

Friday, 05 June 2020



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Dear Sir/Madam

SITE: 229, Willowbrae Road, Edinburgh, EH8 7ND
PLANNING REF: 20/02101/FUL
OUR REF: DSCAS-0015607-TC5
PROPOSAL: A residential led development consisting of 48 apartments over 2 apartment buildings with a commercial unit at ground floor

Please quote our reference in all future correspondence

Audit of Proposal

Scottish Water has no objection to this planning application; however, the applicant should be aware that this does not confirm that the proposed development can currently be serviced and would advise the following:

Water Capacity Assessment

Scottish Water has carried out a Capacity review and we can confirm the following:

- ▶ There is currently **sufficient** capacity in the Glencorse Water Treatment Works to service your development. However, please note that further investigations may be required to be carried out once a formal application has been submitted to us.

Waste Water Capacity Assessment

- ▶ This proposed development will be serviced by Edinburgh Waste Water Treatment Works. Unfortunately, Scottish Water is unable to confirm capacity currently so to allow us to fully appraise the proposals we suggest that the applicant completes a Pre-Development Enquiry (PDE) Form and submits it directly to Scottish Water via [our Customer Portal](#) or contact Development Operations.



To find out more about connecting your

property to the water and waste water supply visit:



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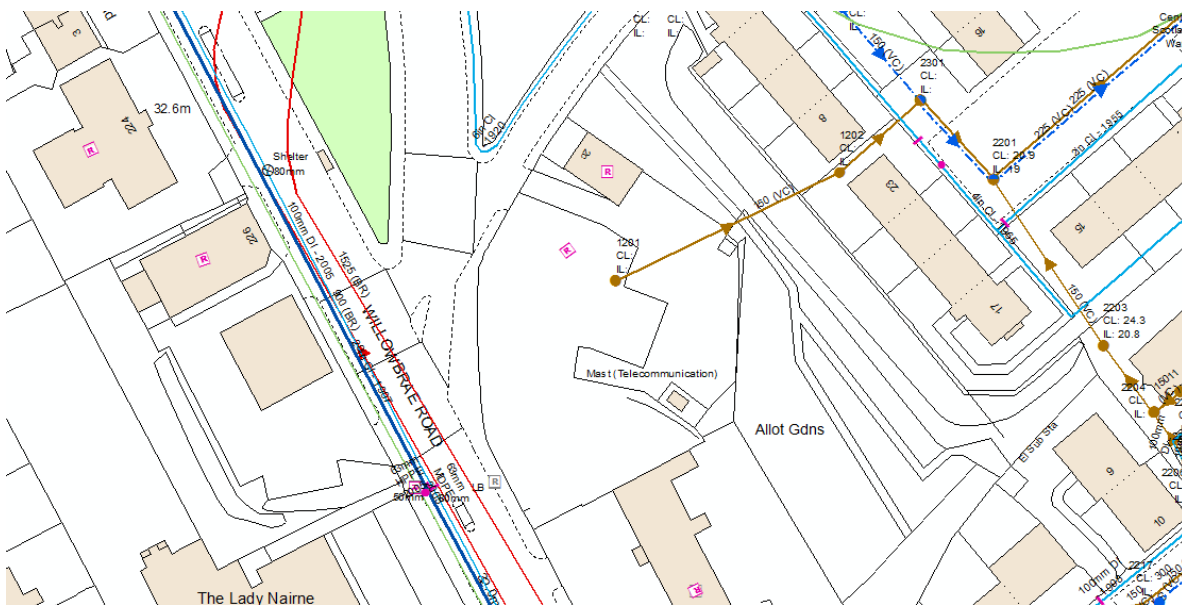


Please Note

- ▶ The applicant should be aware that we are unable to reserve capacity at our water and/or waste water treatment works for their proposed development. Once a formal connection application is submitted to Scottish Water after full planning permission has been granted, we will review the availability of capacity at that time and advise the applicant accordingly.

Asset Impact Assessment

According to our records, the development proposals impact on existing Scottish Water assets.



The applicant must identify any potential conflicts with Scottish Water assets and contact our Asset Impact Team via [our Customer Portal](#) to apply for a diversion.

The applicant should be aware that any conflict with assets identified may be subject to restrictions on proximity of construction. Please note the disclaimer at the end of this response.

Surface Water

For reasons of sustainability and to protect our customers from potential future sewer flooding, Scottish Water will not accept any surface water connections into our combined sewer system.

There may be limited exceptional circumstances where we would allow such a connection for brownfield sites only, however this will require significant justification from the customer taking account of various factors including legal, physical, and technical challenges.



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In order to avoid costs and delays where a surface water discharge to our combined sewer system is anticipated, the developer should contact Scottish Water at the earliest opportunity with strong evidence to support the intended drainage plan prior to making a connection request. We will assess this evidence in a robust manner and provide a decision that reflects the best option from environmental and customer perspectives.

General notes:

- ▶ Scottish Water asset plans can be obtained from our appointed asset plan providers:
 - ▶ Site Investigation Services (UK) Ltd
 - ▶ Tel: 0333 123 1223
 - ▶ Email: sw@sisplan.co.uk
 - ▶ www.sisplan.co.uk
- ▶ Scottish Water's current minimum level of service for water pressure is 1.0 bar or 10m head at the customer's boundary internal outlet. Any property which cannot be adequately serviced from the available pressure may require private pumping arrangements to be installed, subject to compliance with Water Byelaws. If the developer wishes to enquire about Scottish Water's procedure for checking the water pressure in the area, then they should write to the Customer Connections department at the above address.
- ▶ If the connection to the public sewer and/or water main requires to be laid through land out-with public ownership, the developer must provide evidence of formal approval from the affected landowner(s) by way of a deed of servitude.
- ▶ Scottish Water may only vest new water or waste water infrastructure which is to be laid through land out with public ownership where a Deed of Servitude has been obtained in our favour by the developer.
- ▶ The developer should also be aware that Scottish Water requires land title to the area of land where a pumping station and/or SUDS proposed to vest in Scottish Water is constructed.
- ▶ Please find information on how to submit application to Scottish Water at [our Customer Portal](#).

Next Steps:

▶ All Proposed Developments

All proposed developments require to submit a Pre-Development Enquiry (PDE) Form to be submitted directly to Scottish Water via [our Customer Portal](#) prior to any formal Technical Application being submitted. This will allow us to fully appraise the proposals.

Where it is confirmed through the PDE process that mitigation works are necessary to support a development, the cost of these works is to be met by the developer,



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which Scottish Water can contribute towards through Reasonable Cost Contribution regulations.

► **Non Domestic/Commercial Property:**

Since the introduction of the Water Services (Scotland) Act 2005 in April 2008 the water industry in Scotland has opened to market competition for non-domestic customers. All Non-domestic Household customers now require a Licensed Provider to act on their behalf for new water and waste water connections. Further details can be obtained at www.scotlandontap.gov.uk

► **Trade Effluent Discharge from Non Dom Property:**

- Certain discharges from non-domestic premises may constitute a trade effluent in terms of the Sewerage (Scotland) Act 1968. Trade effluent arises from activities including; manufacturing, production and engineering; vehicle, plant and equipment washing, waste and leachate management. It covers both large and small premises, including activities such as car washing and launderettes. Activities not covered include hotels, caravan sites or restaurants.
- If you are in any doubt as to whether the discharge from your premises is likely to be trade effluent, please contact us on 0800 778 0778 or email TEQ@scottishwater.co.uk using the subject "Is this Trade Effluent?". Discharges that are deemed to be trade effluent need to apply separately for permission to discharge to the sewerage system. The forms and application guidance notes can be found [here](#).
- Trade effluent must never be discharged into surface water drainage systems as these are solely for draining rainfall run off.
- For food services establishments, Scottish Water recommends a suitably sized grease trap is fitted within the food preparation areas, so the development complies with Standard 3.7 a) of the Building Standards Technical Handbook and for best management and housekeeping practices to be followed which prevent food waste, fat oil and grease from being disposed into sinks and drains.
- The Waste (Scotland) Regulations which require all non-rural food businesses, producing more than 50kg of food waste per week, to segregate that waste for separate collection. The regulations also ban the use of food waste disposal units that dispose of food waste to the public sewer. Further information can be found at www.resourceefficientscotland.com

I trust the above is acceptable however if you require any further information regarding this matter please contact me on **0800 389 0379** or via the e-mail address below or at planningconsultations@scottishwater.co.uk.



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Yours sincerely,

Planning Application Team

Development Operations Analyst

developmentoperations@scottishwater.co.uk

Scottish Water Disclaimer:

"It is important to note that the information on any such plan provided on Scottish Water's infrastructure, is for indicative purposes only and its accuracy cannot be relied upon. When the exact location and the nature of the infrastructure on the plan is a material requirement then you should undertake an appropriate site investigation to confirm its actual position in the ground and to determine if it is suitable for its intended purpose. By using the plan you agree that Scottish Water will not be liable for any loss, damage or costs caused by relying upon it or from carrying out any such site investigation."



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CDA Group

Proposed Development at Willowbrae Road, Edinburgh

Flood Risk Assessment

Final

February 2020

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Document Information and History

Project: Proposed Development at Willowbrae Road, Edinburgh - Flood Risk Assessment
Client: CDA Group
Client Representative: Nicolas Saunders
Kaya Consulting Job Number: KC1776
Filename: 1776 Willowbrae Road Final
Project Director: Michael Stewart
Author: Lee Ruddick

This document has been issued and amended as follows:

Version	Date	Description	Created by:	Verified by:	Approved by:
1.0	23/01/2020	Draft	Lee Ruddick	Michael Stewart	Michael Stewart
2.0	27/01/2020	Draft – post review	Lee Ruddick	Michael Stewart	Michael Stewart
3.0	04/02/2020	Final	Lee Ruddick	Michael Stewart	Michael Stewart

Table of Contents

SEPA Checklist	i
1 Introduction	1
2 Legislative and Policy Aspects.....	3
2.1 National Planning Policy	3
2.2 SEPA Flood Maps	6
2.3 SEPA Technical Flood Risk Guidance.....	6
2.5 Flood Risk Management (Scotland) Act 2009	10
2.6 Controlled Activities Regulations (CAR)	10
2.7 Climate Change	10
3 Site Location and Description	11
4 Flood Risk Assessment.....	18
4.1 Braid Burn	18
4.2 Surface Water Flooding	19
4.3 Groundwater Flooding.....	23
4.4 Safe Access	23
5 Summary and Conclusions	24
6 Appendix 1 – Sensitivity Results using LiDAR only Topography.....	25

List of Figures

Figure 1: General location of site	2
Figure 2: Site boundary and location	12
Figure 3: a) General topography of the site and surrounding area with contours (from LiDAR topography with 2m contour interval shown), b) General topography across the model area with contours (5m contour interval shown).....	13
Figure 4: Cross sections of the site and surroundings.....	14
Figure 5: General topography of the unnamed bridge crossing Braid Burn and surroundings with contours (from LiDAR topography with 2m contour interval shown). Orange arrows denote overland flow pathways if the bridge is blocked.....	18
Figure 6: Watershed analysis of the area of the site	20
Figure 7: 2D active domain (denoted in purple).....	21
Figure 8: Maximum predicted flood extent for the 1 in 200-year 1-Hour rainfall event – updated local topography	21

List of Photographs

Photo 1: View of the site from the west.....	15
Photo 2: Northfield Drive to the north of the site	15
Photo 3: View of the site's southern boundary.....	16
Photo 4: Willowbrae Road to the west of the site	16
Photo 5: View to the east of the site	17

SEPA Checklist

SEPA Scottish Environmental Protection Agency Established by the Environment Act 1968		Flood Risk Assessment (FRA) Checklist		(SS-NFR-F-001 - Version 14 - Last updated 28/05/2019)	
<p>This document must be attached within the front cover of any Flood Risk Assessments issued to Local Planning Authorities (LPA) in support of a development proposal which may be at risk of flooding. The document will take only a few minutes to complete and will assist SEPA in reviewing FRAs, when consulted by LPAs. This document should not be a substitute for a FRA.</p>					
Development Proposal Summary					
Site Name:	Willowbrae Road				
Grid Reference:	Easting:	329130	673262		
Local Authority:	Edinburgh City Council				
Planning Reference number (if known):					
Nature of the development:	Residential	If residential, state type: Flats			
Size of the development site:	~0.3	Ha			
Identified Flood Risk:	Source:	Pluvial	Source name:		
Land Use Planning					
Is any of the site within the functional floodplain? (refer to SPP para 255)	No	If yes, what is the net loss of storage? m ³			
Is the site identified within the local development plan?	No	Local Development Plan Name: Year of Publication:			
If yes, what is the proposed use for the site as identified in the local plan?		Allocation Number / Reference:			
Does the local development plan and/or any pre-application advice, identify any flood risk issues with or requirements for the site.	No	If other please specify:			
What is the proposed land use vulnerability?	Highly Vulnerable	If so, please specify:			
		Do the proposals represent an increase in land use vulnerability? Yes			
Supporting Information					
Have clear maps / plans been provided within the FRA (including topographic and flood inundation plans)?	Yes				
Has sufficient supporting information, in line with our Technical Guidance, been provided? For example: site plans, photos, topographic information, structure information and other site specific information.	Yes				
Has a historic flood search been undertaken?	Yes	If flood records in vicinity of the site please provide details:			
Is a formal flood prevention scheme present?	No	If known, state the standard of protection offered:			
Current / historical site use:	Pub / Wasteland				
Is the site considered vacant or derelict?	No				
Development Requirements					
Freeboard on design water level:	See report	m			
Is safe / dry access and egress available?	Vehicular and Pedestrian	Min access/egress level: See report m AOD			
Design levels:	Ground level:	See report	m AOD	Min FFL: See report m AOD	
Mitigation					
Can development be designed to avoid all areas at risk of flooding?	Yes				
Is mitigation proposed?	No				
If yes, is compensatory storage necessary?	No				
Demonstration of compensatory storage on a "like for like" basis?	Select from List				
Should water resistant materials and forms of construction be used?	Select from List				

SEPA		Flood Risk Assessment (FRA) Checklist		(SS-NFR-F-001 - Version 14 - Last updated 28/05/2019)	
Hydrology					
Is there a requirement to consider fluvial flooding?	No			Is a map of catchment area included in FRA?	Yes
Area of catchment:	0.14	km ²		If Pooled analysis have group details been included?	Select from List
Estimation method(s) used (please select all that apply):	Pooled Analysis				
	Single Site Analysis				
	Enhanced Single Site				
	PeFRA				
	PeFRA				
	Other			If other (please specify methodology used):	PeFRA / PeFRA
Estimate of 200 year design flood flow:	0.20	m ³ /s			
Qmed estimate:	0.10	m ³ /s		Method:	Select from List
Statistical Distribution Selected:	Select from List			Reasons for selection:	
Hydraulics					
Hydraulic modelling method:	2D			Software used:	SS-DC
Number of cross sections:	1			If other please specify:	
Source of data (i.e. topographic survey, LiDAR etc):	Topo Survey			Date obtained / surveyed:	2018
Modelled reach length:		m		If yes please provide details:	
Any changes to default simulation parameters?					
Model timestep:					
Model grid size:				Specify, if combination:	
Any structures within the modelled length?	Select from List				
Maximum observed velocity:		m/s			
Brief summary of sensitivity tests, and range:				Please specify climate change scenario considered:	
variation on flow (%)		%			
variation on channel roughness (%)		%			
blockage of structure (range of % blocked)		%			
boundary conditions:					
(1) type	Upstream			Downstream	
(2) does it influence water levels at the site?	Specify if other			Specify if other:	
Has model been calibrated (gauge data / flood records)?	Select from List				
Is the hydraulic model available to SEPA?	Select from List				
Design flood levels:	200 year			200 year plus climate change	
Cross section results provided?	Select from List	m AOD			m AOD
Long section results provided?	Select from List				
Cross section ratings provided?	Select from List				
Tabular output provided (i.e. levels, velocities)?	Select from List				
Mass balance error:		%			
Coastal					
Is there a requirement to consider coastal / tidal flooding?	No				
Estimate of 200 year design flood level:		m AOD		If other please specify methodology used:	
Estimation method(s) used:	Select from List				
Allowance for climate change (m):		m			
Allowance for wave action etc (m):		m			
Overall design flood level:		m AOD			
Comments					
Any additional comments:	Fluvial flood risk from Braid Burn considered to be low. Pluvial flooding modelling using 2D model. Flood risk also considered to be low. General recommendations made.				
Approved by:	Michael Stewart				
Organisation:	Kaya Consulting				
Date:		29/01/2020			
Note: Further details and guidance is provided in 'Technical Flood Risk Guidance for Stakeholders' which can be accessed here: https://www.kayaconsulting.co.uk/technical-flood-risk-guidance-for-stakeholders					

1 Introduction

Kaya Consulting Ltd. was commissioned by CDA group to undertake a Flood Risk Assessment for a proposed redevelopment at Willowbrae Road, Edinburgh. The site measures approximately 0.3ha in area.

The site is bounded to the north by Northfield Drive, to the south by commercial developments, to the west by Willowbrae Road and to the east by a steep decline at the bottom of which is further residential developments.

Approximately 200m to the south-east of the site, the Braid Burn flows north under an unnamed bridge on Duddingston Road. Consultation of the SEPA flood map indicates that the site is not predicted to be at risk from fluvial and surface water flooding; however, the map does show a low likelihood risk from ground water sources and there are surface water flooding risks predicted close to the site. Flood risk from all sources requires a more detailed assessment.

As the redevelopment is residential, SEPA vulnerability guidance will require the assessment to consider the 200-year event.

The scope of work includes the following:

- Walkover site visit;
- Review of historical maps and available historical flood records;
- Assessment of risk of flooding from Braid Burn based on available topographical information and knowledge of previous work on the watercourse;
- Assessment of surface water flood risk, based on 2D surface water modelling;
- Assessment of risk from groundwater;
- Assessment of risk from other sources such as failure of drainage system;
- Recommendations for additional works, if deemed necessary;
- Preparation of report suitable to be included with a planning application, assuming all flood management measures can be mitigated.

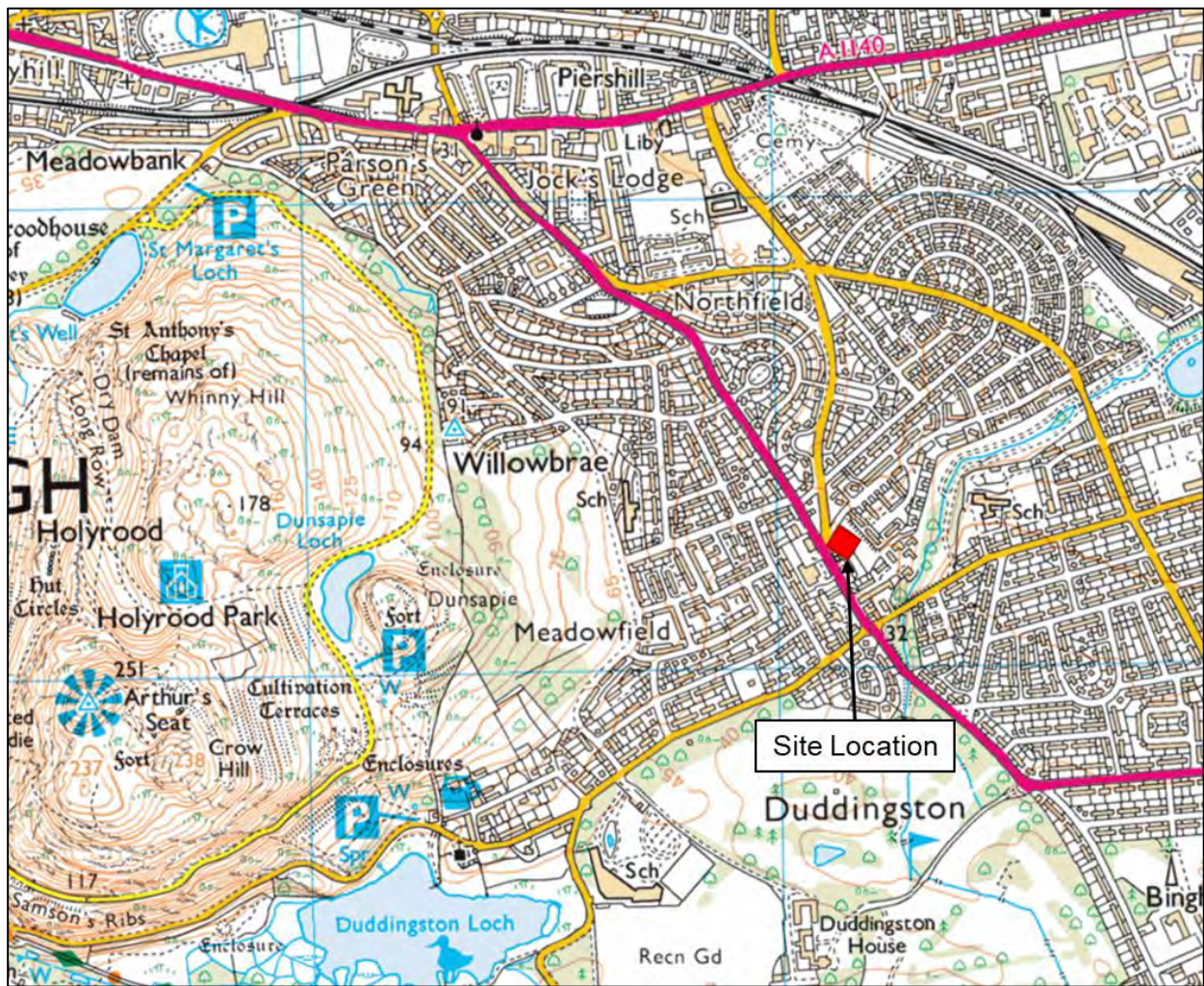
Information made available to Kaya Consulting Ltd. for the study includes the following:

- Site location map;
- Proposed development layout;
- 1m horizontal resolution LiDAR DTM data.

A general location map of the site is shown in Figure 1.

The work carried out to assess the flooding risk of the site and main findings of the study are summarised in the following sections.

Figure 1: General location of site



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2 Legislative and Policy Aspects

2.1 National Planning Policy

The current version of the Scottish Planning Policy (SPP) was published in June 2014 and replaces the previous version which was published in February 2010. The SPP sets out national planning policies which reflect Scottish Government's priorities for operation of the planning system and for the development and use of land. It relates to:

- the preparation of development plans;
- the design of development, from initial concept through to delivery; and
- the determination of planning applications and appeals.

The National Planning Framework (NPF) provides a statutory framework for Scotland's long term spatial development and sets out the Scottish Government's spatial development priorities for the next 20 to 30 years. The SPP sets out the policy that will help to deliver the objectives of the NPF.

Some extracts from the SPP related to flooding are listed below:

Policy Principles

255. *The planning system should promote:*

- *a precautionary approach to flood risk from all sources, including coastal, water course (fluvial), surface water (pluvial), groundwater, reservoirs and drainage systems (sewers and culverts), taking account of the predicted effects of climate change;*
- *flood avoidance: by safeguarding flood storage and conveying capacity, and locating development away from functional flood plains and medium to high risk areas;*
- *flood reduction: assessing flood risk and, where appropriate, undertaking natural and structural flood management measures, including flood protection, restoring natural features and characteristics, enhancing flood storage capacity, avoiding the construction of new culverts and opening existing culverts where possible; and*
- *avoidance of increased surface water flooding through requirements for Sustainable Drainage Systems (SuDS) and minimising the area of impermeable surface.*

256. *To achieve this, the planning system should prevent development which would have a significant probability of being affected by flooding or would increase the probability of flooding elsewhere. Piecemeal reduction of the functional floodplain should be avoided given the cumulative effects of reducing storage capacity.*

257. *Alterations and small-scale extensions to existing buildings are outwith the scope of this policy, provided that they would not have a significant effect on the storage capacity of the functional floodplain or local flooding problems.*

Key Documents

- *Flood Risk Management (Scotland) Act 2009.*
- *Updated Planning Advice Note on Flooding.*
- *Delivering Sustainable Flood Risk Management (Scottish Government, 2011).*
- *Surface Water Management Planning Guidance (Scottish Government, 2013).*

Delivery

258. Planning authorities should have regard to the probability of flooding from all sources and take flood risk into account when preparing development plans and determining planning applications. The calculated probability of flooding should be regarded as a best estimate and not a precise forecast. Authorities should avoid giving any indication that a grant of planning permission implies the absence of flood risk.
259. Developers should take into account flood risk and the ability of future occupiers to insure development before committing themselves to a site or project, as applicants and occupiers have ultimate responsibility for safeguarding their property.

Development Planning

260. Plans should use strategic flood risk assessment (SFRA) to inform choices about the location of development and policies for flood risk management. They should have regard to the flood maps prepared by Scottish Environment Protection Agency (SEPA), and take account of finalised and approved Flood Risk Management Strategies and Plans and River Basin Management Plans.
261. Strategic and local development plans should address any significant cross boundary flooding issues. This may include identifying major areas of the flood plain and storage capacity which should be protected from inappropriate development, major flood protection scheme requirements or proposals, and relevant drainage capacity issues.
262. Local development plans should protect land with the potential to contribute to managing flood risk, for instance through natural flood management, managed coastal realignment, washland or green infrastructure creation, or as part of a scheme to manage flood risk.
263. Local development plans should use the following flood risk framework to guide development. This sets out three categories of coastal and watercourse flood risk, together with guidance on surface water flooding, and the appropriate planning approach for each (the annual probabilities referred to in the framework relate to the land at the time a plan is being prepared or a planning application is made):
- **Little or No Risk** – annual probability of coastal or watercourse flooding is less than 0.1% (1:1000 years)
 - No constraints due to coastal or watercourse flooding.
 - **Low to Medium Risk** – annual probability of coastal or watercourse flooding is between 0.1% and 0.5% (1:1000 to 1:200 years)
 - Suitable for most development. A flood risk assessment may be required at the upper end of the probability range (i.e. close to 0.5%), and for essential infrastructure and the most vulnerable uses. Water resistant materials and construction may be required.
 - Generally not suitable for civil infrastructure. Where civil infrastructure must be located in these areas or is being substantially extended, it should be designed to be capable of remaining operational and accessible during extreme flood events.
 - **Medium to High Risk** – annual probability of coastal or watercourse flooding is greater than 0.5% (1:200 years)
 - May be suitable for:
 - residential, institutional, commercial and industrial development within built-up areas provided flood protection measures to the appropriate standard already exist and are maintained, are under construction, or are a planned measure in a current flood risk management plan;
 - essential infrastructure within built-up areas, designed and constructed to remain operational during floods and not impede water flow;
 - some recreational, sport, amenity and nature conservation uses, provided appropriate evacuation procedures are in place; and

- *job-related accommodation, e.g. for caretakers or operational staff.*
- *Generally not suitable for:*
 - *civil infrastructure and the most vulnerable uses;*
 - *additional development in undeveloped and sparsely developed areas, unless a location is essential for operational reasons, e.g. for navigation and water-based recreation, agriculture, transport or utilities infrastructure (which should be designed and constructed to be operational during floods and not impede water flow), and an alternative, lower risk location is not available; and*
 - *new caravan and camping sites.*
- *Where built development is permitted, measures to protect against or manage flood risk will be required and any loss of flood storage capacity mitigated to achieve a neutral or better outcome.*
- *Water-resistant materials and construction should be used where appropriate. Elevated buildings on structures such as stilts are unlikely to be acceptable.*

Surface Water Flooding

- *Infrastructure and buildings should generally be designed to be free from surface water flooding in rainfall events where the annual probability of occurrence is greater than 0.5% (1:200 years).*
- *Surface water drainage measures should have a neutral or better effect on the risk of flooding both on and off the site, taking account of rain falling on the site and run-off from adjacent areas.*

Development Management

264. *It is not possible to plan for development solely according to the calculated probability of flooding. In applying the risk framework to proposed development, the following should therefore be taken into account:*

- *the characteristics of the site;*
- *the design and use of the proposed development;*
- *the size of the area likely to flood;*
- *depth of flood water, likely flow rate and path, and rate of rise and duration;*
- *the vulnerability and risk of wave action for coastal sites;*
- *committed and existing flood protection methods: extent, standard and maintenance regime;*
- *the effects of climate change, including an allowance for freeboard;*
- *surface water run-off from adjoining land;*
- *culverted watercourses, drains and field drainage;*
- *cumulative effects, especially the loss of storage capacity;*
- *cross-boundary effects and the need for consultation with adjacent authorities;*
- *effects of flood on access including by emergency services; and*
- *effects of flood on proposed open spaces including gardens.*

265. *Land raising should only be considered in exceptional circumstances, where it is shown to have a neutral or better impact on flood risk outside the raised area. Compensatory storage may be required.*

266. *The flood risk framework set out above should be applied to development management decisions. Flood Risk Assessments (FRA) should be required for development in the medium to high category of flood risk, and may be required in the low to medium category in the circumstances described in the framework above, or where other factors indicate heightened risk. FRA will generally be required for applications within areas identified at high or medium likelihood of flooding/flood risk in SEPA's flood maps.*

267. *Drainage Assessments, proportionate to the development proposal and covering both surface and foul water, will be required for areas where drainage is already constrained or otherwise problematic, or if there would be off-site effects.*

268. *Proposed arrangements for SuDS should be adequate for the development and appropriate long-term maintenance arrangements should be put in place.*

2.2 SEPA Flood Maps

The SEPA flood maps show the likely extent of flooding for high, medium and low likelihood for fluvial, pluvial (surface water) and tidal flows.

Consultation of the SEPA flood map indicates that the site is not at risk of flooding from fluvial and surface water sources, although the site is identified as being at low risk from groundwater. Flood risk from all sources requires a more detailed assessment.

2.3 SEPA Technical Flood Risk Guidance

The latest version of SEPA 'Technical Flood Risk Guidance for Stakeholders' would need to be consulted when undertaking flood risk assessments (Current version is 12, May 2019). This technical guidance document is intended to outline methodologies that may be appropriate for hydrological and hydraulic modelling and sets out what information SEPA requires to be submitted as part of a Flood Risk Assessment.

SEPA Policy 41 sets out roles and responsibilities of SEPA and Planning Authorities.

2.4 SEPA Flood Risk and Land Use Vulnerability Guidance

The current version (July 2018) states that:

"The purpose of this guidance is to:

- o aid understanding of the relative vulnerability to flooding of different land uses;*
- o assist in the interpretation of SEPA's Flood Risk Planning Guidance, which is based upon the risk framework.*

SEPA has created this guidance to assist in our assessment of the vulnerability to flooding of different types of land use. Table 1 classifies the relative vulnerability of land uses, grouping them into five categories from Most Vulnerable through to Water Compatible Uses.

The classification comprises five categories: 1. Most Vulnerable Uses; 2. Highly Vulnerable Uses; 3. Least Vulnerable Uses; 4. Essential Infrastructure; 5. Water Compatible Uses.

The classification (Table 1) is linked to the risk framework in SPP by a matrix of flood risk (Table 2). Table 2 gives a very brief outline of SEPA's likely planning response for each of the three flood risk categories of the risk framework relative to each of the five vulnerability categories.

In producing this guidance, SEPA has sought to refine and enhance the vulnerability classification and definitions identified in the SPP risk framework.

Table 1: SEPA Land Use Vulnerability Classification¹

1. Most Vulnerable Uses	2. Highly Vulnerable Uses	3. Least Vulnerable Uses	4. Essential Infrastructure	5. Water Compatible Uses ³
<p>For the purpose of this guidance, Most Vulnerable Uses include land uses that are defined as both civil infrastructure and most vulnerable in the SPP 2014 glossary. Civil infrastructure is denoted with an asterisk (*) in the list below.</p> <p>Most Vulnerable Uses therefore comprise:</p> <ul style="list-style-type: none"> • police stations* • ambulance stations* • fire stations* • command centers and telecommunications installations required to be operational during flooding* • emergency dispersal points* • hospitals* • schools* • care homes* • nurseries • residential institutions, e.g. prisons, children's homes • basement dwellings • isolated dwelling(s) in sparsely populated areas • dwelling houses situated behind informal embankments² • caravans, mobile homes, chalets and park homes intended for permanent residential use • holiday caravan, chalet, and camping sites • installations requiring hazardous substance consent (but where there is demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or with energy infrastructure, that require a coastal or water-side location, or other high flood risk areas, then the facilities should be classified as Essential Infrastructure – see column 4). 	<p>Comprise:</p> <ul style="list-style-type: none"> • buildings used for dwelling houses • social services homes (ambulant /adult) • hostels and hotels • student halls of residence • non-residential uses for health service • landfill and sites used for waste management facilities for hazardous waste 	<p>Comprise:</p> <ul style="list-style-type: none"> • shops • financial, professional, and other services • restaurants and cafés • hot-food takeaways • drinking establishments • nightclubs • offices • general industry • storage and distribution • non-residential institutions not included in Most Vulnerable or Highly Vulnerable Uses • assembly and leisure • land and buildings used for agriculture and forestry that are subject to planning control • waste treatment (except landfill and hazardous waste facilities) • minerals working and processing (except for sand and gravel) 	<p>Comprises:</p> <ul style="list-style-type: none"> • essential transport infrastructure (including mass evacuation routes) that has to cross the area at risk • essential utility infrastructure that has to be located in a flood risk area for operational reasons (this includes electricity generating power stations and grid and primary sub-stations, sewage treatment plants and water treatment works, wind turbines and other energy generating technologies) • installations requiring hazardous substance consent only where there is demonstrable need to locate such installations for the bulk storage of materials with port or other similar facilities, or with energy infrastructure that requires a coastal, water-side, or other high flood risk area location. 	<p>Comprise:</p> <ul style="list-style-type: none"> • flood control infrastructure • environmental monitoring stations • water transmission infrastructure and pumping stations • sewage transmission infrastructure and pumping stations • sand and gravel workings • docks, marinas and wharves • navigation facilities • MOD defence installations • ship building, repairing, and dismantling • dockside fish processing and refrigeration and compatible activities requiring a waterside location • water-based recreation (excluding sleeping accommodation) • lifeguard and coastguard stations • amenity open space • nature conservation and biodiversity • outdoor sports and recreation and essential facilities such as changing rooms • essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific operational warning⁴ and evacuation plan.

¹ Developments that combine a mixture of uses should be placed in the higher of the relevant classes of flood risk vulnerability. The impact of a flood on the particular land use could vary within each vulnerability class. In particular, a change of use to a dwelling house within the 'Highly Vulnerable' category could significantly increase the overall flood risk, especially in relation to human health and financial impacts. Any proposal for a change of use to a dwelling house should therefore be supported by a flood risk assessment. The redevelopment (including change of use) of an existing building or site provides a valuable opportunity to reduce the vulnerability of that site to flooding and therefore to reduce overall flood risk. This can be achieved through changes to less vulnerable land uses and improvements to the management of flood risk on the site.

² Embankments not formally constituted under flood prevention legislation including agricultural flood embankments constructed under permitted development rights.

³ Advice in the SPP risk framework on these activities is limited. The nature of the above activities necessitates locations that are prone to flooding. Generally, it is difficult to recommend a specific annual return period to guide development decisions for such uses. SEPA would recommend that the risk of flooding should be assessed giving particular consideration to:

1. Specific locational requirements of the development and availability of alternative locations;
2. Consideration of any loss of floodplain storage (in riverside developments) that may increase flood risk to nearby existing development and options to mitigate against this;
3. Appropriate mitigation measures, including water resistance and resilience measures;
4. Health and safety implications and the need for access, egress, and evacuation, with specific consideration of, and provision of, measures to provide for these where:
 - The development will attract the public especially vulnerable people such as children and old people.
 - Large numbers of the public may gather and where evacuation routes are limited.
 - Hazardous materials are stored or processed.

⁴ In this context, specific warning does not mean a formal flood warning from SEPA. SEPA does not support the provision of flood warning as a viable reason to develop in flood risk areas. Warning is a non-structural measure that does not physically prevent flooding and has associated uncertainties.

Table 2: SEPA Matrix of Flood Risk (to be read in conjunction with our [Flood Risk Planning Guidance](#))

Classification Flood Risk	Most Vulnerable Uses	Highly Vulnerable Uses	Least Vulnerable Uses	Essential Infrastructure	Water Compatible Uses
Little or no risk (<0.1% AP)	No constraints	No constraints	No constraints	No constraints	No constraints
Low to medium risk (0.1% - 0.5% AP)	<p>Generally not suitable for Civil Infrastructure; where Civil Infrastructure must be located in these areas, or is being substantially extended, it should be designed to be capable of remaining operational and accessible during extreme flood events (i.e. 0.1% AP).</p> <p>May be suitable for other Most Vulnerable Uses if the risk from a 0.1%AP event can be alleviated through appropriate mitigation, or where one of the following apply:</p> <ul style="list-style-type: none"> Redevelopment of an existing building, including changes of use to an equal or less vulnerable use to the existing use. Redevelopment of a previously developed site where it involves the demolition of existing buildings and/or erection of additional buildings within a development site, and the proposed land use is equal or less vulnerable than the existing land use. Where the principle of development on the site has been established in an up-to-date, adopted development plan or the National Planning Framework and flood risk issues were given due consideration as part of the plan preparation process and our assessment of risk has not changed in the interim. 	Generally suitable for development though an FRA may be required at upper end of the probability range (i.e. close to 0.5% AP).	Generally suitable for development though an FRA may be required at upper end of the probability range (i.e. close to 0.5% AP).	Generally suitable for development.	Generally suitable for development.
Medium to high risk within built up area (>0.5% AP)	<p>Generally not suitable for development unless one of the following apply:</p> <ul style="list-style-type: none"> Redevelopment of an existing building, including changes of use to an equal or less vulnerable use to the existing use. Redevelopment of a previously developed site where it involves the demolition of existing buildings and/or erection of additional buildings within a development site, and the proposed land use is equal or less vulnerable than the existing land use. 	<p>Generally not suitable for development unless one of the following apply:</p> <ul style="list-style-type: none"> Redevelopment of an existing building, including changes of use to an equal or less vulnerable use to the existing use. Redevelopment of a previously developed site where it involves the demolition of existing buildings and/or erection of additional buildings within a development site, and the proposed land use is equal or less vulnerable than the existing land use. 	<p>Generally not suitable for development unless one of the following apply:</p> <ul style="list-style-type: none"> Redevelopment of an existing building, including changes of use to an equal or less vulnerable use to the existing use. Redevelopment of a previously developed site where it involves the demolition of existing buildings and/or erection of additional buildings within a development site, and the proposed land use is equal or less vulnerable than the existing land use. 	Suitable for essential infrastructure, designed and constructed to remain operational during floods (i.e. 0.5% AP), and not impede water flow.	Generally suitable for development - job related accommodation and some recreational, sport, amenity and nature conservation uses are only suitable provided that appropriate evacuation procedures are in place

	<ul style="list-style-type: none"> Where the principle of development on the site has been established in an up-to-date, adopted development plan or the National Planning Framework and flood risk issues were given due consideration as part of the plan preparation process and our assessment of risk has not changed in the interim. 	<ul style="list-style-type: none"> Where the principle of development on the site has been established in an up-to-date, adopted development plan or the National Planning Framework and flood risk issues were given due consideration as part of the plan preparation process and our assessment of risk has not changed in the interim. The site is protected by a flood protection scheme of the appropriate standard that is already in existence and maintained, is under construction, or is planned for in a current flood risk management plan. 	<ul style="list-style-type: none"> Where the principle of development on the site has been established in an up-to-date, adopted development plan or the National Planning Framework and flood risk issues were given due consideration as part of the plan preparation process and our assessment of risk has not changed in the interim. The site is protected by a flood protection scheme of the appropriate standard that is already in existence and maintained, is under construction, or is planned for in a current flood risk management plan. 		
Medium to high risk within undeveloped and sparsely developed area (>0.5% AP)	<p>Generally not suitable for development unless one of the following apply:</p> <ul style="list-style-type: none"> Redevelopment of an existing building, including changes of use to an equal or less vulnerable use to the existing use. Redevelopment of a previously developed site where it involves the demolition of existing buildings and/or erection of additional buildings within a development site, and the proposed land use is equal or less vulnerable than the existing land use. Where the principle of development on the site has been established in an up-to-date, adopted development plan or the National Planning Framework and flood risk issues were given due consideration as part of the plan preparation process and our assessment of risk has not changed in the interim. 	<p>Generally not suitable for development unless one of the following apply:</p> <ul style="list-style-type: none"> Redevelopment of an existing building, including changes of use to an equal or less vulnerable use to the existing use. Redevelopment of a previously developed site where it involves the demolition of existing buildings and/or erection of additional buildings within a development site, and the proposed land use is equal or less vulnerable than the existing land use. Where the principle of development on the site has been established in an up-to-date, adopted development plan or the National Planning Framework and flood risk issues were given due consideration as part of the plan preparation process and our assessment of risk has not changed in the interim. 	<p>Generally not suitable for development unless one of the following apply:</p> <ul style="list-style-type: none"> Redevelopment of an existing building, including changes of use to an equal or less vulnerable use to the existing use. Redevelopment of a previously developed site where it involves the demolition of existing buildings and/or erection of additional buildings within a development site, and the proposed land use is equal or less vulnerable than the existing land use. Where the principle of development on the site has been established in an up-to-date, adopted development plan or the National Planning Framework and flood risk issues were given due consideration as part of the plan preparation process and our assessment of risk has not changed in the interim. 	<p>Generally suitable where a flood risk location is required for operational reasons and an alternative lower-risk location, is not available – development should be designed and constructed to be operational during floods (i.e. 0.5% AP), and not impede water flow.</p>	<p>Generally suitable for development – job related accommodation and some recreational, sport, amenity and nature conservation uses are only suitable provided that appropriate evacuation procedures are in place, and an alternative, lower risk location is not available.</p>

2.5 Flood Risk Management (Scotland) Act 2009

The Flood Risk Management (Scotland) Act 2009 came into force on 26 November 2009. The Act repealed the Flood Prevention (Scotland) Act 1961 and introduces a more sustainable and streamlined approach to flood risk management, suited to present and future needs and to the impact of climate change. It encourages a more joined up and coordinated process to manage flood risk at a national and local level.

The Act brings a new approach to flood risk management including a framework for coordination and cooperation between all organisations involved in flood risk management, new responsibilities for SEPA, Scottish Water and local authorities in relation to flood risk management, a revised and streamlined process for flood protection schemes, new methods to enable stakeholders and the public to contribute to managing flood risk; and SEPA to act as a single enforcement authority for the safe operation of Scotland's reservoirs.

2.6 Controlled Activities Regulations (CAR)

The Water Environment (Controlled Activities) (Scotland) Amended Regulations 2013 (CAR) brings new controls for discharges, abstractions, impoundments and engineering works in or near inland waters. Any such work requires authorisation (licence) from the Scottish Environment Protection Agency (SEPA) who are responsible for the implementation of the Act. The Regulations include a requirement that surface water discharge must not result in pollution of the water environment. It also makes Sustainable Drainage Systems (SuDS) a requirement for new development, with the exception of runoff from a single dwelling and discharges to coastal waters.

2.7 Climate Change

The SPP states that *"planning system should promote a precautionary approach to flood risk from all sources, including coastal, water course (fluvial), surface water (pluvial), groundwater, reservoirs and drainage systems (sewers and culverts), taking account of the predicted effects of climate change."*

One of the sustainable policy principles within the National Planning Framework is supporting climate change mitigation and adaptation including taking account of flood risk.

SEPA previously recommended a 20% increase in peak flow for the 0.5% AEP (1:200) event, in accordance with DEFRA (Department of Environment, Food and Rural Affairs) and Scottish Government research.

SEPA has recently released updated climate change recommendations by River Basin Region, based on UKCP18. These climate change uplifts range from 24% to 56%. For smaller catchments, an increase in peak rainfall intensity allowances of between 35% and 55% are now recommended. As of November 2019, Edinburgh Council's latest flood risk requirements are 40% for climate change.

It is recommended that any site drainage design considers future estimates of increased precipitation and follows an adaptive approach.

The Climate Change (Scotland) Act 2009 also makes reference to adaptation to climate change.

3 Site Location and Description

The site, which was once the location of a public house, is currently a car park (Photo 1) and measures approximately 0.3ha in area. The site is bounded to the north by Northfield Drive (Photo 2), to the south by commercial developments (Photo 3), to the west by Willowbrae Road (Photo 4) and to the east by a steep decline followed by residential developments (Photo 4).

Development proposals for the site include construction of two new residential buildings. Figure 2 shows the site boundary and location.

Approximately 190m to the east of the site the Braid Burn flows north. The Braid Burn is situated at approximately 16m AOD (Above Ordnance Datum), 12m below the east boundary of the site. The burn then flows north-east parallel to Northfield Drive, where it is briefly culverted under railway lines. The burn continues flowing north-east, where it is culverted once again under Portobello High Street before it finally discharges into the sea approximately 1.6km to the north-east of the site.

The general site topography was derived from 1m resolution LiDAR DTM data. Levels within the site range between highs of approximately 33m AOD in the south of the site, to lows of approximately 28m AOD in the east (Figure 3). Figure 4 shows cross sections of the site and surroundings. The site is located approximately 1.4km east of Holyrood Park which is of relatively higher elevation, the peak of which is 238m AOD at Arthur's Seat.

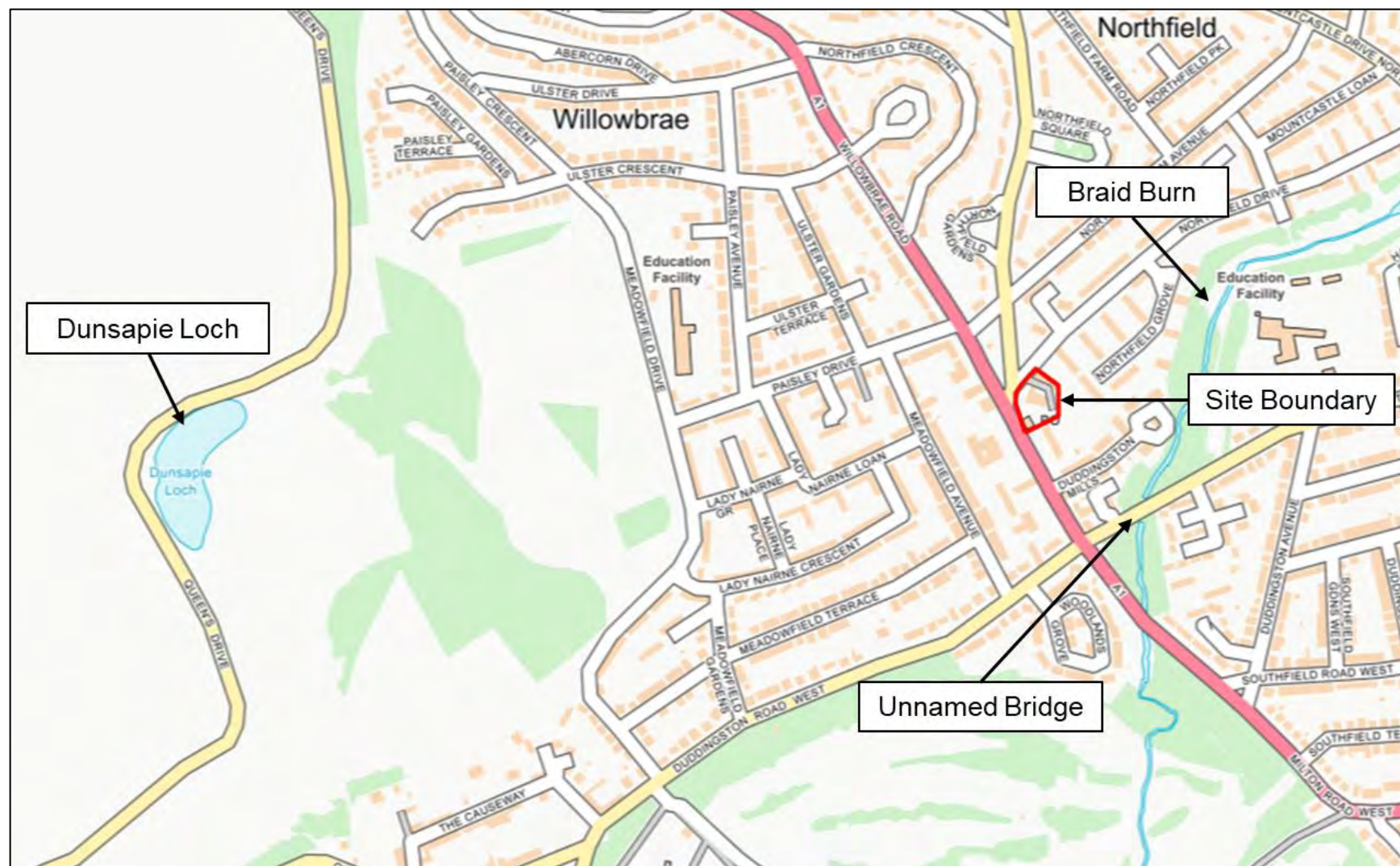
A topographical survey of the site was provided by the client and shows;

- Low wall along the western edge of the site
- Raised ground within the site, used as a patio for the pub-restaurant

Historical maps were examined and the OS six-inch 1892-1914 map shows that the site did not have any wells or water taps. However, there was a water tap present approximately 100m south of the site. The line of the channel remains identical when compared to the OS six-inch 1892-1914.

A review of the British Hydrological Society (BHS) Chronology of British Hydrological Events website was undertaken searching for the following keywords: "Northfield", "Dunsapie", "Duddingston", "Willowbrae", "Braid" and "Figgate". Searched keywords refer to nearby locations and features marked on current and historic maps. A single reference was identified for the search term "Braid". This reference in "British Rainfall for 1887" refers to an "Extremely local thunderstorm, 0.29 inches of rain in 14 minutes" at Blacket Place, Edinburgh, approximately 2.7km south-west of the site.

Figure 2: Site boundary and location



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Figure 3: a) General topography of the site and surrounding area with contours (from LiDAR topography with 2m contour interval shown), b) General topography across the model area with contours (5m contour interval shown)

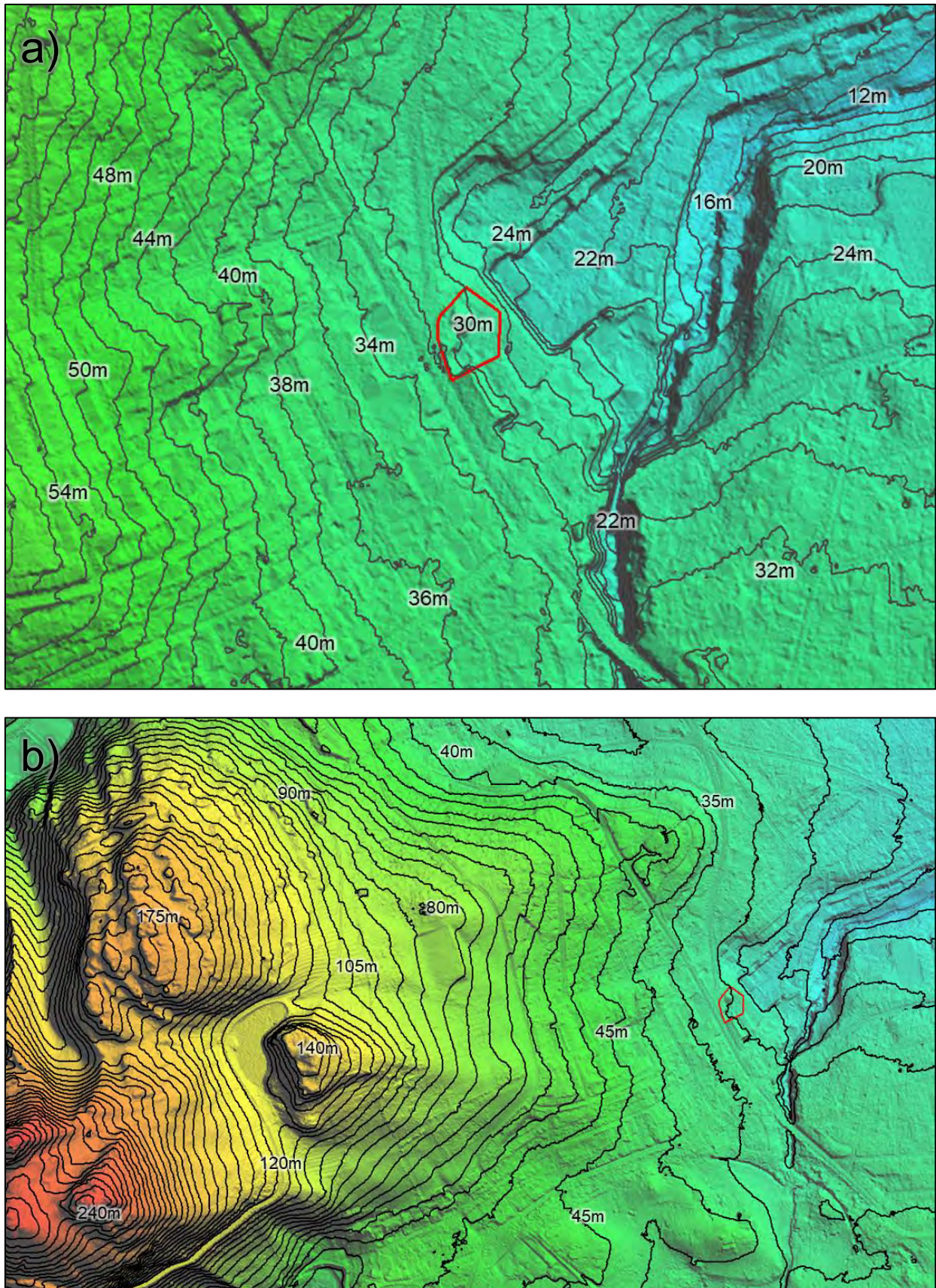


Figure 4: Cross sections of the site and surroundings

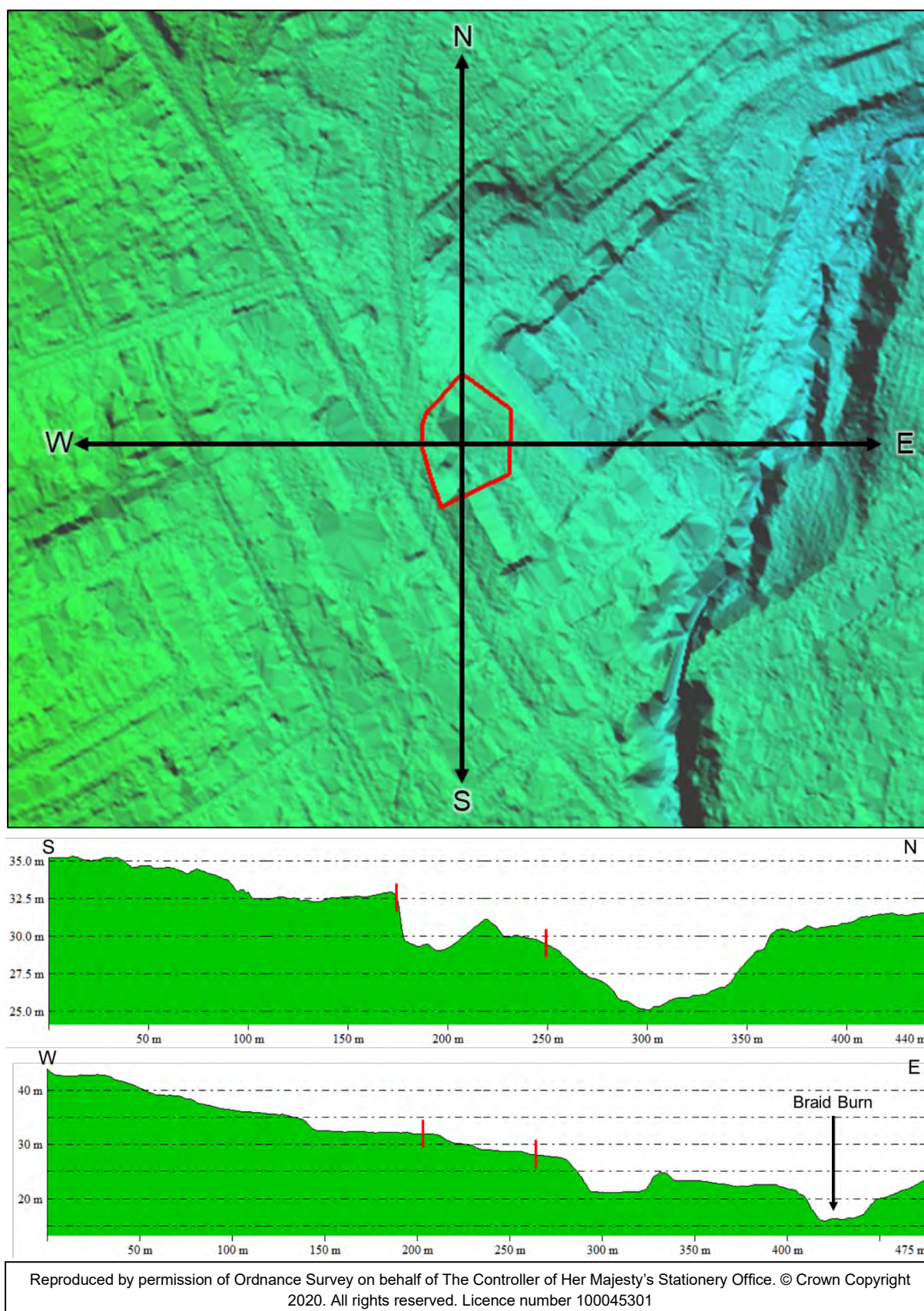


Photo 1: View of the site from the west



Photo 2: Northfield Drive to the north of the site



Photo 3: View of the site's southern boundary



Photo 4: Willowbrae Road to the west of the site



Photo 5: View to the east of the site



Photo 6: View of the site's west wall (courtesy of Google Street view)



4 Flood Risk Assessment

The flood risk assessment considers the risk from:

- Braid Burn;
- Surface water flooding;
- Groundwater flooding; and
- Site drainage and local sewer.

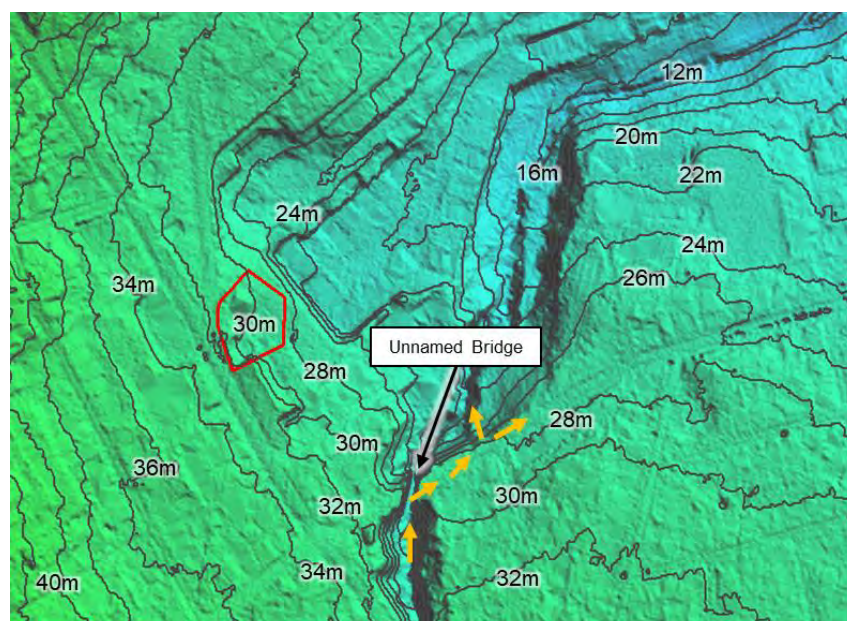
4.1 Braid Burn

Approximately 200m to the south-east of the site, the Braid Burn flows north under an unnamed bridge on Duddingston Road. The burn continues to flow north-east parallel to Northfield Drive where it is briefly culverted under railway lines. The burn continues flowing north-east where it is culverted under Portobello High Street before it discharges into the Sea. The Braid Burn is situated approximately 12m below the site. The catchment drainage area of the Braid Burn is approximately 27.6km², with a mean altitude of 137m above sea level and an urban extent of 25.5%. Peak flow during a 200-year event calculated using the FEH rainfall runoff method is estimated to reach 55.4m³s⁻¹, which occurs during a 2.3-hour design storm. The Braid Burn was the focus of a flood prevention scheme in 2003. Several culverts, bridges, floodwalls and embankments were improved, and two flood storage reservoirs were created in order to mitigate flooding of the Braid Burn to a design standard of 1 in 200-years.

Figure 5 shows the topography at the unnamed bridge crossing Braid Burn on Duddingston Road. The elevation of the left-hand bank and right-hand bank are approximately 30m AOD and 28m AOD respectively. If flow under the bridge is restricted or blocked entirely, water will pool at the bridge before eventually overtopping the right-hand bank where the elevation is lowest.

Therefore, due to the distance between the site and the Braid Burn, as well as difference in elevation, the site is not considered to be at flood risk from the Braid Burn.

Figure 5: General topography of the unnamed bridge crossing Braid Burn and surroundings with contours (from LiDAR topography with 2m contour interval shown). Orange arrows denote overland flow pathways if the bridge is blocked



4.2 Surface Water Flooding

A detailed watershed analysis was undertaken using Global Mapper software to determine the route of overland flows using the 1m resolution LiDAR DTM data. The results are shown in Figure 6.

The analysis indicates that the site is potentially at risk from surface water runoff from areas outside the site boundary, predominantly Holyrood Park. To assess this in more detail a Flood Modeller Pro surface water model was developed of the site and surrounding areas.

The extent of the overland flow model is shown in Figure 7. The model active area covers the site and the surrounding area. The model was run based on SEPA guidance for surface water flood modelling (Flood Modelling Guidance for Responsible Authorities).

Modelling was undertaken in the first instance using the LiDAR data only. This model was used for a detailed sensitivity analysis to calculate the design condition. The model was then updated at the site using local topographical information that included a wall along the edge of the site and locally raised ground within the site (patio for pub/restaurant). This updated model was then used for the design run.

Rainfall: Rainfall hyetographs were developed using both FEH13 and ReFH2 methodologies, with hyetographs created for a winter rainfall profile of a 1 in 200-year rainfall event with 1, 5 and 7-hour storm durations. To analyse model sensitivity, hyetographs were also created for a summer rainfall profile, and both an increase and decrease in runoff for impervious areas (60% and 80% compared to the SEPA assumption of 70% for urban areas). To account for local drainage the 1 in 5-year rainfall was removed from the 1 in 200-year as per SEPA guidance. The 200-year plus 40% uplift for climate change hyetographs were also developed to simulate the effect of climate change as required by CEC.

The 1-Hour FEH13 hyetograph produced the greatest volume of flooding within the site. Comparing the results of the varying impervious runoff percentage models shows minimal variation. The summer rainfall profile shows increased pooling in comparison to the winter profile. The sensitivity analysis therefore indicated that the most conservative hyetograph, and thus the one to be used, was that of the 1-Hour FEH13 Summer Rainfall Profile.

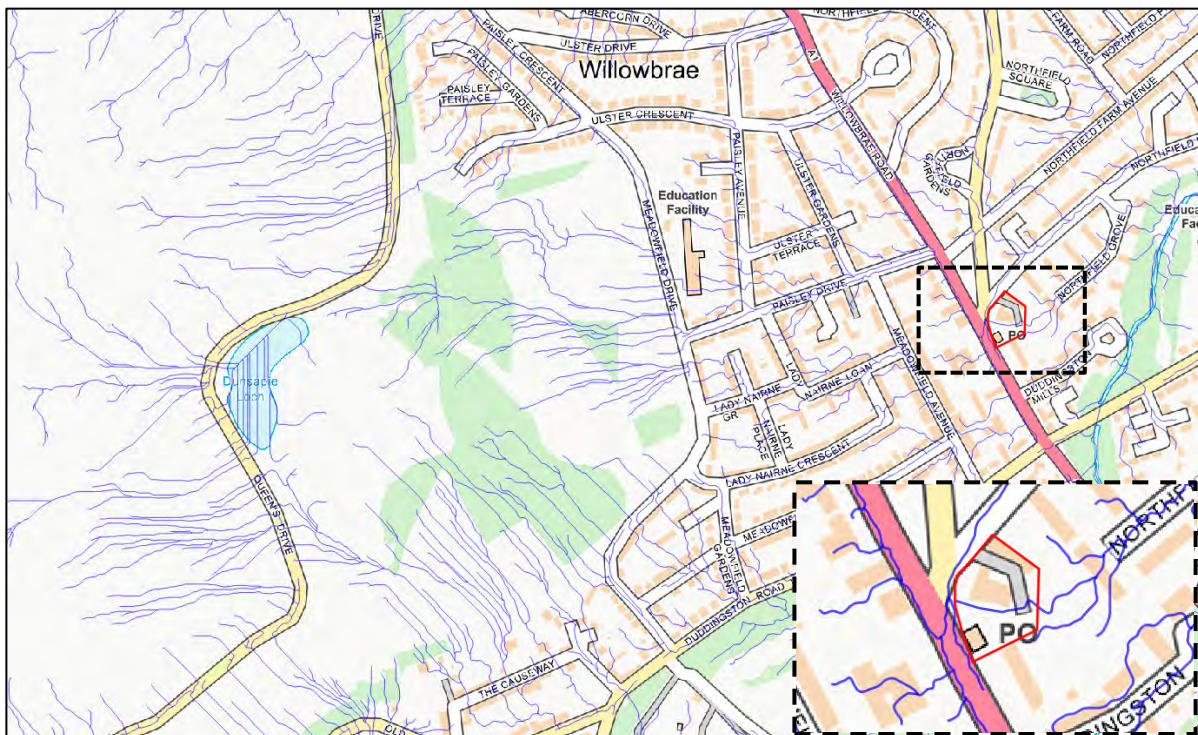
Model Grid: The model grid was based on the 1m LiDAR data at a grid resolution of 2m and a Manning's friction value of 0.04. The model time step was 1s. Comparison of both pre- and post-development planning maps revealed a wall of raised elevation at the west boundary of the site (photo 6) that is to remain after redevelopment. The wall was overlaid onto the existing LiDAR data so that elevation was increased by 0.30m. The openings of the wall remained at the pre-existing elevation.

Model sensitivity results using the raw LiDAR data are presented in Appendix 1. Model results using the design event and local topographical adjustments are shown in Figure 8. The modelling suggests that during a 200-year and also 200-year plus 40% uplift for climate change, water is not predicted to enter the site. Maximum water depths at the west boundary of the site at Willowbrae Road are modelled to be between 0.02m and 0.30m for the 200-year event. Results indicate that surface water pooling at the west boundary of the site is generated by runoff from both the immediate surroundings and Holyrood Park, as evidenced in Figure 6.

An overflow pathway from Dunsapie Loch is shown to the north of the site. However, the catchment of the loch is small and the magnitude of any overtopping flows would be expected to be low, given the location of the loch. The SEPA reservoir inundation map does not show that the site is at risk from the loch or indeed any other reservoir source.

Post-development rainfall on the site will be managed by the site drainage system. Although there is a low risk of surface water runoff ingress from outside of the site boundary (mainly due to the boundary wall and elevated ground at the edge of the site), any changes to the design should accommodate a flow pathway within the site. It is recommended that Finished Floor Levels are set above the surrounding ground levels, with access designed to slope away from the buildings to divert any flood water away from properties. Any design should be as such that runoff into neighbouring buildings is not increased. Special care should be considered to the residential buildings east of the site as they are the most at risk due to their relatively low elevation.

Figure 6: Watershed analysis of the area of the site



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Figure 7: 2D active domain (denoted in purple)

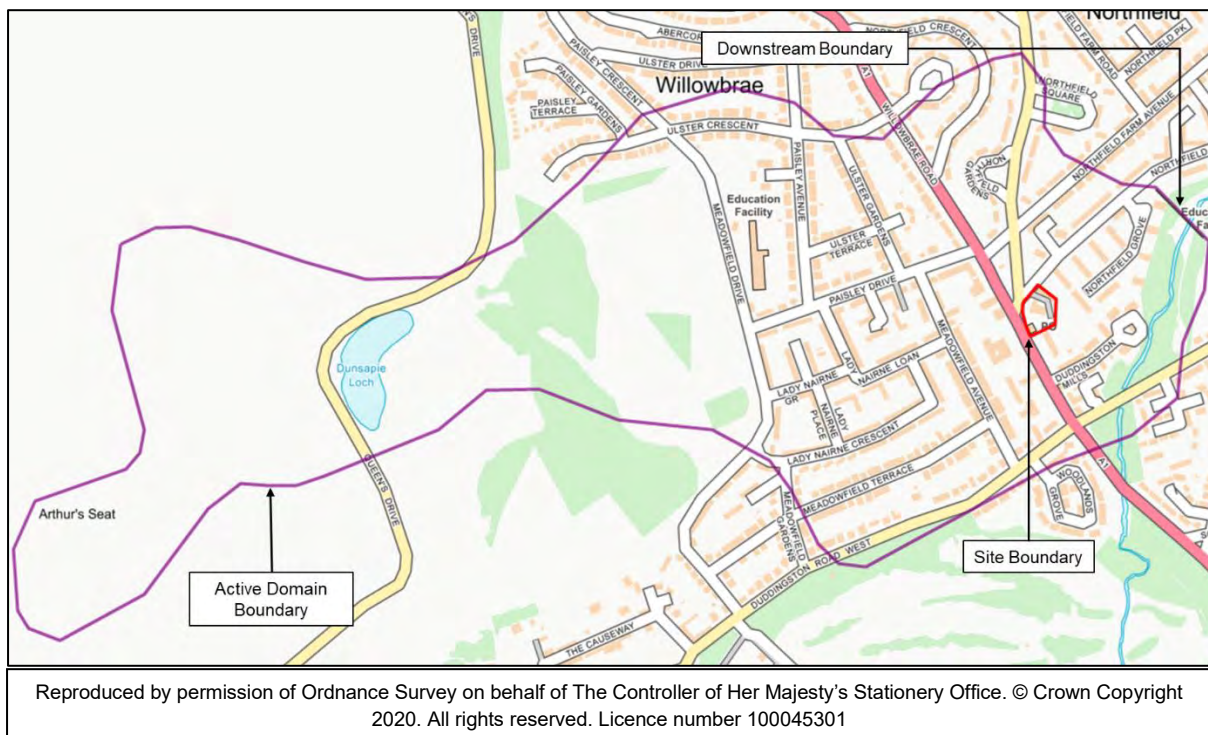
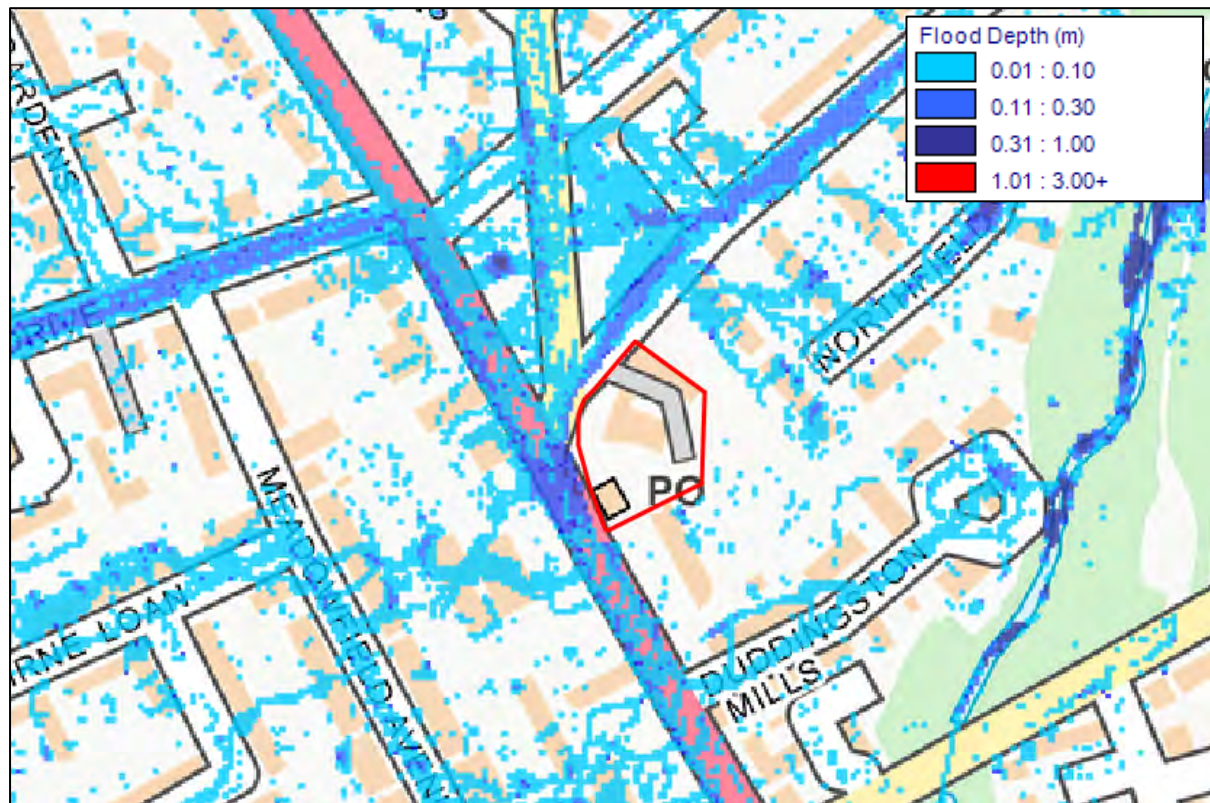


Figure 8: Maximum predicted flood extent for the 1 in 200-year 1-Hour rainfall event – updated local topography



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4.3 Groundwater Flooding

The SEPA flood map shows that the site could be at risk of flooding from groundwater in the Willowbrae Road area. The inclusion of wells on historical maps likewise suggests that groundwater can be found in the area (100m south of the site). However, historical maps do not indicate the presence of springs suggesting that groundwater does not come to the surface of the site naturally.

Groundwater monitoring is normally undertaken as part of the Site Investigation works. If locally raised groundwater levels are identified during site investigations, suitable mitigation measures would need to be employed for foundations and SuDS. If there are groundwater springs, these would need to be grouted or flows managed with consultation with City of Edinburgh Council, SEPA and Scottish Water.

4.4 Safe Access

Access to the development would be from the current access point at the north-west of the site from Northfield Drive. Surface Water modelling suggests that ponding is not predicted on the access road. If the access is proposed to be redesigned, care will need to be exercised in the design of access points so that the road does not act as a flow pathway in routing excess surface water from the road into the site and flooding the development or surrounding properties.

5 Summary and Conclusions

Kaya Consulting Ltd. was commissioned by CDA Group to undertake a Flood Risk Assessment for a proposed redevelopment at Willowbrae Road, Edinburgh.

The site is not considered to be at risk of flooding from any watercourses.

Modelling indicates that surface water from the surrounding areas reaches the west boundary of the site but does not enter the site. The modelling suggests that during a 200-year and also 200-year plus 40% uplift for climate change, water is not predicted to enter the site. Maximum water depths at the west boundary of the site at Willowbrae Road are modelled to be between 0.02m and 0.30m for the 200-year event. Comparing flow pathways between the sensitivity analysis models (west wall not included in the model grid) and the refined model, highlights that the removal of the wall and elevated ground within the current site (patio area) would leave the site at risk of surface water flooding. Therefore, it is recommended that the existing wall is retained as part of the new development, any changes to the design should also accommodate a flow pathway at access points within the site. Post-development rainfall on the site will be managed by the site drainage system, which is not part of this commission. It is recommended that Finished Floor Levels are set above the surrounding ground levels, with access and finished ground levels designed to slope away from the buildings to avoid water entering properties.

Access to the development would be from the north-west of the site from Northfield Drive. Surface water modelling suggests that ponding is not predicted on the access road. If the access is to be redesigned, care will need to be exercised in the design of access points so that the road does not act as a flow pathway in routing excess surface water from the road into the site and flooding the development or surrounding properties.

The SEPA flood map shows that the site could be at risk of flooding from groundwater in the Willowbrae area. The inclusion of wells on historical maps likewise suggests that groundwater can be found in the area (100m south of the site). If locally raised groundwater levels are identified during site investigations, suitable mitigation measures would need to be employed for foundations and SuDS. If there are groundwater springs, these would need to be grouted or flows managed with consultation with the City of Edinburgh Council, SEPA and Scottish Water.

Design of the site drainage system is not part of this commission.

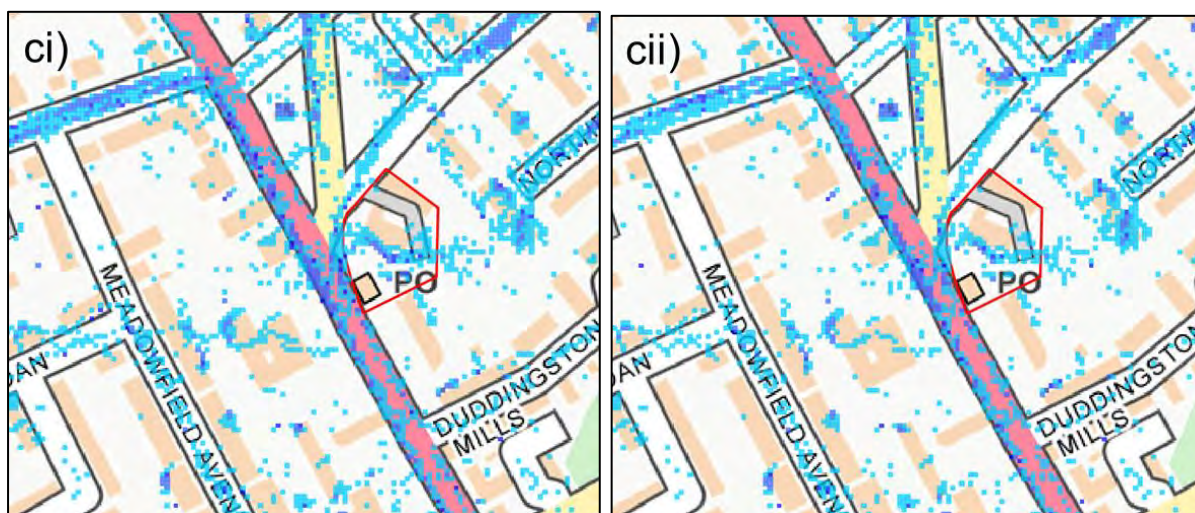
It is also recommended that the site is designed so that there is an emergency flow pathway through the site in the event of blockage of the site drainage system, or rainfall events in excess of design conditions. The flow pathways (e.g. road network) should route surface water through the site without flooding properties or increasing flood risk to neighbouring properties.

It should be noted that the risk of flooding can be reduced, but not eliminated, given the potential for events exceeding design conditions and the inherent uncertainty associated with estimating hydrological parameters for any given site.

6 Appendix 1 – Sensitivity Results using LiDAR only Topography

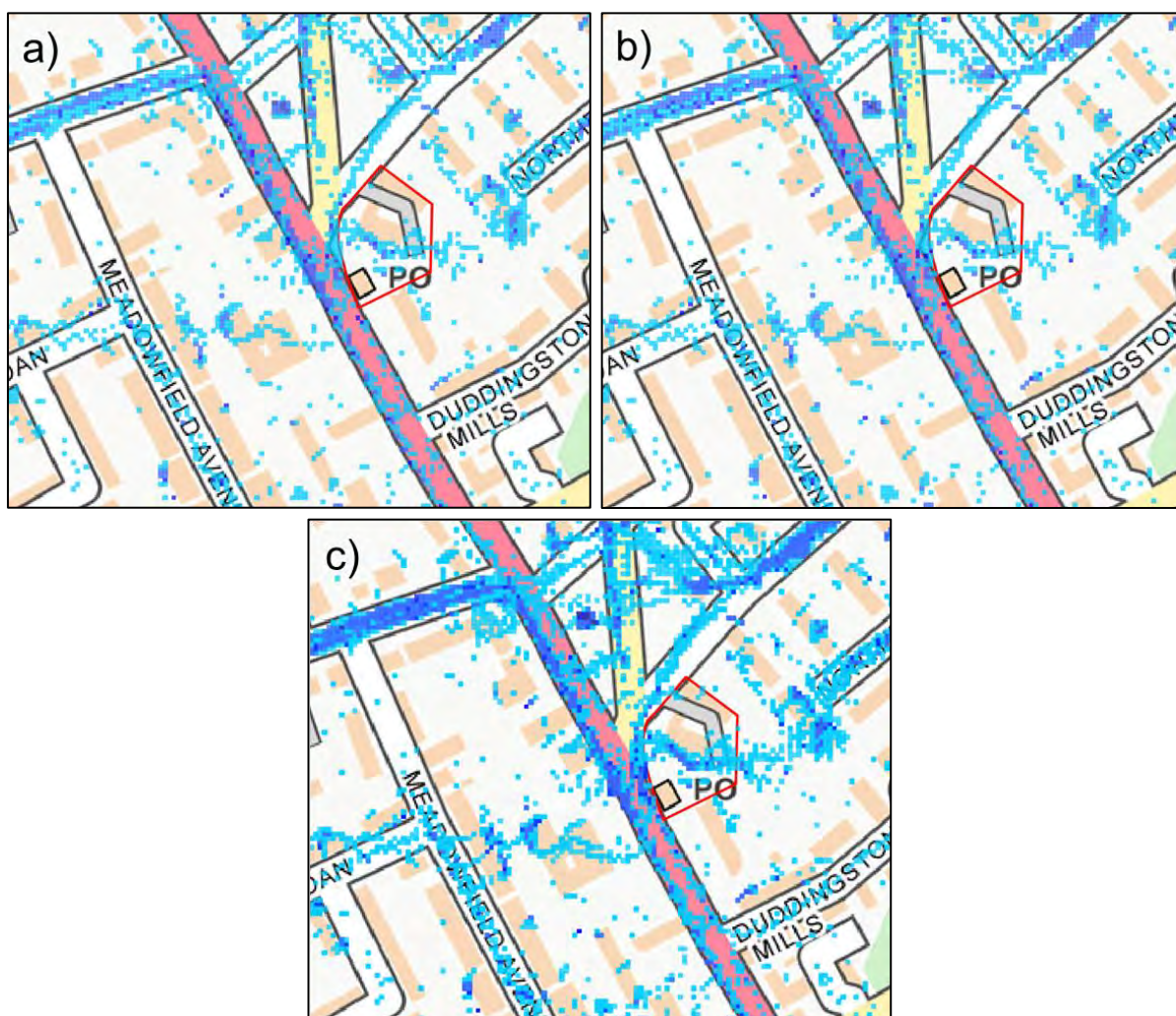
Appendix 1: Predicted flood extents for the 1 in 200-year rainfall event with varying durations; ai) 1 Hour FEH, aii) 1 Hour ReFH2, bi) 5 Hour FEH, bii) 5 Hour ReFH2, ci) 7 Hour FEH, cii) 7 Hour ReFH2





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Appendix 2: Predicted flood extents for the 1 in 200-year 1 hour ReFH2 rainfall event with varying parameters; a) 60% runoff for impervious areas, b) 80% runoff for impervious areas, c) Summer storm rainfall profile



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CERTIFICATE A1 – SELF CERTICATION (DESIGNER)

1 We certify that reasonable professional skill and care has been used in the preparation and checking of the Flood Risk Assessment for the development at Willowbrae Road, Edinburgh with a view to securing that: -

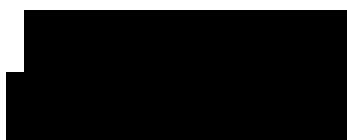
- i It has been designed and checked in accordance with the most recent City of Edinburgh Council Flood Prevention Requirements.
- ii It has been checked for compliance with the relevant Standards in i.
- iii details of the ground investigation and the attached interpretative report demonstrating that any soakaways provided are compliant provided (*delete as appropriate*)
- iv It has been accurately translated into drawings and documents submitted alongside the planning application (all of which have been checked). The unique numbers and revisions of these drawings are: -

Version 3.0 - Final

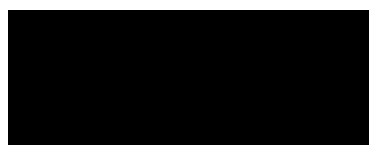
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.....

2 Signed



Name Michael Stewart
DESIGN TEAM LEADER



3 Signed

Name Yusuf Kaya

Professional Qualifications BSc, PhD, CEng, MICE

Position Held Managing Director
PRINCIPAL OF ORGANISATION RESPONSIBLE
FOR DESIGN

Name of Organisation Kaya Consulting Ltd

Date 04.02.2020

4 Is an independent check required? (Refer to Section 7) Yes

5 This certificate is accepted by the City of Edinburgh Council

Signed

Name

Position Held



229 Willowbrae Road, Edinburgh

Surface Water Management Plan

Jan 2020

Contact

124-125 Princes St Edinburgh,
EH2 4AD
enquiries@harleyhaddow.com

Document Revision Control

Revisions	Date	Reason for Issue	By	Approved
00	Jan 2020	Surface Water Management Plan	DC	DC

Contents

1.0 Introduction	4
2.0 Preliminary Enquiries and Consultations	4
3.0 Existing Site Drainage	4
4.0 Proposed Foul Water Drainage	4
5.0 Surface Water Flow Paths	5
6.0 Proposed Surface Water Drainage	5
7.0 SUDS	5
8.0 Summary	5

Appendices

Appendix 1 – Dwg 305610-LP1 Location Plan	6
Appendix 2 - Scottish Water Drainage Records	7
Appendix 3 – City of Edinburgh Council Drainage Records	8
Appendix 4 – Scottish Water PDE Response, dated 21 October 2019	9
Appendix 5 – Dwg 305610-PD1 Proposed Drainage Layout	10
Appendix 6 – Surface Water Micro-drainage Calculations	11
Appendix 7 – Dwg 305610-HS1-Hardstanding Layout	12
Appendix 8 – Dwg 305610-FP1 Pre Development Surface Water Flow Path Layout	13
Appendix 9– Dwg 305610-FP2 Post Development Surface Water Flow Path Layout	14
Appendix 10 - Engineers Self Certification A1 Form	15
Appendix 11 - Surface Water Management Checklist	16

1.0 Introduction

Evantyr Properties Ltd are proposing to construct 48 new apartments on a site previously used as a pub/restaurant at 229 Willowbrae Road, Edinburgh.

The site extends to an area of 0.30 Ha or thereby and the site is bounded to the North and East by Open Space Area, to the south and west by Willowbrae Road & Northfield Drive. The location of the site is shown on DWG 305610-LP1 (Refer to Appendix 1).

Harley Haddow have been appointed to carry out a Drainage Design in accordance with current standards and specifications of Scottish Water, City of Edinburgh Council and SEPA in terms of quality and quantity of discharge and flooding issues pertaining to this development.

2.0 Preliminary Investigations and Consultations

The engineer has carried out investigations into establishing the extents and capacities of the current public drainage network and culverts. These investigations include obtaining Scottish Water Drainage Records and City of Edinburgh Council Drainage Records.

3.0 Existing Site Drainage

Scottish Water Drainage Records (Refer to Appendix 2) indicate that the existing public sewer network adjacent to the site is a combination of both separate foul and surface water and combined sewer systems.

City of Edinburgh Council Drainage Records (Refer to Appendix 3) confirm that the existing building and associated car parking areas are drained on a combined foul and surface water system prior to discharging to the existing foul sewer in Northfield Grove as shown on Scottish Water Records.

4.0 Proposed Foul Water Drainage

The foul flows from the proposed development will discharge to the existing foul sewer in Northfield Drive. A PDE application has been submitted to Scottish Water and Scottish water confirmed in their letter, dated 21 October 2019, that there is adequate capacity in the existing foul sewer network. The foul connection for the site is shown on Dwg 305610-PD1 (Appendix 5).

5.0 Surface Water Flow Paths

The existing Site is approximately 85% hard standing area comprising of the main building and associated car parking. The attached Dwg 305610-FP1 (Refer to Appendix 8) shows the pre development surface water flow paths for the site. The attached Dwg 305610-FP2 (Refer to Appendix 9) shows the post development surface water flow paths for the site.

6.0 Proposed Surface Water Drainage

To comply with CoEC Flooding Division, the surface water system must not surcharge during the 1 in 30 year plus 40% CC storm event and attenuation must be provided on site for the 1 in 200 year plus 40% CC storm event. Micro-drainage Calculations (Refer to Appendix 6) have been completed for the proposed on-site surface water drainage system. Based on these calculations, the attenuation required to attenuate the 1 in 200 year plus 40% CC storm event to a restricted discharge rate of 3L/s is 139m³.

An attenuation volume of 145m³ will be provided by 85m³ of attenuation tanks and 60m³ of attenuation provided within the voids of the porous paving construction. The underground attenuation units have been designed to ensure the 1 in 200 year storm event plus 40% CC is contained below ground. The surface water drainage for the site is shown on Dwg 305610-PD1 (Appendix 5).

7.0 SUDS

To comply with Scottish Planning Policy all surface water run-off from hard standing areas on new developments must have an appropriate level of treatment. For a development of this size, 2 levels of treatment is required for the surface water run-off from all road areas and 1 level of treatment is required for the surface water run-off from roof areas. It is intended to provide the required treatment levels by the following means

1. Roads and Parking - Constructed in porous paving
2. Roofs - All roof areas will discharge to filtertrenches

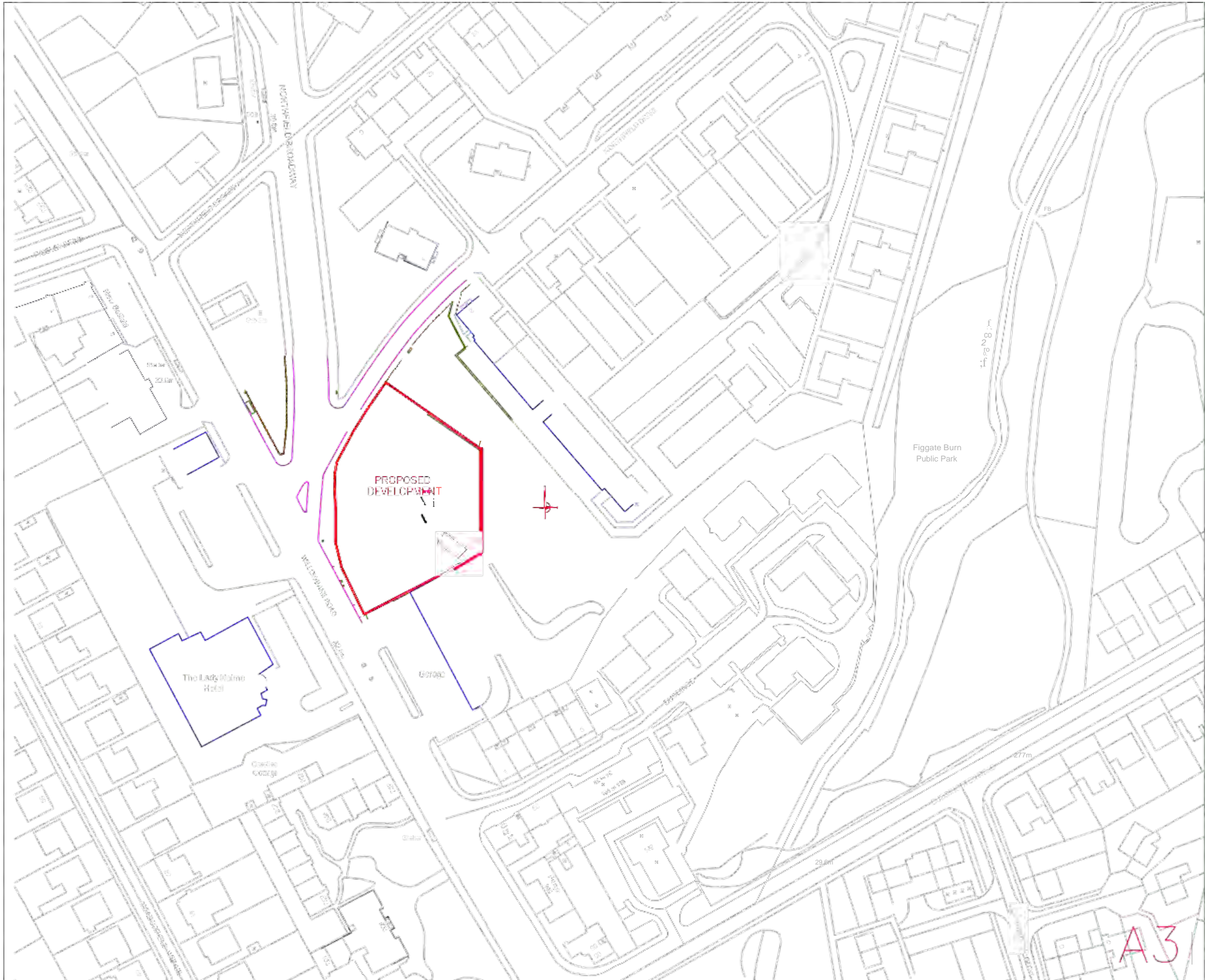
All surface water treatment measures will be privately maintained.


8.0 SUDS

The proposed foul and surface water drainage proposals complies with all the design requirements of Scottish Water, City of Edinburgh Council and SEPA.

Appendix 1

Dwg 305610-LP1 Location Plan



Rev	Date	Description	By	Eng
Status				
PLANNING				
HARLEY HADDOW CONSULTING ENGINEERS 124-125 Princes Street, Edinburgh, EH2 4AD T: +44 (0) 131 2263331 Email - edin@harleyhaddow.com www.harleyhaddow.com <small>AssociationsConsulting Engineers River Fm Edinburgh Glasgow Loodoo</small>				
Project Title:				
MNM DevelopMents Ltd Willowbrooke Road Edinburgh				
Drawing Title				
Lornt on PION				
Date:	Scale:	Engineer:	Technician:	
		D		
Drawing Number 305610-LP1				

Appendix 2

Scottish Water Drainage Records



Appendix 3

City of Edinburgh Council Drainage Records

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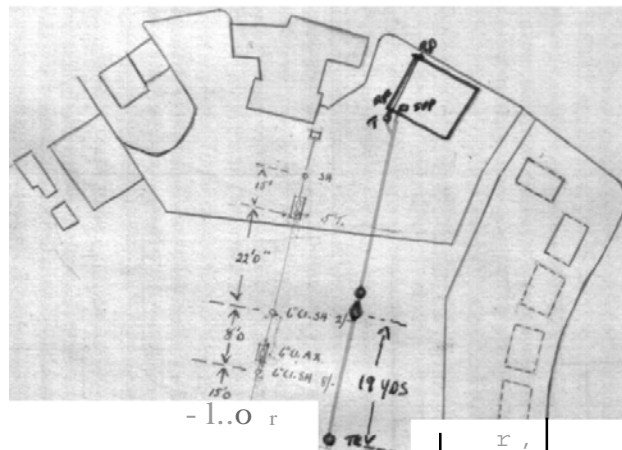
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LENGTH 01' PIPES IN YARDS,



REMARKS :-

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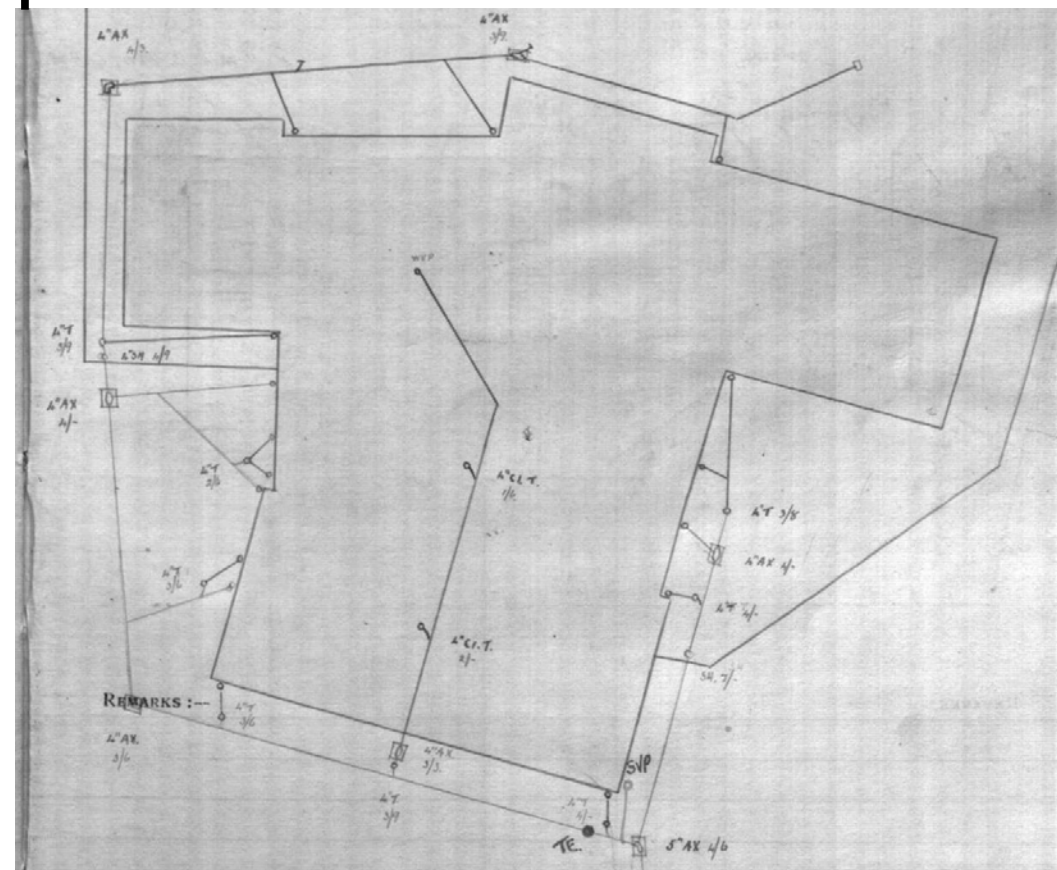
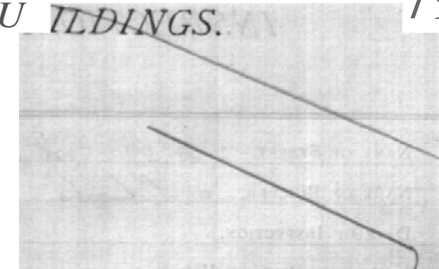
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REMARKS :-

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Appendix 4

Scottish Water PDE Response, dated 21 October 2019

21st October 2019



Harley Haddow
124-125 Princes Street
Edinburgh
EH2 4AD

SCOTTISH WATER

Development Operations
The Bridge
Buchanan Gate Business Park
Cumbernauld Road
Stepps
Glasgow
G33 6FB

Development Operations
Free phone Number - 0800 389 0379
E-Mail - DevelopmentOperations@scottishwater.co.uk
www.scottishwater.co.uk

Dear Mr D Coulter

EH8 Edinburgh Willowbrae Road 229
Pre-Development Enquiry Application – Capacity Review
Your Ref: 1010
Our Ref: 783714

Please quote our reference in all future correspondence

Number of housing units reviewed	48
----------------------------------	----

Thank you for your application regarding the above proposed development. Please note our reference number, which should be quoted on all future correspondence.

Following a capacity review we can now confirm the following:

Assessment of capacity at our treatment works:

- There is currently sufficient capacity in the **Glencorse** Water Treatment Works to service your development.
- There is currently sufficient capacity in the **Edinburgh PFI** Waste Water Treatment works to service your development.

Assessment of our network:

- There are no issues currently identified within our **water** and **wastewater** network that would adversely affect the demands of your development.

Please note:

- This response is valid for **12 months** from the date above and may be subject to further review
- The above waste water assessment is based on a foul only connection. All surface water to discharge to surface water sewer at an attenuated rate of **3l/s** as per application. Foul and surface water to be separated within the site.

Infrastructure within boundary

On review of your application it has been found that there is Scottish Water Infrastructure within the boundary of the proposed development. I have referred your application to the Scottish Water Asset Impact Team to discuss any diversion requirements which may be necessary. You will receive a response from a member of our team in due course. If you have any questions in the meantime you can contact them at service.relocation@scottishwater.co.uk The applicant should be aware that any conflict with assets identified will be subject to restrictions on proximity of construction.

General notes:

- Scottish Water's current minimum level of service for water pressure is 1.0 bar or 10m head in the public main. Any property which cannot be adequately serviced using this pressure may require private pumping arrangements installed, subject to compliance with the current water byelaws.
- Scottish Water is unable to reserve capacity therefore connections to the water and wastewater networks can only be granted on a first come first served basis. For this reason we will review our ability to serve the development on receipt of an application to connect.
- Please be advised that Scottish Water will only accept surface water into the combined network under exceptional circumstances. In the consideration of any development, if due diligence has been carried out in fully investigating the available options for surface water drainage and if all of these options are subsequently deemed unreasonable to pursue, the remaining alternative options can then be considered for approval to allow the development to proceed.
- Unless stated on your PDE application, the drainage is assumed to propose to connect to our network via gravity without the use of a pumping station. If this is not the case then please let us know as soon as possible because Scottish Water would need to reassess this case.

Next steps:

If you would like to progress with connection(s) to the water and waste water network please submit the relevant application to our business team. Application forms and guidance can be found at <https://www.scottishwater.co.uk/Business/Connections>.

This response is in relation to the information you have provided in your application. If there are any changes to your proposed development you may be required to submit a new Pre-Development Enquiry application.

If you have any questions, please contact us at developmentoperations@scottishwater.co.uk or call us on 0800 389 0379, quoting your reference number and a member of our team will be happy to assist you.

Yours sincerely

Sarah Gracie

Development Operations

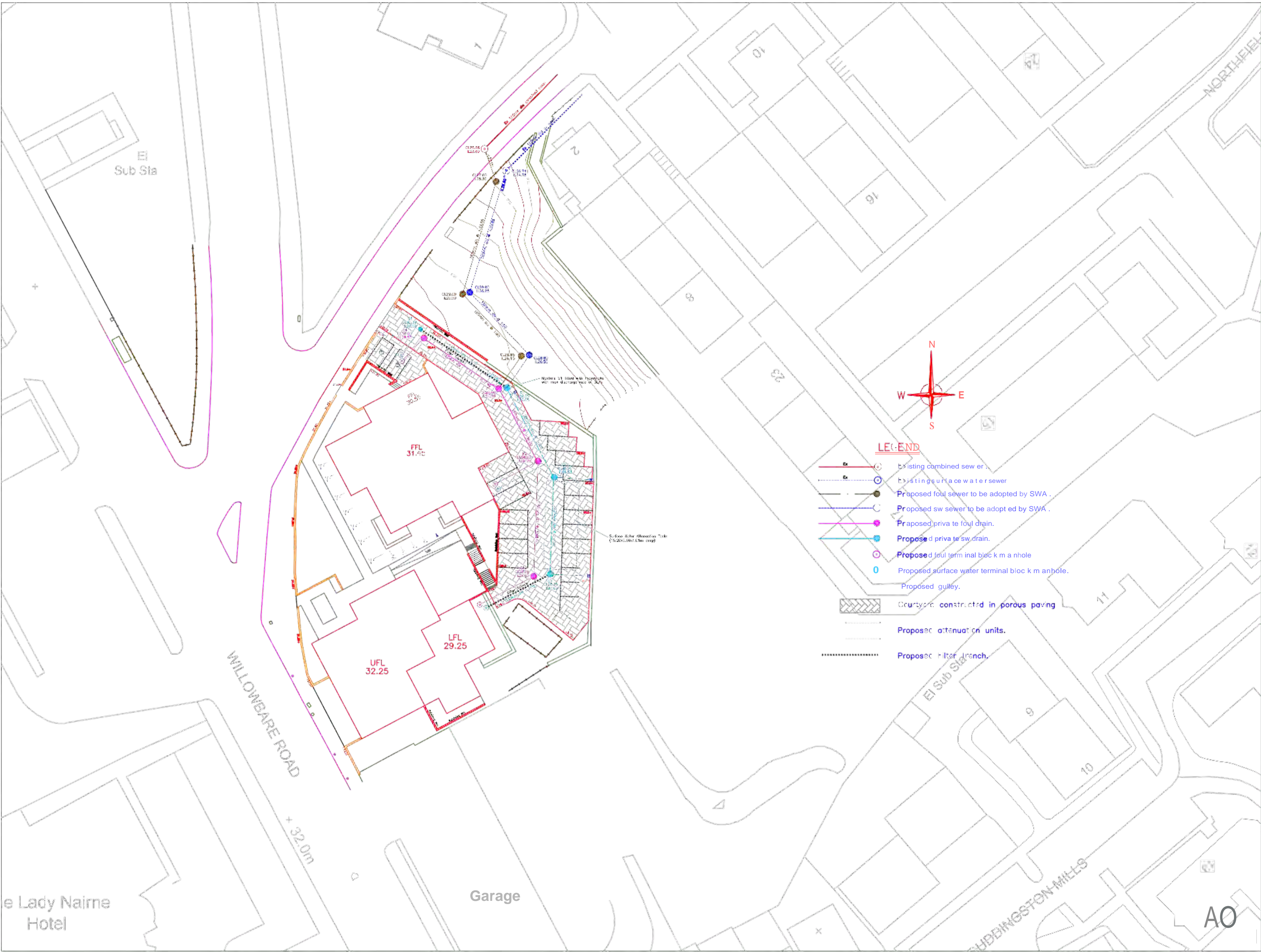
Sarah.Gracie@scottishwater.co.uk

Scottish Water Disclaimer:

"It is important to note that the information on any such plan provided on Scottish Water's infrastructure, is for indicative purposes only and its accuracy cannot be relied upon. When the exact location and the nature of the infrastructure on the plan is a material requirement then you should undertake an appropriate site investigation to confirm its actual position in the ground and to determine if it is suitable for its intended purpose. By using the plan you agree that Scottish Water will not be liable for any loss, damage or costs caused by relying upon it or from carrying out any such site investigation."

Appendix 5

Dwg 305610-PD1 Proposed Drainage Layout




PRELIMINARY			
HARLEY HADDOW CONSULTING ENGINEERS 124-125 Prince Street, Edinburgh, EH2 4FD T: +44 (0) 131 226 3333 Email: info@haddow.co.uk www.haddow.co.uk			
Project Title: MN M D1 vel opMent s L t d Vil l o w b r a e R o o d Edinbu, gh			
Drawing Title: Proposed Drainage Layout			
Date: Jun 2018	Scale: 1:200	Drawn: JD	Checked: JC
Drawing Number: D1017			

AO

Appendix 6

Surface Water Micro-drainage Calculations

Harley Haddow	Page 0
124-125 Princes Street Edinburgh EH2 4AD	
Date 01/01/0001	
File STORM NETWORK.MDX	
Innovyze	Network 2019.1

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for STORM NETWORK.SWS

Pipe Sizes ScottishWater Manhole Sizes Scottish Water

FEH Rainfall Model	
Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 328500 672000 NT 28500 72000
Data Type	Catchment
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	0.75
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits



Time Area Diagram for STORM NETWORK.SWS

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.040	4-8	0.022	8-12	0.021	12-16	0.018

Total Area Contributing (ha) = 0.101


Total Pipe Volume (m³) = 2.000

Network Design Table for STORM NETWORK.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	16.736	0.167	100.2	0.052	15.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	17.429	0.174	100.2	0.024	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	I.Area (ha)	Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	20.06	15.21	27.000	0.052	0.0	0.0	0.0	1.31	51.9	2.8
1.001	19.95	15.44	26.833	0.076	0.0	0.0	0.0	1.31	51.9	4.1

Harley Haddow		Page 2
124-125 Princes Street Edinburgh EH2 4AD		
Date 01/01/0001	Designed by craigb	
File STORM NETWORK.MDX	Checked by	
Innovyze	Network 2019.1	

Online Controls for STORM NETWORK.SWS


Hydro-Brake® Optimum Manhole: 1, DS/PN: 1.002, Volume (m³): 3.1


Unit Reference	MD-SHE-0081-3000-1100-3000
Design Head (m)	1.100
Design Flow (l/s)	3.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	81
Invert Level (m)	26.659
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.100	3.0
Flush-Flo™	0.333	3.0
Kick-Flo®	0.682	2.4
Mean Flow over Head Range	-	2.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.4	1.200	3.1	3.000	4.8	7.000	7.1
0.200	2.9	1.400	3.4	3.500	5.1	7.500	7.3
0.300	3.0	1.600	3.6	4.000	5.5	8.000	7.6
0.400	3.0	1.800	3.8	4.500	5.8	8.500	7.8
0.500	2.9	2.000	4.0	5.000	6.1	9.000	8.0
0.600	2.7	2.200	4.1	5.500	6.3	9.500	8.2
0.800	2.6	2.400	4.3	6.000	6.6		
1.000	2.9	2.600	4.5	6.500	6.9		

Harley Haddow		Page 3																		
124-125 Princes Street Edinburgh EH2 4AD																				
Date 01/01/0001	Designed by craigb																			
File STORM NETWORK.MDX	Checked by																			
Innovyze		Network 2019.1																		
<p style="text-align: center;"><u>Storage Structures for STORM NETWORK.SWS</u></p> <p style="text-align: center;"><u>Cellular Storage Manhole: 2, DS/PN: 1.001</u></p> <p style="text-align: center;">Invert Level (m) 26.833 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000</p> <table border="1"> <thead> <tr> <th>Depth (m)</th> <th>Area (m²)</th> <th>Inf. Area (m²)</th> <th>Depth (m)</th> <th>Area (m²)</th> <th>Inf. Area (m²)</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>85.1</td> <td>85.1</td> <td>1.400</td> <td>0.0</td> <td>139.2</td> </tr> <tr> <td>1.300</td> <td>85.1</td> <td>139.2</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	0.000	85.1	85.1	1.400	0.0	139.2	1.300	85.1	139.2			
Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)															
0.000	85.1	85.1	1.400	0.0	139.2															
1.300	85.1	139.2																		
©1982-2019 Innovyze																				

Harley Haddow		Page 4
124-125 Princes Street Edinburgh EH2 4AD		
Date 01/01/0001 File STORM NETWORK.MDX	Designed by craigb Checked by	
Innovyze	Network 2019.1	

Summary of Critical Results by Maximum Level (Rank 1) for STORM NETWORK.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 328500 672000 NT 28500 72000
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk	Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)	
DTS Status		ON
DVD Status		OFF
Inertia Status		OFF

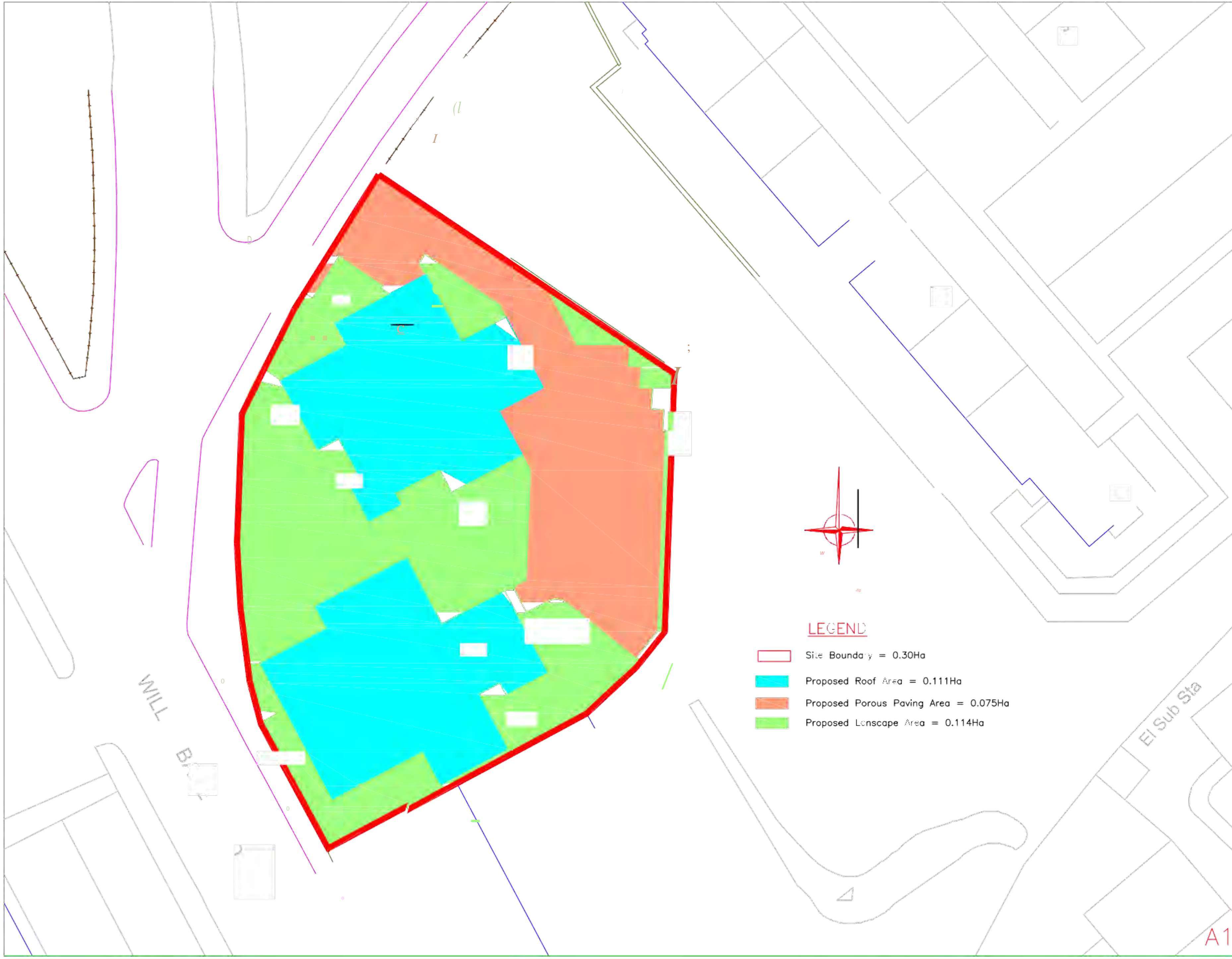
Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	200
Climate Change (%)	40

								Water
	US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.
								Level
								(m)
1.000	3	180 Winter	200	+40%	200/60 Winter			27.279
1.001	2	180 Winter	200	+40%	200/30 Summer			27.277
2.000	4	30 Winter	200	+40%				28.640
1.002	1	120 Winter	200	+40%	200/15 Summer			27.282

PN	US/MH Name	Surcharged Flooded		Pipe		Status	Level Exceeded
		Depth (m)	Volume (m³)	Flow / Overflow Cap.	Flow (l/s)		
1.000	3	0.054	0.000	0.16	7.4	SURCHARGED	
1.001	2	0.219	0.000	0.07	3.1	SURCHARGED	
2.000	4	-0.110	0.000	0.16	6.9	OK	
1.002	1	0.398	0.000	0.07	3.0	SURCHARGED	

Appendix 7

Dwg 305610-HS1-Hardstanding Layout



LEGEND

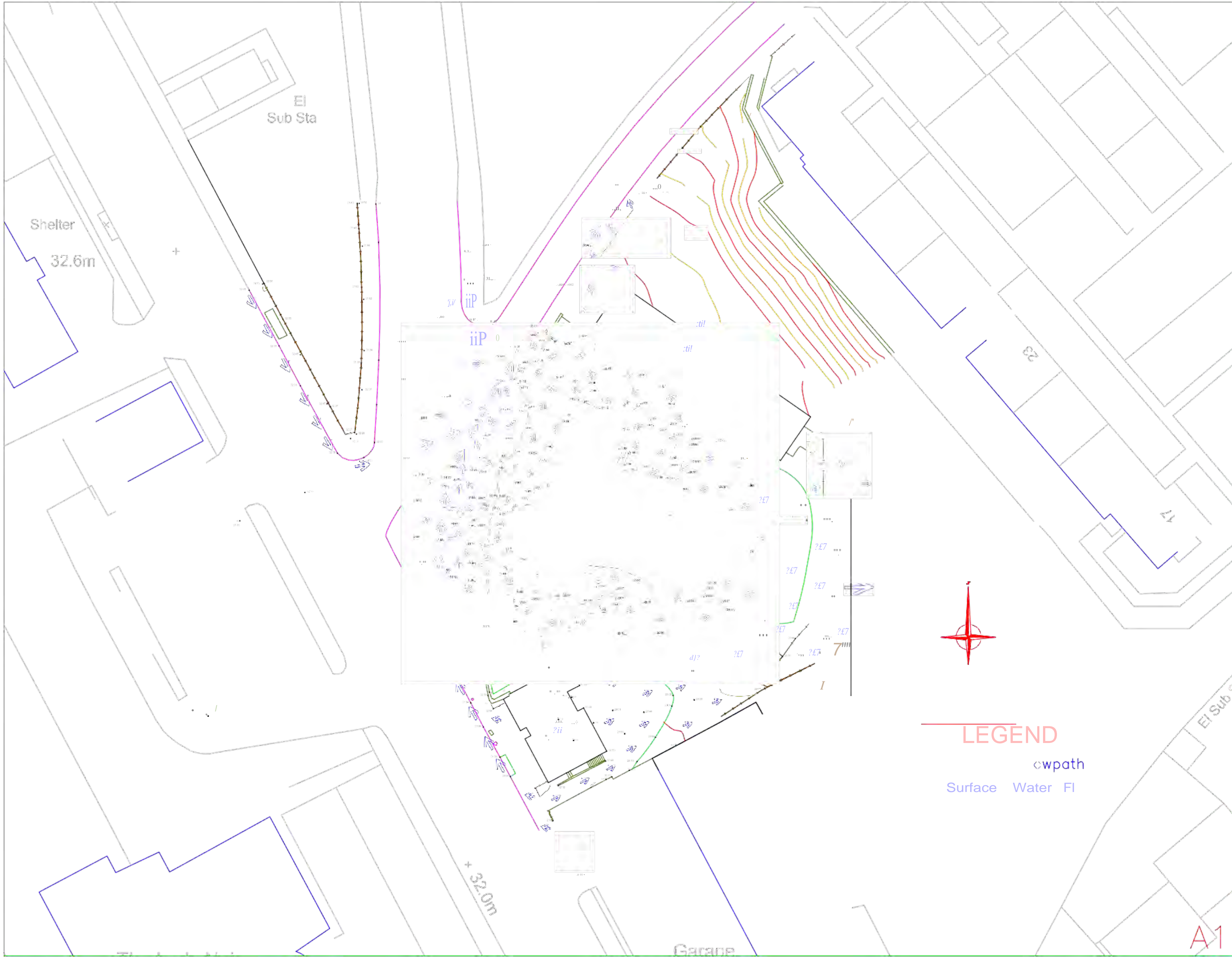
- Site Boundary = 0.30Ha
- Proposed Roof Area = 0.111Ha
- Proposed Porous Paving Area = 0.075Ha
- Proposed Landscape Area = 0.114Ha

A1

Rev.	Date	Description	By	Ltd.
Status				
PLANNING				
HARLEY HADDOW CONSULTING ENGINEERS				
101-105 Prince Street Edinburgh, EH1 1BB Tel: 0131 225 1111 Email: info@haddow.co.uk www.haddow.co.uk				
Project Title				
MNM Developments Ltd Willowbrae Drive Edinburgh				
Drawing Title				
Hardsurfacing Layout Water Flowpath Layout				
Date	Scale	Project	Technician	Rev.
Jun 2020	1:200	RD	DC	-
Drawing Number				Rev.
305610-HS1				-

Appendix 8

Dwg 305610-FP1 Pre Development Surface Water Flow Path Layout



LEGEND

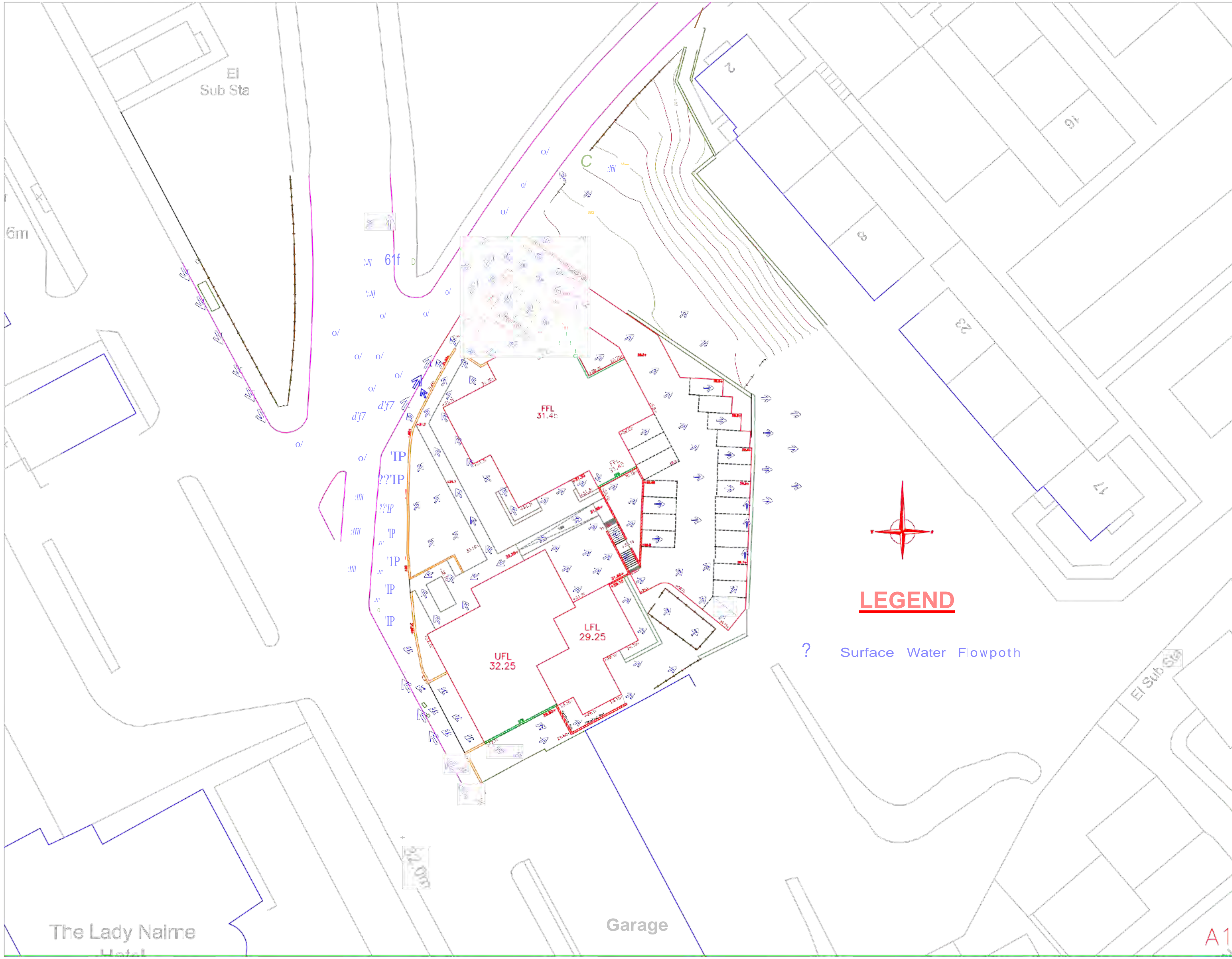
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Surface Water FI

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Rev.	Date	Description	By	Ltd.
PLANNING				
<div><div><div>HARLEY HADDOW CONSULTING ENGINEERS</div><div>10-15 Prince Street Edinburgh, EH4 4EP Tel: 0131 220 3551 Email: info@haddow.co.uk www.haddow.co.uk Edinburgh Support Centre</div></div><div><div>h</div><div>HARLEY HADDOW</div></div></div>				
Project Title MNM Developments Ltd Willowbrae Drive Edinburgh				
Drawing Title Pre Development Surface Water Flowpath Layout				
Date Jun 2020	Scale 1:250	Engineer RD	Technician BC	Rev. -
Drawing Number 305610-FP1				


Appendix 9

Dwg 305610-FP2 Post Development Surface Water Flow Path Layout



LEGEND

? Surface Water Flowpath

Rev	Date	Drawn by	Checked by
1	2020-01-20	JD	JD
Status			
PLANNING			
HARLEY HADDOW CONSULTING ENGINEERS			
124-125 Princes Street			
Edinburgh, EH2 4AD			
T: +44 (0) 131 226 3331			
Email: edn@harleyhaddow.com			
www.harleyhaddow.com			
A Member of the Engineering Council			
Edinburgh Glasgow London			
Project Title:			
Development of a new building			
Water Flowpath Design			
Drawing Title:			
Surface Water Flowpath Layout			
Date:	Scale:	Project:	Technician:
Jan 2020	1:250	RD	JD
Drawn by:	Checked by:	Rev:	
JD	JD		
305610-FP2			

A1

Appendix 10

Engineers Self Certification A1 Form

CERTIFICATE A1 - SELF CERTICATION (DESIGNER)

- 1 We certify that reasonable professional skill and care has been used in the preparation and checking of the Surface Water Management Plan for the development at **229 Willowbrae Road, Edinburgh, EHS 7ND** with a view to securing that:-

It has been designed and checked in accordance with the most recent City of Edinburgh Council Flood Prevention Requirements.

ii It has been checked for compliance with the relevant Standards in i.

iii details of the ground investigation and the attached interpretative report demonstrating that any soakaways provided are compliant provided (*delete as appropriate*)

iv It has been accurately translated into drawings and documents submitted alongside the planning application (all of which have been checked). The unique numbers and revisions of these drawings are:-

SWMP1-305610

2 Signed

Name

Richard Dunlop

ceiR
v,41

3 Signed

Name

Chris Chesney

Professional Qualifications

BEng Ceng MICE

Position Held

Technical Director

Name of Organisation

Harley Haddow (Edinburgh) Ltd

Date

03 February 2020

4 Is an independent check required? (Refer to Section 7)

No

5

Ibis certificate is accepted by the City of Edinburgh Council

Signed

Name

Position Held

Appendix 11

Surface Water Management Checklist

Application reference: MNM Developments Ltd, 229 Wilowbrae Road, Edinburgh

	Item	Provided? (Y/N)	Submission Section Reference	If N comment reason
1	Location Plan.	Y	Dwg 305610-LP1 (SWMP Appendix 1)	
2	Pre development overland flow path arrows for site and surrounding land .	Y	Dwg 305610-FP1 (SWMP Appendix 8)	
3	Area of impermeable surface in proposed development.	Y	Dwg 305610-HS1 (SWMP Appendix 7)	
4	Greenfield runoff calculations for impermeable area.	Y	Scottish Water PDE Response (SWMP Appendix 4)	
5	Confirmation that attenuation is provided to allow 200yr+CC discharge at the lesser of *: <ul style="list-style-type: none"> 1:2 year greenfield runoff rate; 4.5 l/s/ha of impermeable area. *Subject to minimum 75mmØ flow control (3l/s)	Y	Refer to Scottish Water PDE Response (SWMP-Appendix 6)	
6	Volume of attenuation required to allow discharge at greenfield rate (m³). Volume of attenuation provided within the proposed drainage layout (m³).	Y	139m3	
			145m3	
7	<ul style="list-style-type: none"> Hand calculations or Hydraulic modelling outputs with pipes included¹ and 30year+CC and 200year +CC outputs. (1000year+CC for civil infrastructure²). 	Y	Microdrainage Calculations attached (SWMP Appendix 6)	
8	Drainage drawing with manhole numbers that cross reference with the hydraulic modelling outputs.	Y	Dwg 305610-PD1 (SWMP Appendix 5)	
9	Confirmation that 30year +CC event remains below ground and that 200year +CC remains attenuated on site safely ³ .	Y	Microdrainage Calculations attached (SWMP Appendix 6)	
10	Post development flow paths for site and surrounding area (on separate plan to pre development) ⁴ .	Y	Dwg 30610-FP2 (SWMP Appendix 8)	
11	Confirmation of who will adopt and maintain the surface water system including SuDS.	Y	Refer to Section 7.0 (SWMP Document)	
12	Confirmation where the surface water ultimately discharges.	Y	Refer to Sections 3.0 & 6.0 (SWMP Document)	
13	Confirmation that appropriate water quality measures (SuDS treatment) is included in the design in line with relevant guidance.	Y	Refer to Section 7.0 (SWMP Document)	
14	If discharging surface water to public sewer - confirmation that Scottish Water agree in principal to proposed connection.	Y	Refer to Scottish Water PDE Response (SWMP-Appendix 6)	
15	Does the proposed design take cognisance of Section 3.7 Water Environment (Edinburgh Design Guidance) and Policies Des 5 City Local Plan, E44 Rural West Local Plan and Des 8 Edinburgh Local Development Plan?	Y	Refer to SWMP Document	

¹ Pipe network only required for FUL and AMC applications. Where part of a larger strategy attenuation network then this must all be represented. For PPP applications minimum requirements are total storage volume and subsequent to-scale representation and location shown on plan layout.

² Refer to SPP for definition of civil infrastructure.

³ All property FFLs are 600mm above this 200-year water level.

⁴ For PPP applications where the site layout has not been finalised, an indication of the general intention for overland water flow paths should be presented.



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Transport Statement

Willowbrae Road

Edinburgh

Residential Development

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Table of contents

1	Introduction.....	1
1.1	Background	1
1.2	Report Structure.....	1
2	Development Proposals	2
2.1	Site Location	2
2.2	Development	2
2.3	Pedestrian and Cycle Access and Parking.....	3
2.3.1	Access	3
2.3.2	Cycle Parking	3
2.4	Vehicle Access and Parking	3
2.4.1	Vehicle Access	3
2.4.2	Vehicle Parking.....	4
2.5	Servicing	4
3	Policy Review	5
3.1	Introduction	5
3.2	Assessment of the Proposed Development Against Planning Policy	5
4	Accessibility Review	6
4.1	Walking	6
4.2	Cycling	7
4.3	Public Transport.....	8
4.3.1	Bus Provision.....	8
4.3.2	Rail Provision.....	9
4.4	Road Network	10
5	Travel Plan Framework	11
6	Vehicle Travel Demand.....	12
6.1	Vehicle Trip Generation	12
6.2	Parking review	12
7	Summary and Conclusions	13
7.1	Summary.....	13
7.2	Conclusions	13

Appendices

Appendix A – Site Layout	14
Appendix B – Policy Context	15
Appendix C – Travel Leaflet	16
Appendix D – TRICS Output	17

1 Introduction

1.1 Background

Sweco was commissioned by MNM Developments to prepare a Transport Statement (TS) in support of a residential development at Willowbrae Road, Edinburgh. The development will consist of 48 private apartments and a commercial unit.

The TS was prepared in accordance with the guidelines set out in the Scottish Government publication 'Transport Assessment Guidance' and takes account of the policies within the Scottish Planning Policy document, with an assessment of the accessibility of the site by non-car modes including walking, cycling and public transport. The TS also provides a framework for a Travel Plan (TP) for the site, designed to encourage travel by sustainable modes.

1.2 Report Structure

The remainder of the report is structured as follows:

- **Chapter 2** – Development Proposals;
- **Chapter 3** – Policy Context;
- **Chapter 4** – Accessibility Review;
- **Chapter 5** – Travel Plan Framework;
- **Chapter 6** – Mode Share and Travel Demands; and
- **Chapter 7** – Summary and Conclusions.

2 Development Proposals

2.1 Site Location

The site is located on Willowbrae Road, approximately 3.5km east of Edinburgh city centre. It is bound by Willowbrae Road to the west, Northfield Drive to the north, residential units to the east and a car dealership to the south. A commercial unit currently exists in the north east of the site. It is proposed that this unit will be replaced by a new commercial unit located on the western boundary of the site.

The location of the site within the context of the surrounding area and road network is provided in **Figure 2.1**. The proposed site layouts as developed by CDA are provided in **Appendix A**.

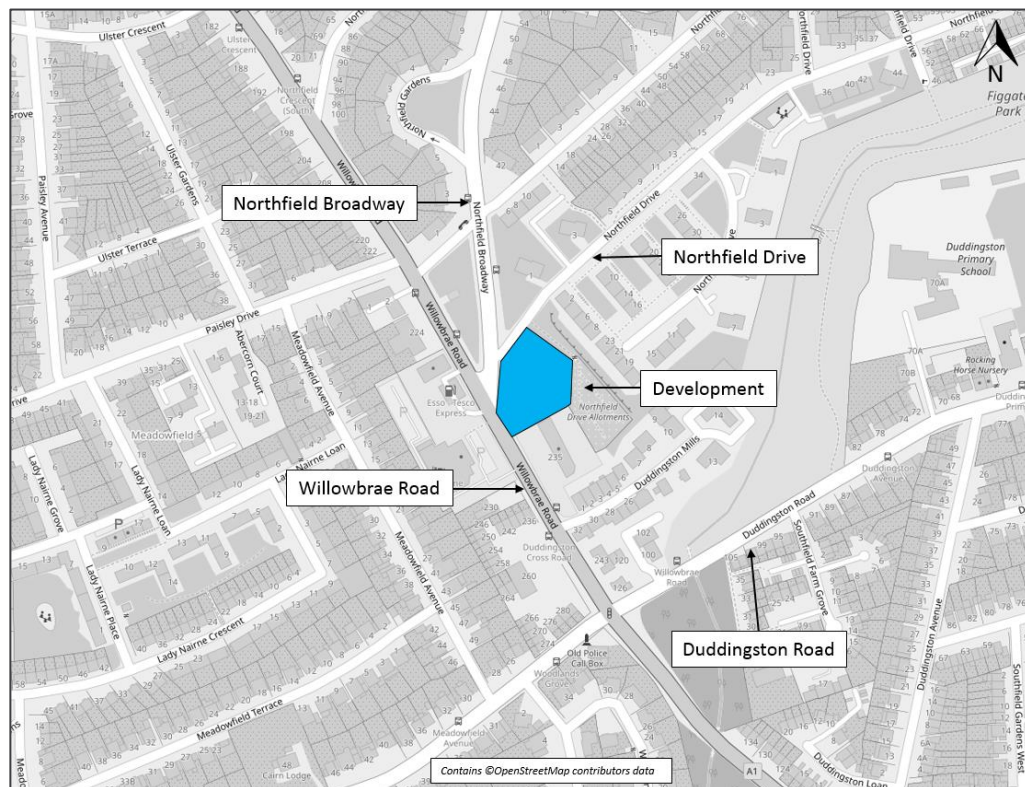


Figure 2.1. Site Location

2.2 Development

The development will be comprised of 48 private apartments across two buildings. Building A, in the north east of the site, will contain 23 apartments and Building B, on the west side of the site, will accommodate 25 apartments. **Table 2.1** provides a breakdown of apartments types within the development.

Apartment Type	Number
1 bed	14
2 beds	21
3 beds	12
4 beds	1
Total	48

Table 2.1. Breakdown of units within development

The commercial unit will have a Gross Floor Area (GFA) of 90m² and will be located on the ground floor of Building B.

2.3 Pedestrian and Cycle Access and Parking

2.3.1 Access

Pedestrian and cycle access to the development will be taken from the footways on Willowbrae Road and Northfield Drive, via new footpaths connecting into the ground floor entrances of each building.

2.3.2 Cycle Parking

It is proposed that a total of 110 cycle parking spaces will be provided at the development comprising 32 in Building A and 77 in Building B with one located at the front of the commercial unit. To establish an appropriate level of cycle parking provision, reference was made to the Council's parking standards within the 'Edinburgh Design Guidance' document, 2018. Willowbrae Road is located in Zone 2 as defined in the parking standards, subsequently the Council's minimum standards are outlined in **Table 2.2.**

Type of Development	Habitable Rooms	Number of units	Minimum Zone 2 Standard	Minimum Provision
Flats	2	14	2 per unit	28
	3	21	2 per unit	42
	4 or more	13	3 per unit	39
Commercial Unit	96 (sq.m)			1
Total		48	-	110

Table 2.2. Council minimum bicycle parking requirements

Based on a minimum requirement of 110 cycle parking spaces, the proposed cycle parking provision complies with standards.

2.4 Vehicle Access and Parking

2.4.1 Vehicle Access

Vehicle access leading to the development car park will be via the retained existing access on Northfield Drive.

2.4.2 Vehicle Parking

Vehicle parking will be provided at surface level as shown in the site layout in **Appendix A**. It is proposed that 26 vehicle parking spaces will be provided, 2 of which will be accessible bays located at the site entrance and 4 will be electric vehicle charging bays.

To establish an appropriate level of cycle parking provision, reference was made to the Council's parking standards within the 'Edinburgh Design Guidance' document, 2018. The Council's maximum vehicle parking standards for the development are summarised in **Table 2.3**.

Type of Development	Number of units	Maximum Zone 2 Standard	Maximum Provision
Flats	48	1 per unit	48

Table 2.3. Council maximum vehicle parking requirements

With a maximum allowable provision of 48, the proposed 26 parking spaces at the development are in line with standards.

2.5 **Servicing**

Refuse collection will take place kerbside on Northfield Drive. Bin stores will be located close to the footways adjacent to each building, within the maximum distance for collection.

3 Policy Review

3.1 Introduction

To demonstrate that the proposals comply with current national and local transport planning policy, a review of the following documents was undertaken:

- Scottish Planning Policy (SPP);
- Planning Advice Note (PAN) 75 – Planning for Transport
- Transport Assessment Guidance;
- Designing Streets – A Policy Statement for Scotland;
- A Long-Term Vision for Active Travel in Scotland, 2030;
- Cycling Action Plan for Scotland, 2013;
- City of Edinburgh Local Transport Strategy 2014-2019; and
- City of Edinburgh Active Travel Plan.

A summary of each of these documents is provided in **Appendix B**, with an assessment of how the development relates to the relevant policies provided below.

3.2 Assessment of the Proposed Development Against Planning Policy

The development complies with criteria set out in the SPP as it is well located in terms of existing public transport. The development provides access to existing walking, cycling and public transport routes.

The provision of a Residential Travel Plan will assist in supporting sustainable travel and alternatives to the private car through behaviour change measures. The nearest bus stops to the site are well within 400m (5minute walk), which complies with the maximum walking distances set out within both SPP and PAN 75. Major employment areas, retail and leisure facilities are easily accessible via cycling routes and public transport. The implementation of a Residential Travel Plan will encourage the use of walking and cycling which will help towards achieving the goals of the Cycling Action Plan for Scotland and the Long-Term Vision for Active Travel in Scotland.

The TA has been prepared in accordance with the Scottish Government's document "Transport Assessment Guidance". The guidance on cycling journey times has been followed during the preparation of this TA.

The development complies with the City of Edinburgh Local Transport Strategy and the Active Travel Action Plan as it promotes sustainable transport by providing the facilities required to make sustainable travel more convenient. The use of public transport is also promoted through the proximity of the site to a range of public transport routes and infrastructure. The proposed development aligns with the sustainable design principles outlined in Designing Streets.

4 Accessibility Review

A baseline accessibility assessment was undertaken to establish existing transport provision near to the development site. The assessment considered travel by all modes of transport including details of available infrastructure and service provision.

An assessment of existing pedestrian and cycle facilities serving the site and walk / cycle and public transport catchment areas was undertaken. The following sections describe the existing infrastructure and facilities together with the opportunities that the development proposals would bring to enhance these facilities.

4.1 Walking

Pedestrian access to each building will be taken via footpaths on Willowbrae Road and Northfield Drive, connected to the existing footway. The existing footway is approximately 2.5metres wide and is in good condition. Footways exist on both sides of Northfield Drive, Northfield Broadway and Willowbrae Road, which provide access to the development from all sides. Several uncontrolled crossing points are available along Willowbrae Road and signalised crossing points are available immediately north of the Willowbrae Road / Northfield Broadway junction and at the A1 / Duddingston Road junction. The location of footways and crossing points surrounding the development are shown in **Figure 4.1**.



Figure 4.1. Walking routes and crossing points within vicinity of the site

Figure 4.2 highlights the pedestrian catchments for the site. National transport policy and guidance specifies that 400m is a reasonable walking distance to the nearest bus stops and 1.6km to the nearest local amenities.

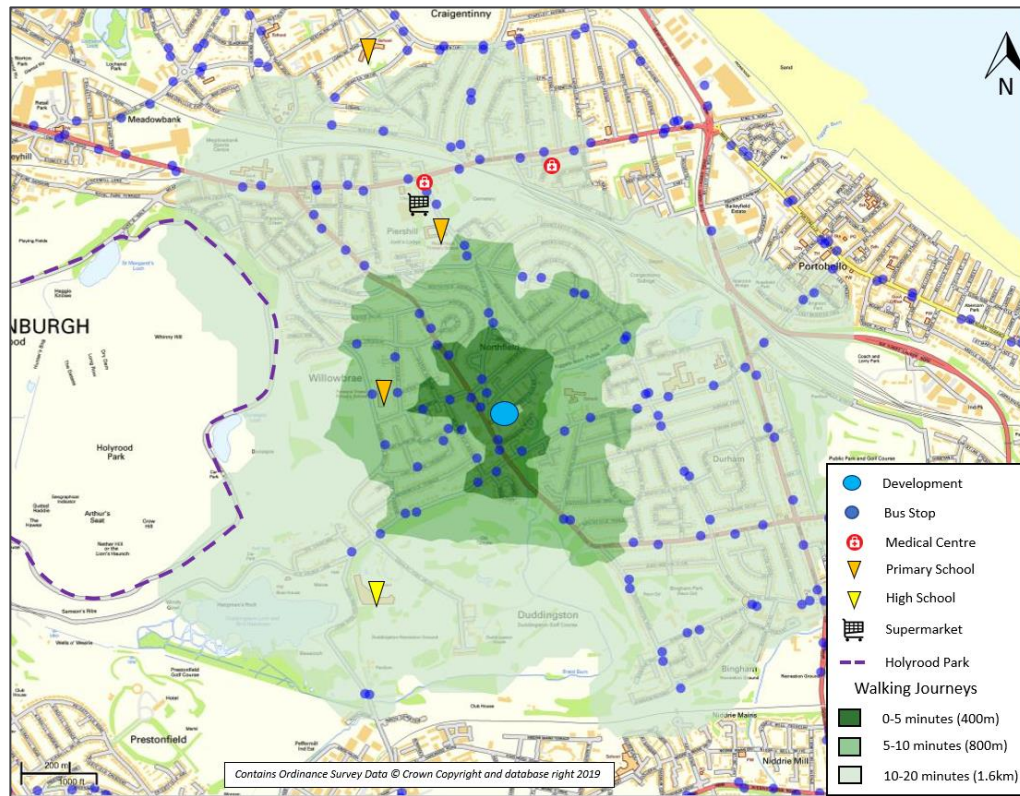


Figure 4.2. Walking catchment

Figure 4.2 shows that the development is located close to several local amenities in the Meadowbank and Duddingston areas of Edinburgh. Two primary schools and a high school are located within a reasonable walking distance of the development site, along with health centres and a Morrisons supermarket. Several bus stops are also located within a five-minute walk of the site which will encourage the use of public transport to and from the development.

4.2 Cycling

Figure 4.3 highlights the catchment within an approximate 30-minute cycle (c.8km) of the development site, which is identified within 'Transport Assessment Guidance' as a reasonable cycle time for a local trip.

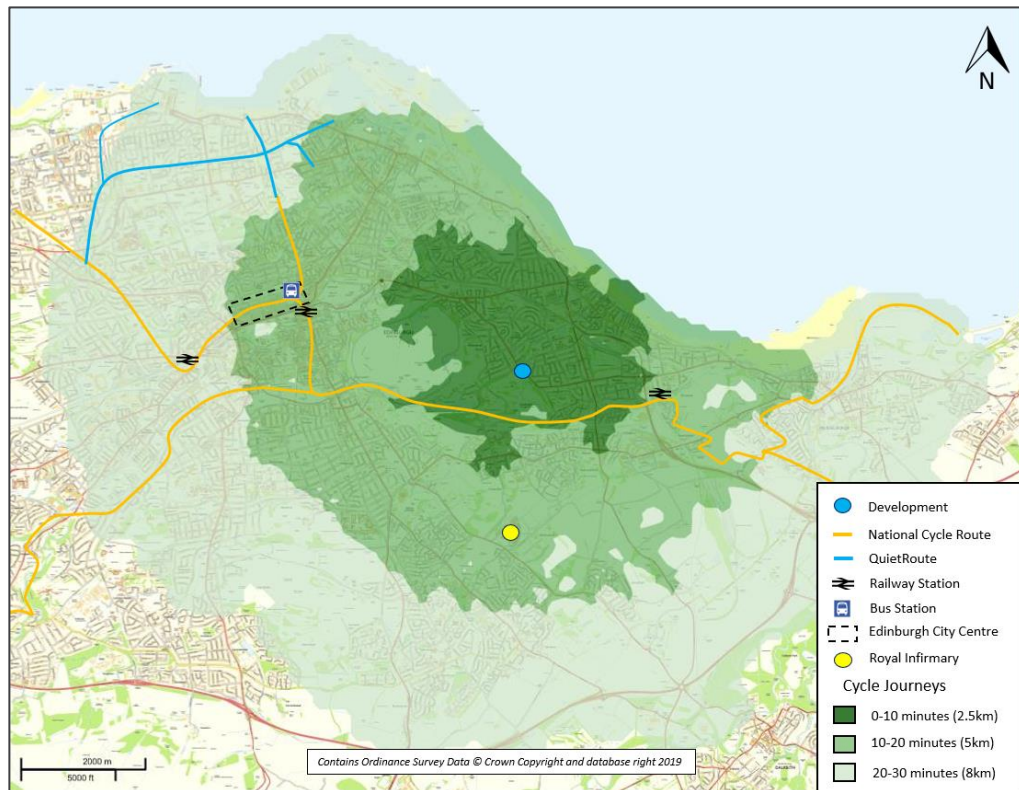


Figure 4.3. Cycling catchment

Figure 4.3 shows that major employment in Edinburgh City Centre and the east part of the city can be reached within a 30 minute cycle of the site.

National Cycle Routes and City of Edinburgh Council's QuietRoutes can be accessed via roads and local cycle routes, which offer travel routes throughout Edinburgh and beyond. The majority of Edinburgh can be accessed within a 30 minute cycle, which includes employment areas, retail, leisure facilities and train stations, including Waverley and Haymarket, which offer services throughout Scotland and the rest of the UK.

4.3 Public Transport

4.3.1 Bus Provision

The closest bus stops to the development are located on Willowbrae Road and Northfield Broadway, within a 1-minute walking distance. These stops provide shelters, seating and timetables, with some stops on Willowbrae Road also containing real time information. These stops are served by Lothian Bus, Borders Bus and East Coast Bus services. In total, bus stops on Willowbrae road are served by approximately 16 buses per hour in each direction on weekdays, 14 buses per hour in each direction on Saturdays and 10 per hour in each direction on Sundays. Northfield Broadway is serviced by Lothian Bus routes 4 and 69, with a total of approximately 5 buses per hour in each direction on weekdays, 4 buses per hour in each direction on Saturdays and 2 buses per hour on Sundays. Buses servicing these stops offer transport to major

employment areas in Edinburgh city centre and to recreational and leisure facilities throughout Edinburgh and the Lothians.

4.3.2 Rail Provision

The closest railway station to Willowbrae Road is Brunstane Station, which is located approximately 3km from the development site. It is located on the Edinburgh to Tweedbank line, offering 2 services per hour in each direction. Edinburgh Waverley Station is located approximately 4km from the development site and offers regular services throughout Scotland and the UK.

Figure 4.4 shows locations that can be accessed within 60 minutes of the development site by means of public transport.

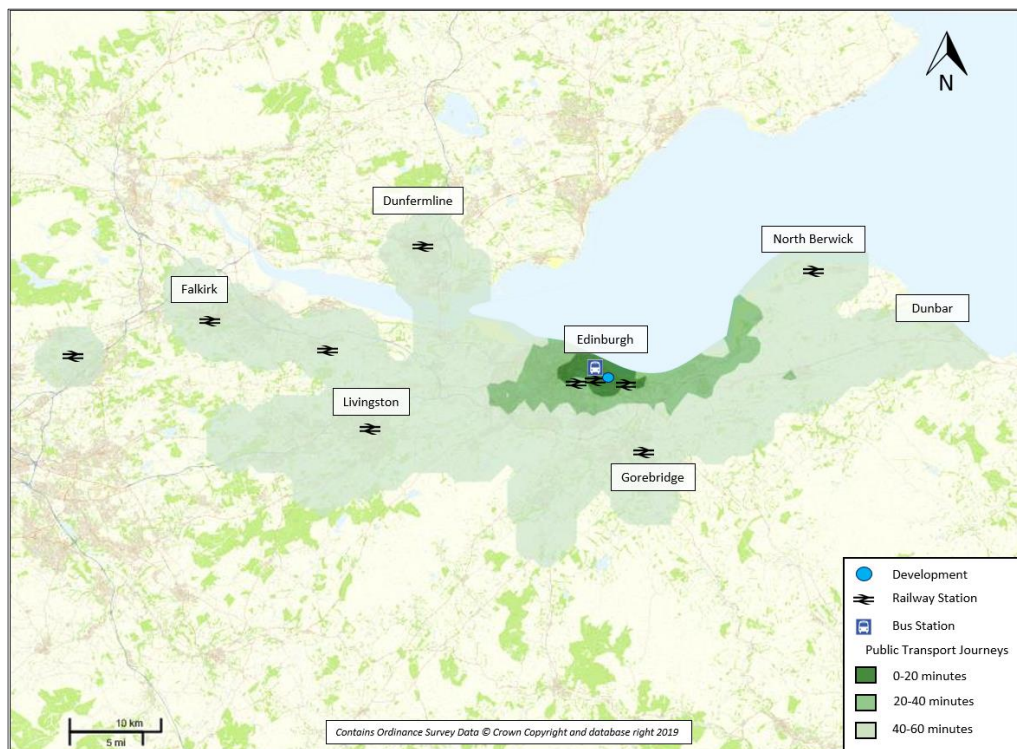


Figure 4.4. Public transport catchment

As shown in **Figure 4.4**, Edinburgh City Centre, areas of East Lothian, Midlothian, West Lothian, Falkirk and Fife can be all be accessed within an hour public transport journey of the site.

4.4 Road Network

Willowbrae Road

Willowbrae Road runs north-south along the western boundary of the development site. It is a key vehicle route providing connections with Wolseley Terrace, Restalrig Road South and Portobello Road to the north and Duddingston Road, and Milton Road West to the South. Willowbrae Road is a two-way single carriageway road approximately 13metres wide at the boundary of the development. The northbound side of the road contains one lane and the southbound side of the road contains two lanes, one of which is a bus lane. Footways and street lighting are provided on both sides of the carriageway. A 30mph speed limit is enforced on this road.

Northfield Broadway

Northfield Broadway is located at the northwestern boundary of the site and provides a connection between Willowbrae Road and Piersfield Terrace. It is a two-way single carriageway road, subject to a 20mph speed limit. Footways and street lighting are present on both sides of the carriageway.

Northfield Drive

Northfield Drive is a two-way single carriageway road that forms the northern boundary of the development site. It contains footways and street lighting on both sides of the carriageway and is subject to a 20mph speed limit. It offers a connection to Mountcastle Drive North.

5 Travel Plan Framework

Travel planning for residential developments has the potential to help achieve more sustainable communities by improving accessibility and travel choice. It is acknowledged that this Residential Travel Plan (RTP) is an 'origin based' Travel Plan (TP) which requires being flexible and meeting the needs and requirements of future residents travelling on various types of journey, as opposed to a typical 'destination based' TP which considers people travelling to a specific destination. A formal site wide RTP would therefore be difficult to implement and ultimately control. Key elements of the RTP are therefore focused around education and the promotion of appropriate transport information.

This RTP framework should be considered as guidance and an available resource which identifies objectives and measures aimed at improving sustainability and choice. The effectiveness of the RTP will be increased if adopted by a residents group or committee. The benefits of residential travel planning can be summarised as follows:

- Reducing the need for car use and carbon emissions;
- Education with respect to sustainable travel;
- Improve accessibility and travel choice for reaching local facilities and amenities;
- Complement nearby existing Travel Plans;
- Achieving a more attractive and safer development by reducing car use;
- Increasing marketability of the development as more households seek to change their travel behaviour;
- Improving the health of residents; and
- Improve knowledge of residents in relation to travel routes and locations of facilities.

It is proposed at this stage that opportunities for sustainable travel will be promoted through a residential travel leaflet, to be provided within a residents' 'Welcome Pack'. The 'Welcome Pack' will include a travel leaflet incorporating the following:

- Public transport information specific to the site. This will include bus timetables and maps, and a map of bus stop locations and pedestrian routes accessing these;
- Information on public transport fares, this could include proposed discounts in the form of bus vouchers;
- Contact information for public transport providers, including internet addresses for up-to-date public transport information;
- A map of pedestrian and cycle routes;
- Details of existing or potential car sharing schemes;
- Contact information for local taxi services; and
- Information on local supermarkets and home delivery services they provide.

The leaflet will provide the new residents with detailed information in relation to a range of transport facilities and travel choices within the area, including sustainable travel alternatives to the car. A draft travel leaflet is provided in **Appendix C**. It is proposed that the leaflet be finalised following grant of planning permission and at an appropriate time, to reflect travel options available at that time and be provided to residents upon arrival.

6 Vehicle Travel Demand

To estimate the vehicle travel demand associated with the development, trip rates taken from the TRICS database were used.

6.1 Vehicle Trip Generation

Vehicle trip rates and corresponding trip generation values are shown in **Tables 6.1** and **6.2** respectively. TRICS output is provided in **Appendix D**.

Land Use	Unit	Morning Peak		Evening Peak	
		Arrivals	Departures	Arrivals	Departures
Residential	Per dwelling	0.119	0.352	0.295	0.177

Table 6.1. Proposed development vehicular trip rates

Land Use	Unit	Morning Peak		Evening Peak	
		Arrivals	Departures	Arrivals	Departures
Residential	Per dwelling	6	17	14	8

Table 6.2. Proposed development vehicular trip generation

Based on the trip rates used, it is predicted that 23 two-way vehicle trips will be generated in the morning peak hour and 22 two-way vehicle trips will be generated in the evening peak hour. This is a relatively low number of trips and is predicted to have a minimal impact on the surrounding network.

6.2 Parking review

The site is very well located in relation to walking, cycling and public transport and can therefore support sustainable travel patterns by the residents.

Whilst there are various opportunities for sustainable travel, in the event that a small proportion of residents choose to have a car but do not have a space, the streets surrounding the site, with the expectation of Willowbrae Road, offer the on-street parking. It is predicted that this will not have a detrimental impact on the operation of the surrounding road network.

7 Summary and Conclusions

7.1 Summary

Sweco was commissioned by MNM Developments to prepare a Transport Statement in support of a planning application for a residential development on Willowbrae Road, situated approximately 3.5km south east of Edinburgh city centre. The proposals include 48 apartment units and a commercial unit, with associated parking and access.

An accessibility review was undertaken to assess opportunities for travel to and from the site by all relevant modes of transport and to assess the current walking, cycling and public transport provision.

A Travel Plan Framework was prepared which outlines measures that will be implemented to encourage travel by sustainable modes of transport.

The predicted trip generation for the proposed development was established through reference to the TRICS database. It is predicted that the development will generate up to an additional 23 and 22 vehicle trips in the weekday morning and evening peaks respectively.

7.2 Conclusions

The proposed development is very well located in terms of existing walking routes and bus stops which are served by several bus services. The implementation of a Residential Travel Plan for the development will promote sustainable travel behaviour.

The number of vehicular trips generated by the development is forecasted to be minimal and will not have an impact on the local road network.

Appendix A – Site Layouts



Proposed Site Plan

Rev Date Description

drawn MNM Developments

PLANNING

Project	Willowbrae Road, Edinburgh	Sheet	E1908	Drawn	WB8-CDA-SW-00-DR-A-PL-0006	PI
Date	25.11.19	Scale	1:200@A1	Drawn	SS	NS