Cameron+Ross

Drainage Impact Assessment

St oneywood Gate, Stoneywood Park
Dyce, Aber deen

prepared for

CoCit y

230736-000 – October 2023

Document Issue Record

Revision	Description	Issued by	Checked by	Date
-	Initial Issue	GCO	RAG	12/10/2023
A	Project Title and Description changed	GCO	RAG	30/10/2023

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Position:	Director		

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Appendices

1. Introduction

Cameron + Ross were appointed by TINTO Architecture on behalf of CoCity to prepare a Drainage Impact Assessment as part of the Planning Application for the proposed development at Stoneywood Gate, Stoneywood Park. This report will consider appropriate drainage proposals in accordance with the following documents.

- The SUDS Manual C753 – Guidance on the planning, design, construction and maintenance of Sustainable Drainage Systems, published by CIRIA, 2015.
- Supplementary Guidance – Supplementary Guidance: Flooding, Drainage & Water Quality for New Developments, published by Aberdeen City Council.
- Sewers for Scotland – A technical specification for the design and construction of sewerage infrastructure (Version 4.0 – October 2018)

This report will establish the suitability of the site for development and identify the drainage principals in recognition of the aforementioned documents to satisfy source control, conveyance measures, attenuation, treatment and enhanced amenity.

2. Existing Site Description

The site is located at Grid Reference NJ 89123 11572 (389123E, 811572N) and is located on the corner of the A947 Stoneywood Road and Stoneywood Park, in Dyce. The site is situated approximately six miles North-West of Aberdeen City Centre, between Dyce to the North and Stoneywood to the South.

The site extends to approximately 0.7 hectares and is accessed via Stoneywood Park. There is an existing two storey office building surrounded by car parking, hard and soft landscaping. Within the existing facility, there is a network of existing foul and surface water drains which discharge to the Scottish Water public sewers.

The site is bounded to the North by Stoneywood Park road; to the East by other commercial properties; to the West by Stoneywood Road; and to the South by residential properties.

Based on the topographical survey, the site is generally flat with a slight fall towards the site access at Stoneywood Park.

Please refer to the Site Location contained within *Appendix A* of this report.

3. Ground Conditions

No intrusive ground investigations have been undertaken at the site. Details relating infiltration rates, percolation rates, topsoil depth, made ground information or subsoil information at the specific site are not available.

Several historical site investigation records can be referenced by recourse to the British Geological Society website. Borehole records for several sites in and around the development area are available. The recorded information for these appears reasonably consistent and indicate the natural subsoils below consist of firm to stiff silty, sandy clay with some gravel and boulders.

It is anticipated that these ground conditions when proven, will not provide suitable infiltration for the control of surface water run-off and more traditional methods of SuDS drainage systems will be required.

Comprehensive site investigations should be undertaken prior to starting the works on site and the results should be reported back to the Engineer.

4. Existing Drainage Network

According to the Scottish Water GIS records, there are foul and surface water sewers running through the Southern part of the site and through Stoneywood Park road located North from the site. A comprehensive summary of existing Scottish Water drainage assets nearby the site is included below.

- Scottish Water 900mm Concrete Surface Water Sewer running through the southern part of the site near the boundary.
- Scottish Water 300mm VC Foul Water Sewer running through the southern part of the site near the boundary.
- Scottish Water 300mm VC transitioning into 375mm Concrete Surface Water Sewer running underneath Stoneywood Park Road.
- Scottish Water 225mm VC Foul Water Sewer running underneath Stoneywood Park road.

Refer to *Appendix B* which contains the Scottish Water GIS Plans for the site.

5. Proposed Development

It is proposed to demolish all existing buildings to facilitate the redevelopment of the site. It is proposed to construct two café/restaurant units and four starter units, with the associated roads, footpaths and parking infrastructure. An electric vehicle hub will be provided with a total of 22 no. EV charging stations.

Vehicular site access will be maintained off Stoneywood Park road. Pedestrian access will be maintained off Stoneywood Park road, and a new pedestrian route will connect into Stoneywood Road near the South-West corner of the site.

The proposed roads, footpaths and parking areas are proposed to remain private. It is assumed the roads, footpaths, parking areas and roof areas will constitute impermeable areas. The parking bays will be surfaced in impervious block paving.

The new roads, footpath and roof areas will be drained via private surface water drains and gullies to attenuation storage systems comprising of geocellular crates. Surface water runoff treatment will be provided using a chamber treatment device, such as Ridgistorm-X4 or similar approved to the same specification and same mitigation indices as the aforementioned product.

Provisions will be made for the foul drainage infrastructure required for the café/restaurnt units and the starter units. Refer to the latest Architect Site Layout Drawing provided in *Appendix C*.

6. Foul Drainage Proposals

It is proposed to discharge the foul water from the café/restaurant units and the starter units to the existing Scottish Water 300mm VC Foul Sewer located in the southern part of the site.

Café/restaurant units' foul discharge will receive treatment using grease traps.

The overall foul drainage system will remain private up to the disconnection chamber prior to the connection to the existing public sewer. Please refer to C+R Drainage Drawings provided in *Appendix E* of this report.

7. Surface Water Proposals

As previously discussed in *Section 3*, a surface water discharge to groundwaters has not been considered at the site due to anecdotal knowledge of poor infiltration. The nearest watercourse to the site is River Don located approximately 600m to the East. The existing Scottish Water Surface Water Sewers located at or nearby the site discharge to River Don. As such, the preferred method of discharge will be to the Scottish Water 900mm Concrete Surface Water Sewer running through the southern part of the site near the boundary.

The proposed café/restaurant and starter units' pollution hazard indices will provide a low risk of contamination at the site. The proposed roads and car parks will provide a medium risk of contamination to the surface water runoff at the site.

As such, the proposals will be to provide sufficient mitigation for each section of the site. All the SuDS Devices suggested in CIRIA's publication C753 "SuDS (Sustainable Urban Drainage Systems) Design Manual" Table 1.1 were individually considered – filter strips, swales, infiltration basins, wet ponds, detention basins, filter drains, infiltration devices, pervious surfaces, and green roofs.

In accordance with CIRIA document C753, the risk posed by surface water runoff to the receiving environment is a function of the land use, the effectiveness of SuDS treatment components and the sensitivity of the receiving environment.

Determining the hazard posed by the land use activities at a site can be established by using a simple index approach by allocating pollution hazard indices for the proposed land use as outlined in Table 26.2 'Pollution Hazard Indices for different land use classifications' from the CIRIA C753 SuDS Manual.

To deliver adequate treatment, the selected SuDS components should have a total pollution mitigation index (for each contaminant type) that equates or exceeds the specific pollution hazard index. Typical SuDS features can be used as outlined in

Table 26.3 'Indicative SuDS mitigation indices for discharges to surface waters' from the CIRIA C753 SuDS Manual.

The proposed café/restaurant and starter units surface water roof runoff will yield a low pollution hazard level. The surface water runoff from the roof areas will be conveyed using private surface water drains, attenuated using geocellular attenuation crates whilst treatment will be provided using a treatment chamber such as Ridgistorm-X4 or similar specification.

The proposed road, footpaths and parking areas runoff will yield a medium pollution hazard level. The surface water runoff from the roads, footpaths and parking areas will be conveyed using gullies and surface water drains to the geocellular attenuation crates. Treatment will be provided via a treatment chamber such as Ridgistorm-X4 or similar specification. Refer to *Tables 7.1* and *7.2* below showing the Pollution Hazard and SuDS Mitigation Indices for this section of the site.

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Proposed café/restaurant and starter unit roofs	Low	0.3	0.2	0.05
Proposed road, footpath and parking areas	Medium	0.7	0.6	0.7
Pollution Hazard Index	Medium	0.7	0.6	0.7

Table 7.1: Pollution Hazard Indices for the development site (based on Table 26.2 in the SuDS Manual - C753 by CIRIA)

Type of SuDS Component	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Proprietary Treatment System – Treatment Chamber Ridgistorm-X4	0.8	0.8	0.8
Total Pollution SuDS Mitigation Index	0.8	0.8	0.8

Table 7.2: SuDS Mitigation Indices for the proposed road, footpath and parking areas (based on Table 26.3 in the SuDS Manual – C753 by CIRIA)

The provided total SuDS Mitigation Index exceeds the Pollution Hazard Index. Therefore, based on the above considerations, it is considered that all proposals are in line with best practice guidance available.

All treated surface water runoff will be discharged to the existing Scottish Water 900mm Concrete Surface Water Sewer running through the southern part of the site near the boundary. The discharge to the sewer will be controlled to the pre-development greenfield runoff rate using a series of control chamber with orifice plates. The attenuation system and drains have been designed for the 1 in 200 Year Storm Event, including 30% Climate Change.

For details relating the hydrology, attenuation storage and treatment proposals, please refer to the C+R Calculations provided in *Appendix D* and to the C+R Drawings provided in *Appendix E* of this report.

8. Assessment of Flood Risk

The SEPA Flood Maps have been reviewed to assess potential flood risk at the proposed site. Based on the SEPA Flood maps, the site is not at fluvial or coastal flood risk. There is a low likelihood of surface water flooding at the site, corresponding with a 0.1% change of surface water flooding each year.

It is considered this low surface water flood risk is correlated with existing surface water drainage systems present at the site which may have been historically under designed. As discussed in *Section 7,* the proposed surface water drainage systems have been designed to cater for the 1 in 200 Year Storm Event, including 30% Climate Change to mitigate any potential surface water flood risk at the site.

Please refer to *Appendix F* for the SEPA Flood Map at the site.

9. Adoption & Future Maintenance

All proposed foul and surface water drains, gullies, chambers, attenuation system, and treatment chambers will remain private.

It is recommended that the drainage systems are inspected a minimum of twice per year, or, as per the manufacturer's guidelines, with the systems also being inspected after any major storm event. Significant sediment deposition is likely in areas used for storage, so a post clean-up operation may be required including the removal of litter, vegetation, sewerage debris and larger objects.

The CIRIA C753 Document provides guidance on the maintenance requirements for SuDS features. Please refer to *Tables 9.1 & 9.2* below for maintenance details of the proposed attenuation and treatment systems.

TABLE 14.2 An example of operation and maintenance requirements for a proprietary treatment system

Maintenance schedule	Required action	Typical frequency
Routine maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation	Six monthly
	Change the filter media	As recommended by manufacturer
	Remove sediment, oil, grease and floatables	As necessary – indicated by system inspections or immediately following significant spill
Remedial actions	Replace malfunctioning parts or structures	As required
Monitoring	Inspect for evidence of poor operation	Six monthly
	Inspect filter media and establish appropriate replacement frequencies	Six monthly
	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly during first half year of operation, then every six months

Table 9.1– Extract from 'CIRIA C753 – The SuDS Manual' for maintenance of a proprietary treatment system (Ref. Table 14.2)

TABLE 21.3 Operation and maintenance requirements for attenuation storage tanks

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Table 9.2 – Extract from 'CIRIA C753 – The SuDS Manual' for maintenance of attenuation storage tanks (Ref. Table 21.3)

10. Construction Phase

The measures for controlling surface water run-off will be continually reviewed in line with each stage of construction by the groundwork's contractor and any influencing factors which should generally consider the following measures:

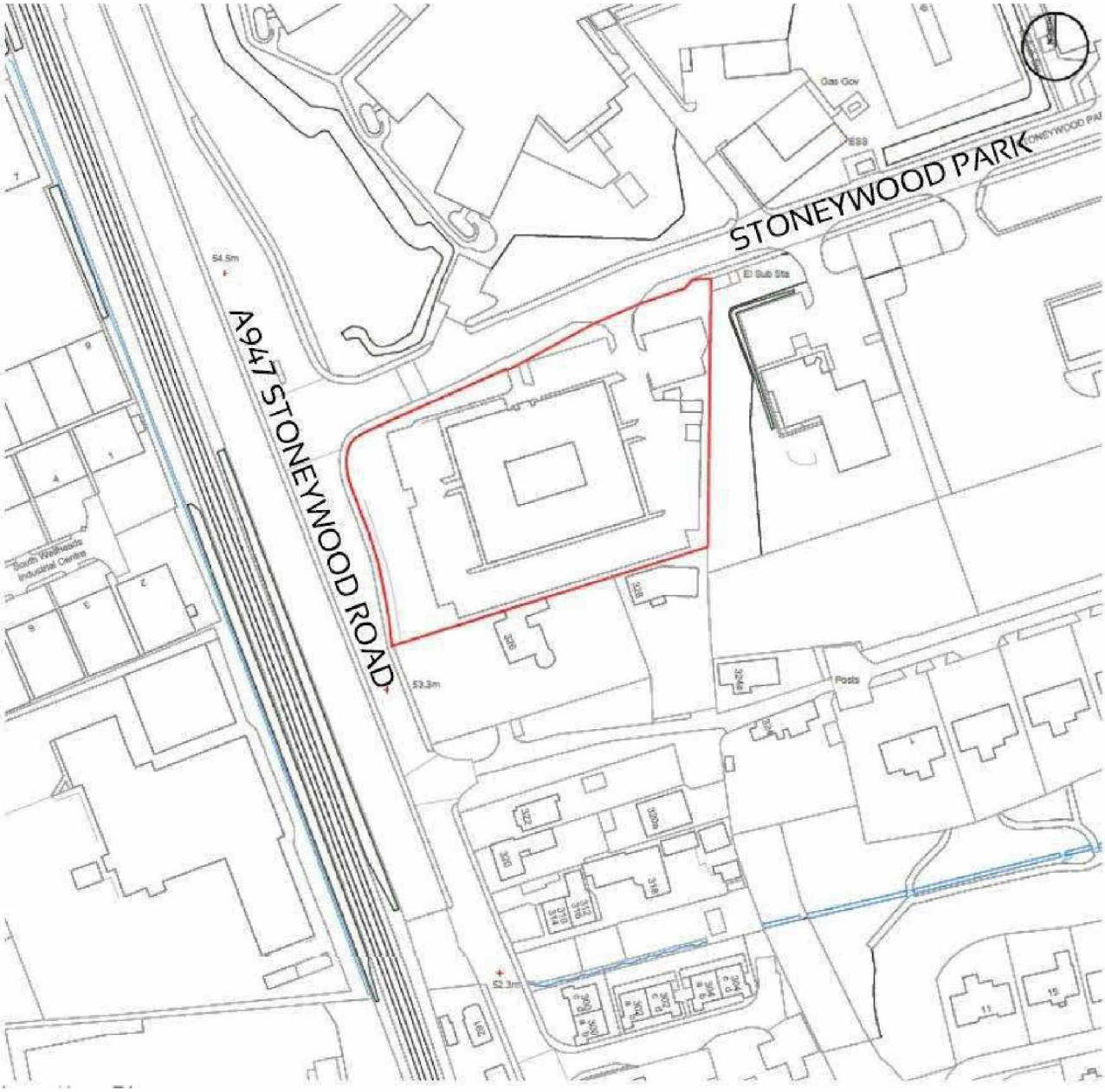
- **Control**: The contractor should give consideration, in the main, to surface water runoff during and after topsoil strip, as well as after re-grading of the land during site construction. Stripping of topsoil and vegetation is to be limited wherever possible and undertaken just prior to the construction in that area. This is to be provide a means of reducing runoff and to remove silts/fines from the water and aid natural absorption into the soils.

- **Interception**: Any existing land drains may be uncovered within currently undeveloped areas of the site. These may not be disturbed by the proposals; however, it should be noted that through development of the site any groundwater discharge will be reduce as surface water is collected via roofs and hardstanding areas and directed into the new surface water drainage network with attenuation provided before controlled discharge to the Scottish Water sewers.

- **Prevention**: The installation of the drains, SuDS measures and roadways will follow the earthworks operation continually improving the overall site drainage. SuDS facilities will be installed at the outset of the sewer works and will be utilised as temporary sediment control. It is therefore essential these are reinstated or reconstructed at the end of construction works and before adoption by the local authority.

APPENDIX A

Location Plan



Location Plan

APPENDIX B

Scottish Water GIS

Warning! Damaging a large diameter trunk main (12"/300mm and above) can result in loss of life and major water supply and water quality problems. If you're planning any extension work in the vicinity of any large diameter mains shown on our maps, you must contact Scottish Water to arrange a site visit 08000 778 778 WELL IN ADVANCE OF THE WORKS

Plotted By: GOlteanu@cameronross.co.uk

The representation of physical assets and the boundaries of areas in which Scottish Water and others have an interest does not necessarily imply their true positions. For further details contact the appropriate District office.

230736 - Alba Gate, Stoneywood Park

The Bridge
6 Buchanan Gate
Stepps
Glasgow
G33 6FB

Tel No: 08000 778 778

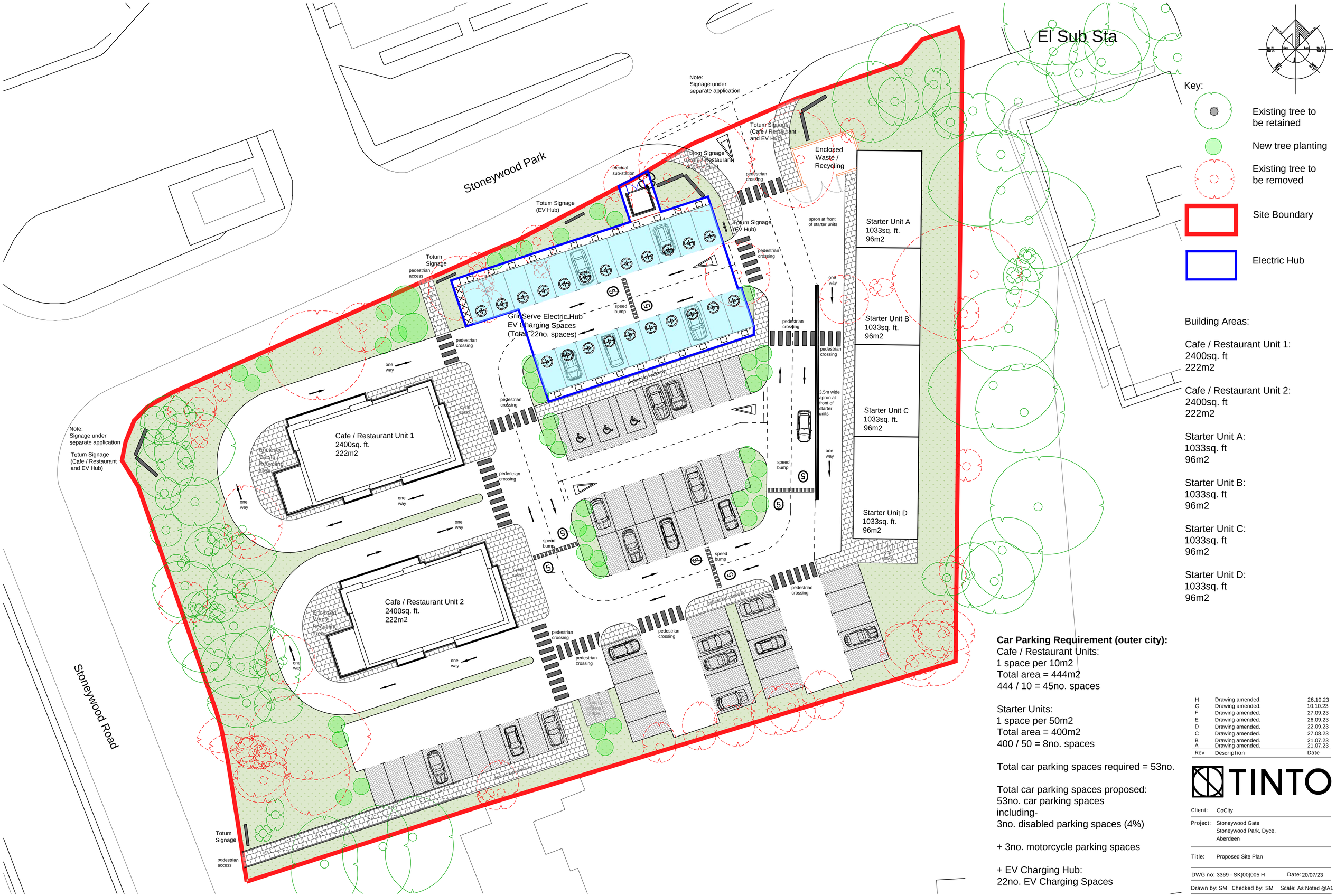
Date: 05/10/2023

0 5 10 20 Meters

SCALE: 1:1,323

APPENDIX C

Architect Layout



Proposed Site Plan

Scale 1:200 on A1

Building Areas:

Cafe / Restaurant Unit 1:
2400sq. ft
222m2

Cafe / Restaurant Unit 2:
2400sq. ft
222m2

Starter Unit A:
1033sq. ft
96m2

Starter Unit B:
1033sq. ft
96m2

Starter Unit C:
1033sq. ft
96m2

Starter Unit D:
1033sq. ft
96m2

Car Parking Requirement (outer city):
Cafe / Restaurant Units:
1 space per 10m2
Total area = 444m2
444 / 10 = 45no. spaces

Starter Units:
1 space per 50m2
Total area = 400m2
400 / 50 = 8no. spaces

Total car parking spaces required = 53no.

Total car parking spaces proposed:
53no. car parking spaces
including-
3no. disabled parking spaces (4%)

+ 3no. motorcycle parking spaces

+ EV Charging Hub:
22no. EV Charging Spaces

0 2 4 6 8 10 20m

Rev	Description	Date
H	Drawing amended.	26.10.23
G	Drawing amended.	10.10.23
F	Drawing amended.	27.09.23
E	Drawing amended.	26.09.23
D	Drawing amended.	22.09.23
C	Drawing amended.	27.08.23
B	Drawing amended.	21.07.23
A	Drawing amended.	21.07.23

TINTO

Client: CoCity

Project: Stoneywood Gate
Stoneywood Park, Dyce,
Aberdeen

Title: Proposed Site Plan

DWG no: 3369 - SK(00)005 H Date: 20/07/23

Drawn by: SM Checked by: SM Scale: As Noted @A1

tinto.co.uk
+44 (0) 1224 821 670
Mill House
Grandholm Crescent
Bridge of Don
Aberdeen, AB22 8BB

APPENDIX D

C+R - Drainage Calculations

Cameron+Ross

Contract	Alba Gate, Stoneywood Park
Part of Structure	Attenuation Trench 1 (Red) Post Development Runoff

CALCULATION	
Sheet No:	-
Cont. No:	A/230736-00(
Date:	03-Oct-2023
Designer:	GCO

Pre-development Site Run-off Calculation

Site Area, Total 6716 m^2 **0.6716** ha
0.5 km^2 (min. 0.5km)

SAAR 830 mm From Wallingford Vol 3 Annual Rainfall Chart

Soil Type 2
SOIL (Soil Index) 0.30

Flow offsite, QBAR rural = $0.00108 \times AREA^{0.89} \times SAAR^{1.17} \times SOIL^{2.17}$

= 111.2 2 l/sec

Therefore QBAR rural / ha = 2.22 l/sec/ha 1.5 l/sec for this site

Equivalent 1, 30, 100 and 200 year throttle rates applicable for hydrological growth curve 1 for North Scotland

1 year factor	0.85
10 year factor	1.45
30 year factor	1.90
100 year factor	2.45
200 year factor	2.80

Greenfield Pre-Development Run-off:

1 year factor	1.8 9	l/sec/ha	1.2 7	l/sec
10 year factor	3.23	l/sec/ha	2.17	l/sec
30 year factor	4.23	l/sec/ha	2.8 4	l/sec
100 year factor	5.45	l/sec/ha	3.6 6	l/sec
200 year factor	6 .23	l/sec/ha	4.18	l/sec

Allowable Post-Development Run-off:

Total Impermeable Area = 1783 m^2 **0.178** ha

1 year factor	0.3	l/sec for this site
10 year factor	0.6	l/sec for this site
30 year factor	0.8	l/sec for this site
100 year factor	1.0	l/sec for this site
200 year factor	1.1	l/sec for this site

Hardstanding covers 26.5 % of Total Site Area

Cameron + Ross

CALCULATION

Sheet No.	1
Contract No.	230736-000
Date	12-Oct-2023
Designer	GCO

Calculation **Orifice Plate Diameter Calculation for Control Chamber 1**

Contract **230736-000 - Alba Gate, Stoneywood Park**

Q = Cd x Ao x Sqrt(2 x g x H)

1.100	l/s	Flow rate (l/s)
0.500	H	Head of Water (m)
0.620	Cd	Discharge coefficient dependent upon the orifice shape (typical 0.62)
9.810	g	Acceleration due to gravity (m/s²)

Provide orifice plate dia. **d= 27 mm**

Cameron+Ross

CALCULATION

Sheet No.	-
Contract No.	230736-000
Date	03/10/2023
Designer	GCO

Calculation: **Surface Water Attenuation Trench 1 (Red)**
Project: **230736-000 - Alba Gate, Stoneywood Park**

Design Rainfall

Additional flow multiplier 30%

From Wallingford Procedure, Volume 3 - Maps
Rainfall Depths (M5 - 60minutes) *M5_60 =* 16 mm

from BRE Digest 365, fig. 1 *rainfall ratio r =* 0.250

Design Storm Return Period, *P =* 200 years

D mins	M5_D	Z2	R = MP_D	Rainfall Intensity
5	4.7 mm	2.574	12.0 mm	144 mm/hr
10	7.0 mm	2.643	18.6 mm	111 mm/hr
15	8.7 mm	2.698	23.4 mm	94 mm/hr
30	12.0 mm	2.752	32.9 mm	66 mm/hr
60	16.0 mm	2.747	44.0 mm	44 mm/hr
120	21.0 mm	2.672	56.1 mm	28 mm/hr
240	27.3 mm	2.595	70.8 mm	18 mm/hr
360	31.7 mm	2.539	80.5 mm	13 mm/hr
600	38.3 mm	2.461	94.2 mm	9 mm/hr
1440	52.7 mm	2.346	123.7 mm	5 mm/hr
2880	67.8 mm	2.255	153.0 mm	3 mm/hr

(●) Scotland and Nth Ireland
( ) England and Wales

Measured Infiltration Rate: 0.00E+00

Infiltration Rate (eff)	0.00E+00	m/s	(OR Outlet Flow Rate	1.1	l/s)
Impermeable Area	1783	m^2	ie	3.96	m^3/hr
Width	12.00	m			
Depth	0.80	m	Gravel Pit or Trench Soakaway		
Fixed Lgth (optional)	15	m	Gravel, free volume	95%	

Insert 100% for Net Storage Chamber Volume

D	Length	Inflow	Outflow	Storage Req	t_{s50} (hrs)	Storage Prov	Overflow
5	15	21.4	0.3	21.0	0.00	136.8	
10	15	33.1	0.7	32.4	0.00	136.8	
15	15	41.7	1.0	40.7	0.00	136.8	
30	15	58.7	2.0	56.8	0.00	136.8	
60	15	78.4	4.0	74.4	0.00	136.8	
120	15	100.0	7.9	92.1	0.34	136.8	
240	15	126.2	15.8	110.4	7.26	136.8	
360	15	143.6	23.8	119.8	10.83	136.8	
600	15	167.9	39.6	128.3	14.06	136.8	
1440	15	220.5	95.0	125.4	12.97	136.8	
2880	15	272.7	190.1	82.7	0.00	136.8	

Time until system can cope with additional influx of 50% design storage volume < 24 hrs ~ OK

Provide storage pit, 15 m x 12 m x 0.8 m deep

Minimum Free Volume = 95%
Total Pit Volume = 144m^3

Cameron+Ross

Contract	Alba Gate, Stoneywood Park
Part of Structure	Attenuation Trench 2 (Cyan) Post Development Runoff

CALCULATION	
Sheet No:	-
Cont. No:	A/230736-00(
Date:	03-Oct-2023
Designer:	GCO

Pre-development Site Run-off Calculation

Site Area, Total 6716 m^2 **0.6716** ha
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100 year factor	5.45	l/sec/ha	3.6 6	l/sec
200 year factor	6 .23	l/sec/ha	4.18	l/sec

Allowable Post-Development Run-off:

Total Impermeable Area = 2772 m^2 **0.277** ha

1 year factor	0.5	l/sec for this site
10 year factor	0.9	l/sec for this site
30 year factor	1.2	l/sec for this site
100 year factor	1.5	l/sec for this site
200 year factor	1.7	l/sec for this site

Hardstanding covers 41.3 % of Total Site Area

Cameron + Ross

CALCULATION

Sheet No.	1
Contract No.	230736-000
Date	12-Oct-2023
Designer	GCO

Calculation **Orifice Plate Diameter Calculation for Control Chamber 2**

Contract **230736-000 - Alba Gate, Stoneywood Park**

Q = Cd x Ao x Sqrt(2 x g x H)

1.700	l/s	Flow rate (l/s)
0.500	H	Head of Water (m)
0.620	Cd	Discharge coefficient dependent upon the orifice shape (typical 0.62)
9.810	g	Acceleration due to gravity (m/s²)

Provide orifice plate dia. **d=** **34 mm**

Cameron+Ross

CALCULATION

Sheet No.	-
Contract No.	230736-000
Date	03/10/2023
Designer	GCO

Calculation: **Surface Water Attenuation Trench 2 (Cyan)**
Project: **230736-000 - Alba Gate, Stoneywood Park**

Design Rainfall

Additional flow multiplier 30%

From Wallingford Procedure, Volume 3 - Maps
Rainfall Depths (M5 - 60minutes) *M5_60 =* 16 mm

from BRE Digest 365, fig. 1 *rainfall ratio r =* 0.250

Design Storm Return Period, *P =* 200 years

D mins	M5_D	Z2	R = MP_D	Rainfall Intensity
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60	16.0 mm	2.747	44.0 mm	44 mm/hr
120	21.0 mm	2.672	56.1 mm	28 mm/hr
240	27.3 mm	2.595	70.8 mm	18 mm/hr
360	31.7 mm	2.539	80.5 mm	13 mm/hr
600	38.3 mm	2.461	94.2 mm	9 mm/hr
1440	52.7 mm	2.346	123.7 mm	5 mm/hr
2880	67.8 mm	2.255	153.0 mm	3 mm/hr

(●) Scotland and Nth Ireland
( ) England and Wales

Measured Infiltration Rate: 0.00E+00

Infiltration Rate (eff)	0.00E+00	m/s	(OR Outlet Flow Rate	1.7	l/s)
Impermeable Area	2772	m^2	ie	6.12	m^3/hr
Width	10.00	m			
Depth	1.20	m	Gravel Pit or Trench Soakaway		
Fixed Lgth (optional)	18	m	Gravel, free volume	95%	

Insert 100% for Net Storage Chamber Volume

D	Length	Inflow	Outflow	Storage Req	t_{s50} (hrs)	Storage Prov	Overflow
5	18	33.2	0.5	32.7	0.00	199.5	
10	18	51.5	1.0	50.4	0.00	199.5	
15	18	64.9	1.5	63.3	0.00	199.5	
30	18	91.3	3.1	88.2	0.00	199.5	
60	18	121.8	6.1	115.7	0.00	199.5	
120	18	155.5	12.2	143.3	2.52	199.5	
240	18	196.2	24.5	171.7	9.49	199.5	
360	18	223.2	36.7	186.5	13.11	199.5	
600	18	261.1	61.2	199.9	16.39	199.5	
1440	18	342.8	146.9	195.9	15.42	199.5	
2880	18	424.0	293.8	130.3	0.00	199.5	

Time until system can cope with additional influx of 50% design storage volume < 24 hrs ≈ OK

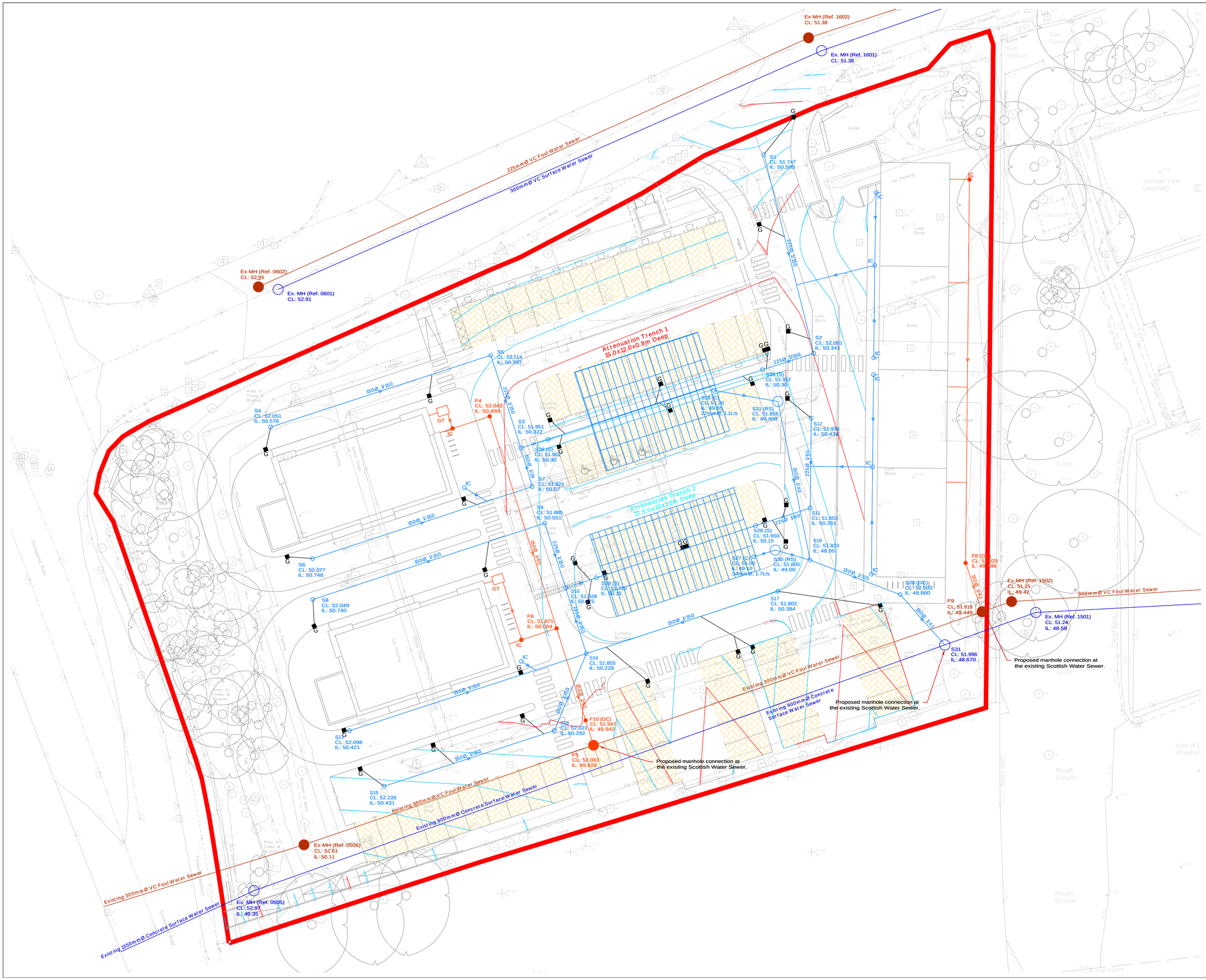
Provide storage pit, 17.5 m x 10 m x 1.2 m deep

Minimum Free Volume = 95%
Total Pit Volume = 210m^3

APPENDIX E

C+R – Drainage Drawings

FIGURED DIMENSIONS ONLY TO BE USED



General notes:

This drawing is to be read in conjunction with all relevant Engineers and Architects drawings.

Refer to Architects design drawings for internal drainage runs and details.

Drainage - all sewers to be constructed in accordance with Scottish Water's publication "Sewers for Scotland (v4 - A technical specification for the design and construction of sewage infrastructure"

Sewers laid within roads should have a minimum cover of 1.5m from final road surface to pipe soffit level. Where this cannot be achieved then rigid pipes shall be protected with full concrete surround, similarly, flexible pipes shall be protected by a concrete slab at a depth less than 1.2m

The Contractor is responsible for checking the line and level of all existing services prior to commencement of works. Any discrepancies from design information must be reported to the Site Manager and Site Engineer in writing.

Surface Drainage

- New surface water drain (smooth walled uPVC pipework) unless otherwise noted on drawing. To remain private and maintained by landowner.
- New 450mmØ Surface Water Plastic Chamber - Inspection Chamber or Silt Trap
- New Ridgistorm Separate-X4 Treatment Chamber (1200mmØ)
- New 450mmØ Surface Water Control Chamber - with orifice diameter and limiting discharge (L/s)
- New attenuation crate system to be used for attenuation beneath permeable paving. To remain private and maintained by landowner
- New 450mmØ Surface Water Plastic Chamber - Disconnection Chamber
- Existing surface water manhole and sewer with reference number as per Scottish Water GIS records
- Proposed surface water manhole and sewer with reference to be constructed on the existing sewer

Foul Drainage

- New foul water drain (smooth walled uPVC pipework) unless otherwise noted on drawing. To remain private and maintained by landowner.
- New 450mmØ Foul Inspection Chamber
- New 450mmØ Foul Inspection Chamber (Disconnection Chamber)
- Proposed Grease Trap / Separator
- Existing foul water manhole and sewer with reference number as per Scottish Waters records.
- Proposed surface water manhole and sewer with reference to be constructed on the existing sewer

The Contractor should allow for CCTV camera survey of entire drainage system upon substantial completion of works. If any remedial works are required a repeat survey should also be carried out prior to formal submission to Engineer together with as-built drawing including manhole co-ordinates, cover and invert levels and pipe gradients.

Rev	Revision Description	Initials	Date
A	Project Title updated	GCO	30/10/2023

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Client:
CoCity

Project:
Stoneywood Gate
Stoneywood Park, Dyce
Aberdeen

Drawing Title:
Drainage Layout

Status:
Planning

North

Scale:	1:200 @ A1	Date:	12/10/2023
By:	GCO	Checked:	RAG
Approved:	RAG		

Dwg. No.	Rev.
230736-000-CAM-DR-C-400	A

FIGURED DIMENSIONS ONLY TO BE USED

Legend

Drainable Area for Attenuation Trench

Drainable Area for Attenuation Trench

1.003 - 433.43m²

Attenuation Trench 1
15.0x12.0x0.8m Deep

1.001 - 177.11m²

1.003 - 86.77m²

3.000 - 397.32m²

3.000 - 192.00m²

1.001 - 378.06m²

1.000 - 116.59m²

2.000 - 150.72m²

0.000 - 376.37m²

Attenuation Trench 2
17.5.0x10x1.2m Deep

0.000 - 359.26m²

0.000 - 70.71m²

0.000 - 52.90m²

0.000 - 377.74m²

0.000 - 20.63m²

0.000 - 96.07m²

0.000 - 8.13m²

0.000 - 680.23m²

0.000 - 173.57m²

0.000 - 360.96m²

0.000 - 192.00m²

Rev	Revision Description	Initia	Date
A	Project Title updated	GCO	30/10/2:

Cameron+Ross

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Client:
CoCity

Project:
Stoneywood Gate
Stoneywood Park, Dyce
Aberdeen

Drawing Title:
Drainable Areas

Status:
Planning

North

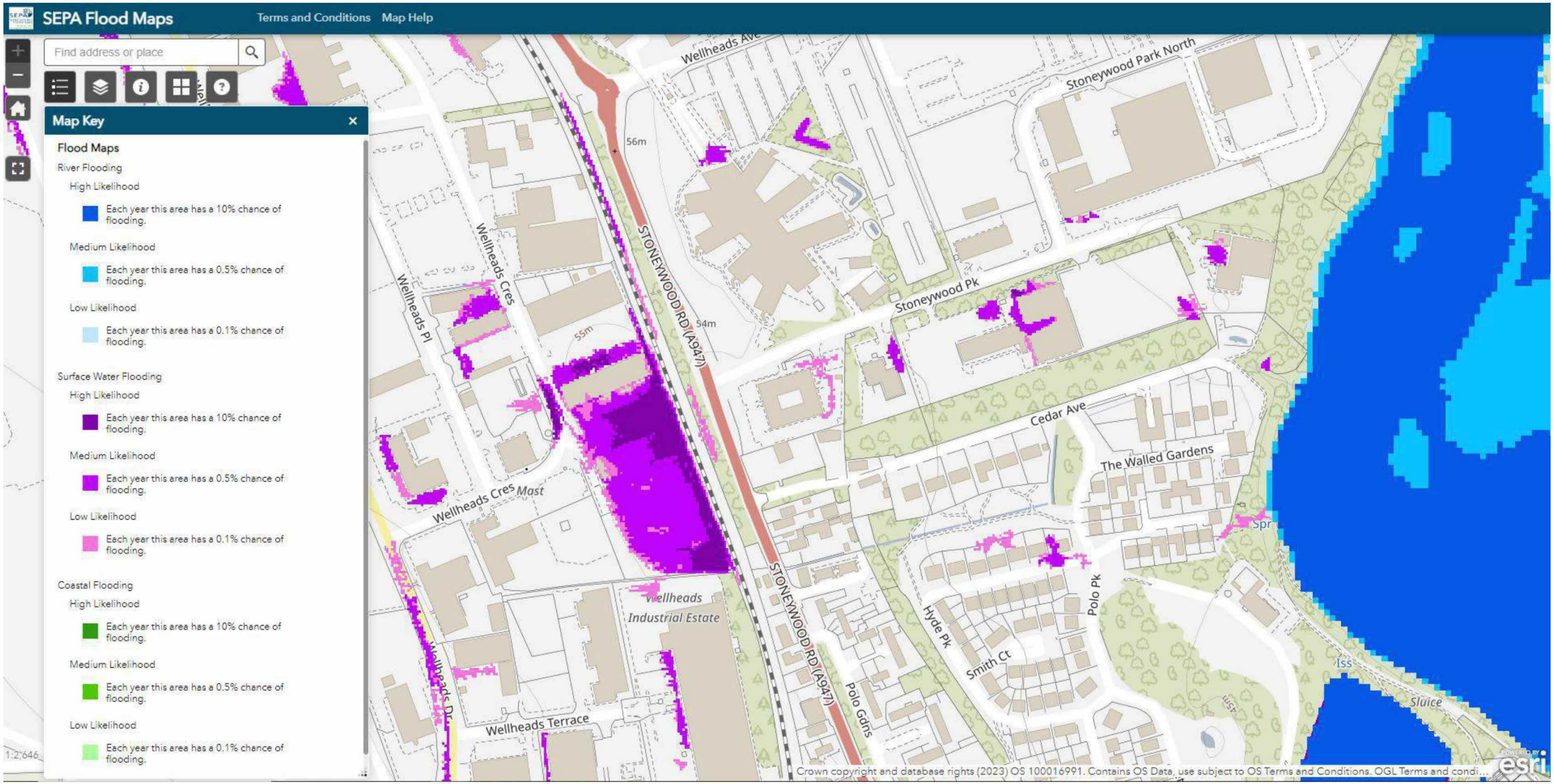
Scale:	1:200 @ A1	Date:	04/10/2023
By: GCO	Checked: RAG	Approved: RAG	

Dwg. No.
230736-000-CAM-DR-C-490

Rev.
A

APPENDIX F

SEPA Flood Map


SEPA Flood Maps
Terms and Conditions
Map Help
Find address or place
Map Key
Flood Maps
River Flooding
High Likelihood
Each year this area has a 10% chance of flooding.
Medium Likelihood
Each year this area has a 0.5% chance of flooding.
Low Likelihood
Each year this area has a 0.1% chance of flooding.
Surface Water Flooding
High Likelihood
Each year this area has a 10% chance of flooding.
Medium Likelihood
Each year this area has a 0.5% chance of flooding.
Low Likelihood
Each year this area has a 0.1% chance of flooding.
Coastal Flooding
High Likelihood
Each year this area has a 10% chance of flooding.
Medium Likelihood
Each year this area has a 0.5% chance of flooding.
Low Likelihood
Each year this area has a 0.1% chance of flooding.
1:2,646
Wellheads Ave
Stoneywood Park North
56m
Wellheads Cres
Wellheads Pl
STONEYWOOD RD (A947)
54m
55m
Stoneywood Pk
Cedar Ave
The Walled Gardens
Wellheads Cres Mast
Wellheads Industrial Estate
Hyde Pk
Smith Ct
Polo Pk
Polo Gdns
Wellheads Terrace
Sluice
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