

Sheriffhall South East

Flooding, Drainage & Surface Water Strategy



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Sherrifhall South East – Proposed Mixed Use Development

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Flooding, Drainage and Surface Water Strategy

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Buccleuch Property Limited

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CONTENTS

Section	Page No
1. INTRODUCTION	3
2. TOPOGRAPHY	3
3. FLOODING	4
4. DRAINAGE	4
4.1 EXISTING DRAINAGE	4
4.2 SURFACE WATER DRAINAGE.....	5
5. CONCLUSION	7

APPENDICES

APPENDIX A	- Architect's Site Location Plan
APPENDIX B	- Architect's Site Plan
APPENDIX C	- Topographic Survey
APPENDIX D	- SEPA Flood Map
APPENDIX E	- Existing Scottish Water Records
APPENDIX F	- Rising Main Route Drawing
APPENDIX G	- SEPA Simple Index Approach Tool and Greenfield Calculation Sheet
APPENDIX H	- Proposed Site Drainage Layout (including SUDS)
APPENDIX I	- Drainage Calculations

1. INTRODUCTION

Quattro Consult Limited has been commissioned to provide a Flooding, Drainage and Surface Water Strategy for the erection of Mixed Use Development at Sherrifhall South, Midlothian.

The purpose of this report is to provide additional detail for the redevelopment of the east site at Sheriffhall South. Work has previously been undertaken on the west portion of the site, with development infrastructure installed and a Public House developed. Site investigation works have also been undertaken prior to development.

The site is bounded to the north by the Dean Burn, to the east by Melville Gate Road, and to the south by the B6392. To the west the site is bound by the A7.

Flooding will be reviewed and will consider the wider SEPA Flood Mapping that relates to the proposed development site.

It is proposed to provide separate drainage systems for foul and surface water within the site. Foul will discharge into the existing Scottish Water system, with surface water into the burn. The proposed development uses the already agreed principle for surface water drainage to an onsite SUDS basin before discharging via a swale into the Dean Burn adjacent.

The Architect's Site Location Plan with site boundary line is shown in **Appendix A**.

The Architect's Site Plan Layout is presented in **Appendix B**.

2. TOPOGRAPHY

Based on the topographic survey shown in **Appendix C**, the site is generally at a level of 72.5m AOD and slopes down from south to the north south to a level of 57.0 m AOD.

The general fall of the existing topography is therefore from southwest to northeast.

3. FLOODING

The SEPA Flood Map, a copy of which is in **Appendix D**, has been reviewed; its content is highlighted below.

There are no surface watercourses on the main part of the site; the closest surface watercourse is the Dean Burn, which is located to the north boundary of the site, flowing towards the northeast. The online SEPA Flood Map indicates that this part of the site is within an area susceptible to flooding due to the existing watercourse and the low lying area around it.

The Dean Burn runs in open channel in an easterly direction and is culverted at the entry to the site via a 1.7m diameter culvert, the invert level of the culvert at this point is shown as 57.16m AOD (approx) on the survey drawing. The watercourse conveys flows from the upland catchment areas, fed via a series of other culverts/road crossings.

The burn exits the site at an invert level of 55.6 (approx) via a 2.4m wide culvert.

The area to the north of the development site, which is well outwith the proposed development area, highlights flooding (fluvial and pluvial) local to the existing watercourse, the Dean Burn.

It is proposed that all development, including the SUDS basin, is located outwith the indicated flood zone adjacent to the Dean Burn at the higher part of the site well above the existing burn.

It is noted that the development plot is generally at level of 72.5m AOD with the area adjacent to the Dean Burn being at 57.0m AOD.

Any new SUDS drainage infrastructure will provide surface water flows at a greenfield runoff to the existing Dean Burn outwith the existing flood zone.

4. DRAINAGE

4.1 Existing Drainage

As the site is currently greenfield, there is no existing drainage within the extents of the site boundary apart from field drains. These drains will flow downhill to the Dean Burn as there is a natural fall.

It is noted that the site falls to the north with no available Scottish Water connection points available close to the site. The nearest Scottish Water asset is the PFI sewer running to the south of the site.

The onsite foul discharge will connect by gravity towards the north of the site to an onsite pumping station where it will be pumped back up south along the new access road to a point externally on the A7 corridor at FWMH01 where it will fall by gravity towards the wider strategic sewerage system.

The existing Scottish Water records contained **Appendix E** highlight the potential connection points for the foul rising main.

Drawing 4536-501 in **Appendix F** highlights the route of the proposed rising main and connection to the wider system.

4.2 Surface Water Drainage

Flows/Attenuation

It is proposed to limit surface water discharge to 4.5 l/s/Ha for all return periods up to and including the 1:200 year +30% climate change.

This figure is based on replicating the two-year greenfield discharge. This is the agreed strategy for Sherrifhall/Midlothian.

The greenfield calculation sheet is located in **Appendix G**.

Each plot will have a restricted surface water discharge prior to connection to a main spine surface water sewer. Surface water will require to be discharged via the SUDS pond prior to discharge into the swale and then to the Dean Burn via gravity drainage. The drawings in **Appendix H** highlight the potential SUDS areas.

Discharge quality will be controlled by introduction of SUDS components to create an appropriate treatment train. Discharge quantity will be restricted to greenfield runoff.

SUDS

The drainage proposals require to incorporate SUDS components to assist with management of surface water run-off. A SEPA Simple Index Approach (SIA) tool has been used to review the SUDS. This is contained in **Appendix G** along with the greenfield calculations.

The proposed conveyance system will use a site wide combination of swales, collection pipes, silt traps, gully guards, permeable paving, gravel filter trenches and ponds/detention basins to provide a manageable SUDS treatment train prior to outfall discharge to the new watercourse.

The proposed discharge outfalls to the existing watercourse will require to acknowledge the existing water/bed levels.

The following table outlines the SUDS strategy proposed for the development.

Site access roads within commercial areas

- Asphalt road drained by point gullies or beeny blocks.
- Silt trap and proprietary “gully guard” installed at each point drainage position.
- Surface water directed to pond/watercourse prior to discharge swale via open outfall.

PRE-TREATMENT + 2 STAGE SUDS TREATMENT

Commercial buildings roof areas and pedestrian areas around buildings

- Surface water collected via a series of gutters and rainwater pipes.
- Silt traps/access chambers provided at the base of rainwater downpipes.
- Footpaths designed with crossfall to direct water onto adjacent porous surfacing.
- Isolated footpaths drain via slot drains and connect to surface water runs upstream of
- SUDS treatment.
- Surface water directed to below ground gravel filter strips. Filter strips form tanked treatment areas are located below selected parking bays.
- If required storm water directed to additional below ground storm attenuation crate system.
- Discharge from each plot to main collector network restricted to 4.5l/s via a flow control manhole.
- Ultimate controlled discharge to new pond/detention basin via commercial area headwall structure.

PRE-TREATMENT + 2 STAGE SUDS TREATMENT

The proposed car parking areas will be drained through a porous surfacing with a minimum of 500mm deep clean stone filter before discharging into the network.

Once the flow has been attenuated and flow controlled, the use of a Downstream Defender manhole to provide additional treatment the surface water run-off prior to discharge to the wider development drainage network. Downstream defender manholes by Hydro International are an advanced hydrodynamic vortex separator that reliably captures and retains sediments, oil, trash and floatables from surface water run-off.

The Proposed Surface Water Drainage Plan is located in **Appendix H**.

Drainage calculations are in **Appendix I**.

5. CONCLUSION

A review of the proposed development has been carried out. Consideration has been given to the requirements of Midlothian Council, SEPA and Scottish Water.

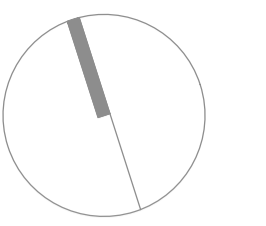
SEPA flood mapping has identified a limited area of flooding adjacent to the Dean Burn, well outwith and well below the site level of the proposed development.

An appropriate SUDS solution has been identified to provide the level of treatment required by the SEPA SIA treatment tool with developed plots requiring to be attenuated to a greenfield runoff rate before connecting to the strategic network, discharging to a SUDS basin and swale then discharging into the Dean Burn

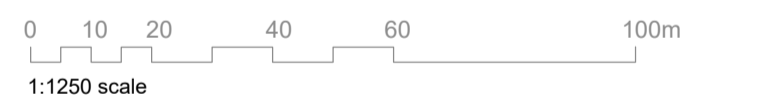
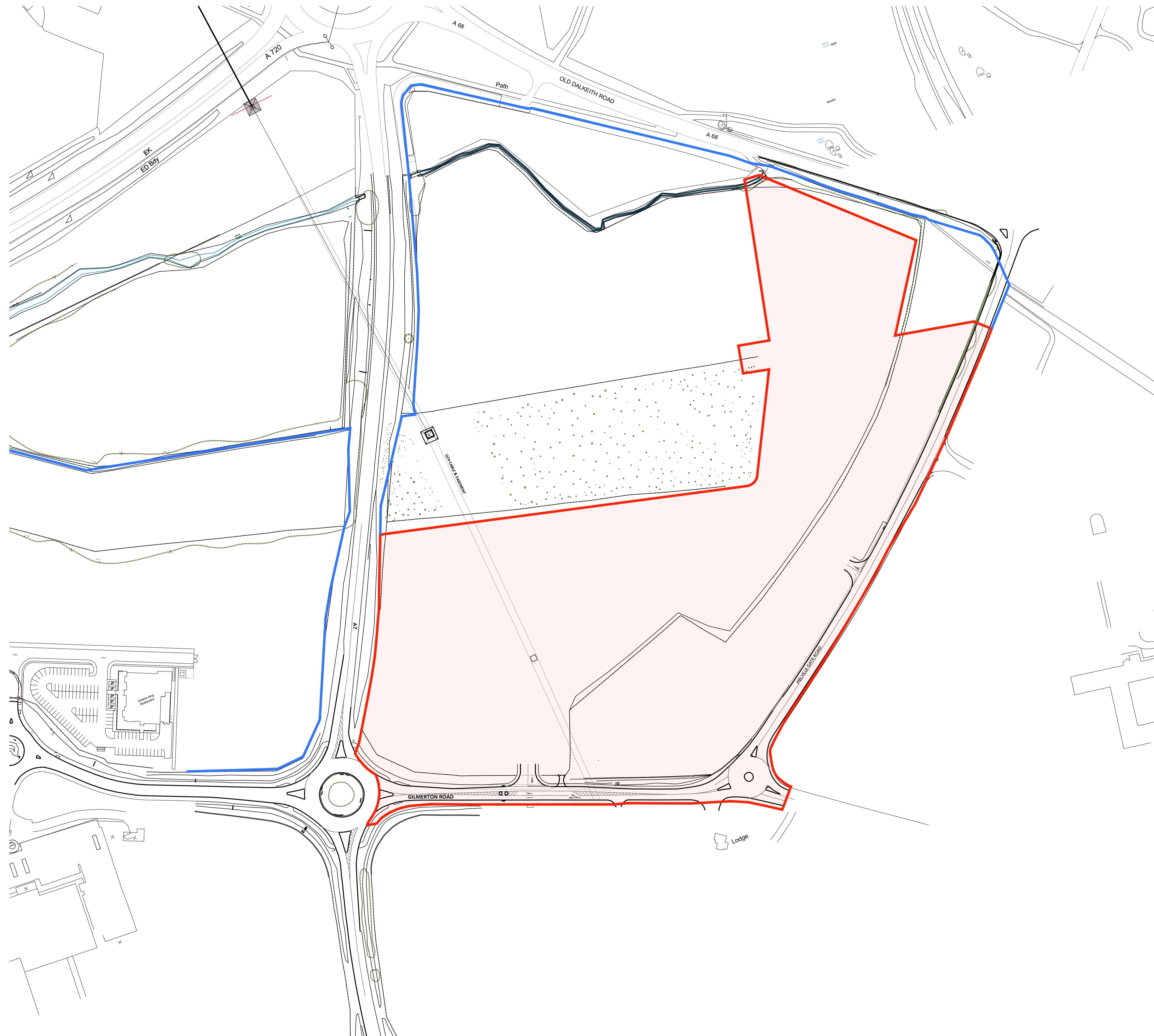
On site foul drainage will drain by gravity to a common pumping station which will connect to a rising main which will then connect off site to a new connection to the existing PFI Sewer. Appropriate approvals will be obtained.

APPENDIX A

Architect's Site Location Plan



Application Boundary
Area = 8.51 ha / 21 acres (or thereby)



1:1250 scale
HFM
HALLIDAY FRASER MUNRO
CHARTERED ARCHITECTS & PLANNING CONSULTANTS

Project:
Proposed Mixed Use Development
Sheriffhall South East

Client:
Buccleuch Property

Title:
Location Plan

Document Reference						
Project Code	Original Code	Volume	Location / Level	Type	Revision	Drawing Number
11658	HFM	ZZ	ZZ	-DR	A	P(00) 001

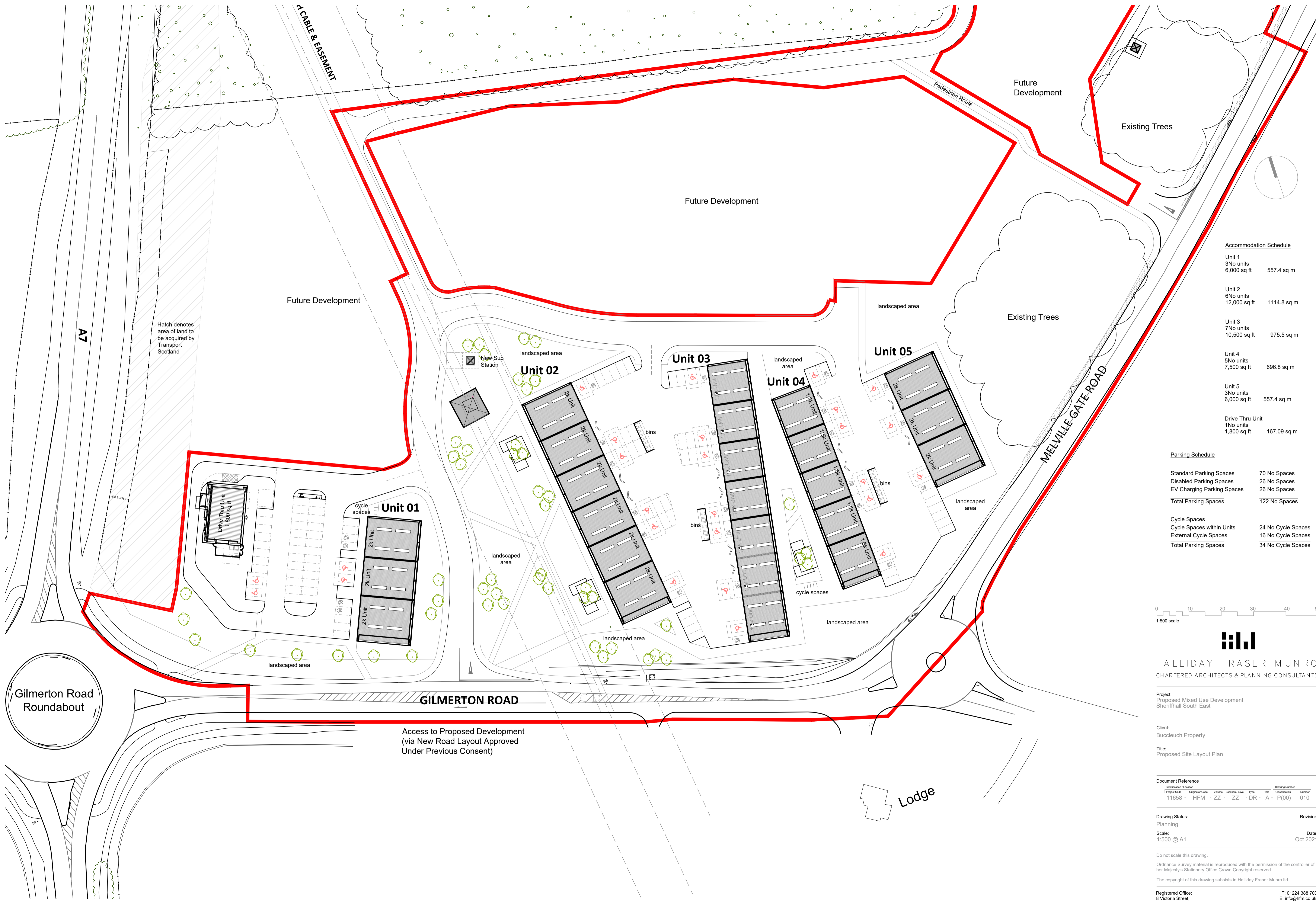
Drawing Status:	Revision
Planning	
Scale:	Date:
1:1250 @ A1	Oct 2021

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APPENDIX B

Architect's Site Plan

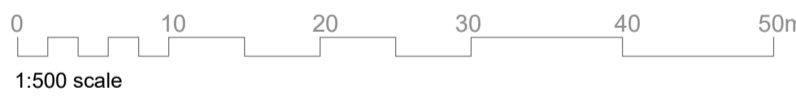


Accommodation Schedule

Unit 1	3No units	6,000 sq ft	557.4 sq m
Unit 2	6No units	12,000 sq ft	1114.8 sq m
Unit 3	7No units	10,500 sq ft	975.5 sq m
Unit 4	5No units	7,500 sq ft	696.8 sq m
Unit 5	3No units	6,000 sq ft	557.4 sq m
Drive Thru Unit	1No units	1,800 sq ft	167.09 sq m

Parking Schedule

Standard Parking Spaces	70 No Spaces
Disabled Parking Spaces	26 No Spaces
EV Charging Parking Spaces	26 No Spaces
Total Parking Spaces	122 No Spaces
Cycle Spaces	
Cycle Spaces within Units	24 No Cycle Spaces
External Cycle Spaces	16 No Cycle Spaces
Total Parking Spaces	34 No Cycle Spaces



HALLIDAY FRASER MUNRO
 CHARTERED ARCHITECTS & PLANNING CONSULTANTS

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Title:
 Proposed Site Layout Plan

Document Reference

Project Code	Original Code	Volume	Location / Level	Type	Rev	Classification	Number
11658	HFM	- ZZ	- ZZ	- DR	- A	- P(00)	010

Drawing Status: Planning
Scale: 1:500 @ A1
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Gilmerton Road Roundabout

Access to Proposed Development
 (via New Road Layout Approved
 Under Previous Consent)

Lodge

Hatch denotes
 area of land to
 be acquired by
 Transport
 Scotland

A7

Future Development

Future Development

Future
 Development

Existing Trees

Existing Trees

Unit 02

Unit 03

Unit 04

Unit 05

Unit 01

GILMERTON ROAD

MELVILLE GATE ROAD

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