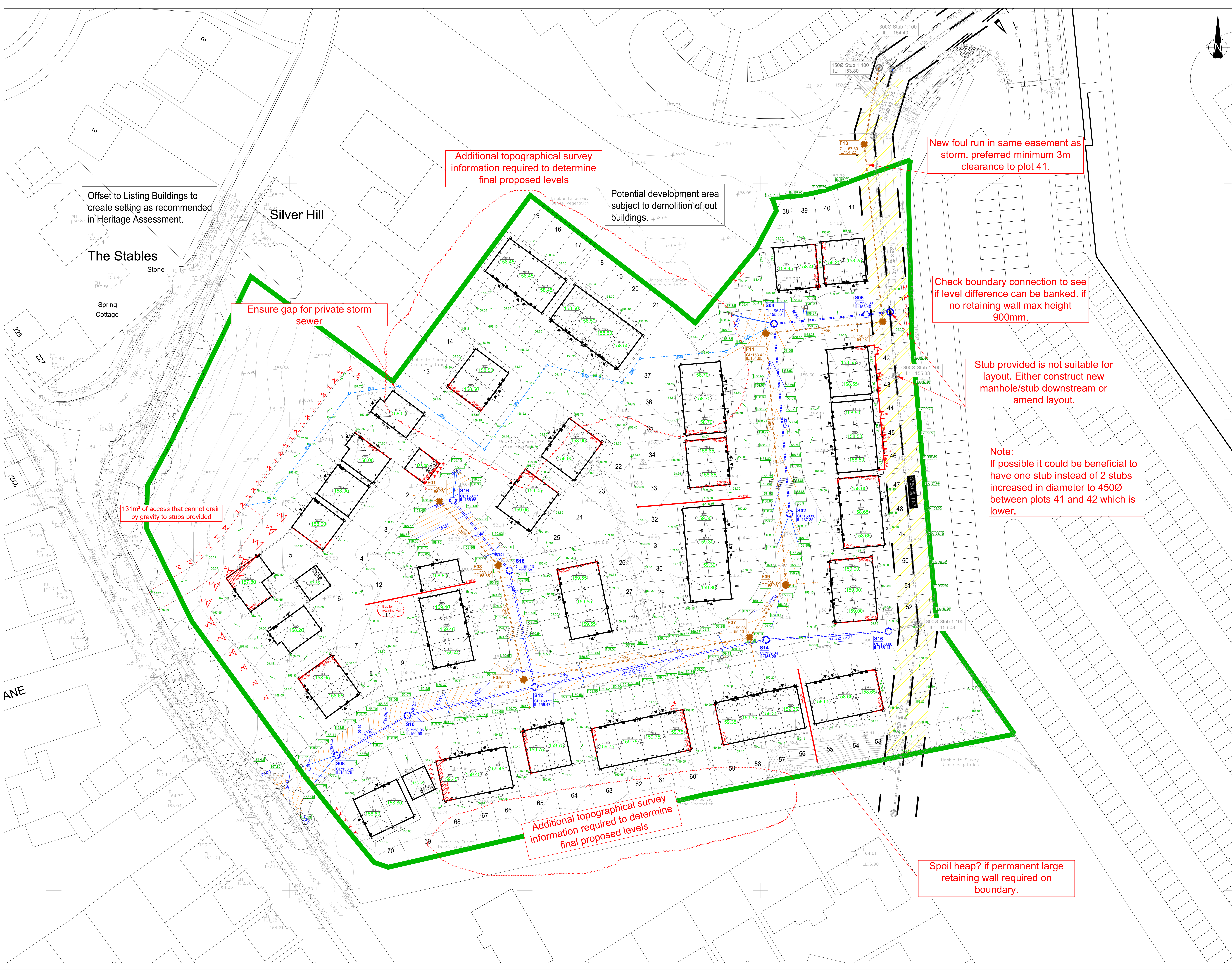
Drawing Ref

revision

SK08

1





Offset to Listing Buildings to create setting as recommended in Heritage Assessment.

Ensure gap for private storm sewer

131m² of access that cannot drain by gravity to stubs provided

Additional topographical survey information required to determine final proposed levels

Potential development area subject to demolition of out buildings.

New foul run in same easement as storm. preferred minimum 3m clearance to plot 41.

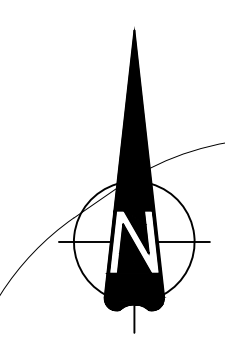
Check boundary connection to see if level difference can be banked. if no retaining wall max height 900mm.

Stub provided is not suitable for layout. Either construct new manhole/stub downstream or amend layout.

Note:
If possible it could be beneficial to have one stub instead of 2 stubs increased in diameter to 450Ø between plots 41 and 42 which is lower.

Additional topographical survey information required to determine final proposed levels

Spoil heap? if permanent large retaining wall required on boundary.



External Levels & Features Legend:

Levels

- 100.00 Proposed Finished Floor Level
- 000.00 Proposed Garage Level
- 100.00 Proposed Rise of Footway Level
- 100.00 Proposed External Level
- 100.00 Existing External Level
- 100.00 Proposed Fall Direction & Gradient

General

- Site Boundary

External Works

- Proposed Double Drury Flood Covering
- Proposed Exposed Brickwork (minimum below damp proof course)
- Proposed Tanking (minimum below damp proof course)
- Proposed Masonry Retaining Wall
- Proposed Bank / Slope (see general note 1)
- Proposed Steps

Drainage Legend:

General

- 140.00 Proposed Finished Floor Level
- 139.85 Proposed Garage Sub Level

Private Drainage

- Foul Water Sewer (100mm unless otherwise stated)
- Foul Water S25mm Inspection Chamber (Min. Depth 300mm)
- Foul Water Pipe Diameter
- Storm Water Sewer (100mm unless otherwise stated)
- Storm Water S25mm Inspection Chamber (Min. Depth 300mm)
- Storm Water Pipe Diameter

Adoptable Drainage

- S104 SW Sewer & MH
- S104 SW Manhole Ref. (Four & Fourteen)
- S104 FW Sewer & MH
- S104 FW Manhole Ref. (Four & Fourteen)
- Proposed SBR Gully & Connection (100mm)

Existing Drainage

- Existing Foul Sewer
- Existing Storm Sewer
- Existing Storm Water MH
- Existing Foul Water MH

Client

David Wilson Homes

Project

Kingsway, Parcel W, Rochdale

Title

Schematic Drainage and External Works Strategy Plan

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Date	December 2019	Checked	SF
Date	19/11/2019	Drawn	JE