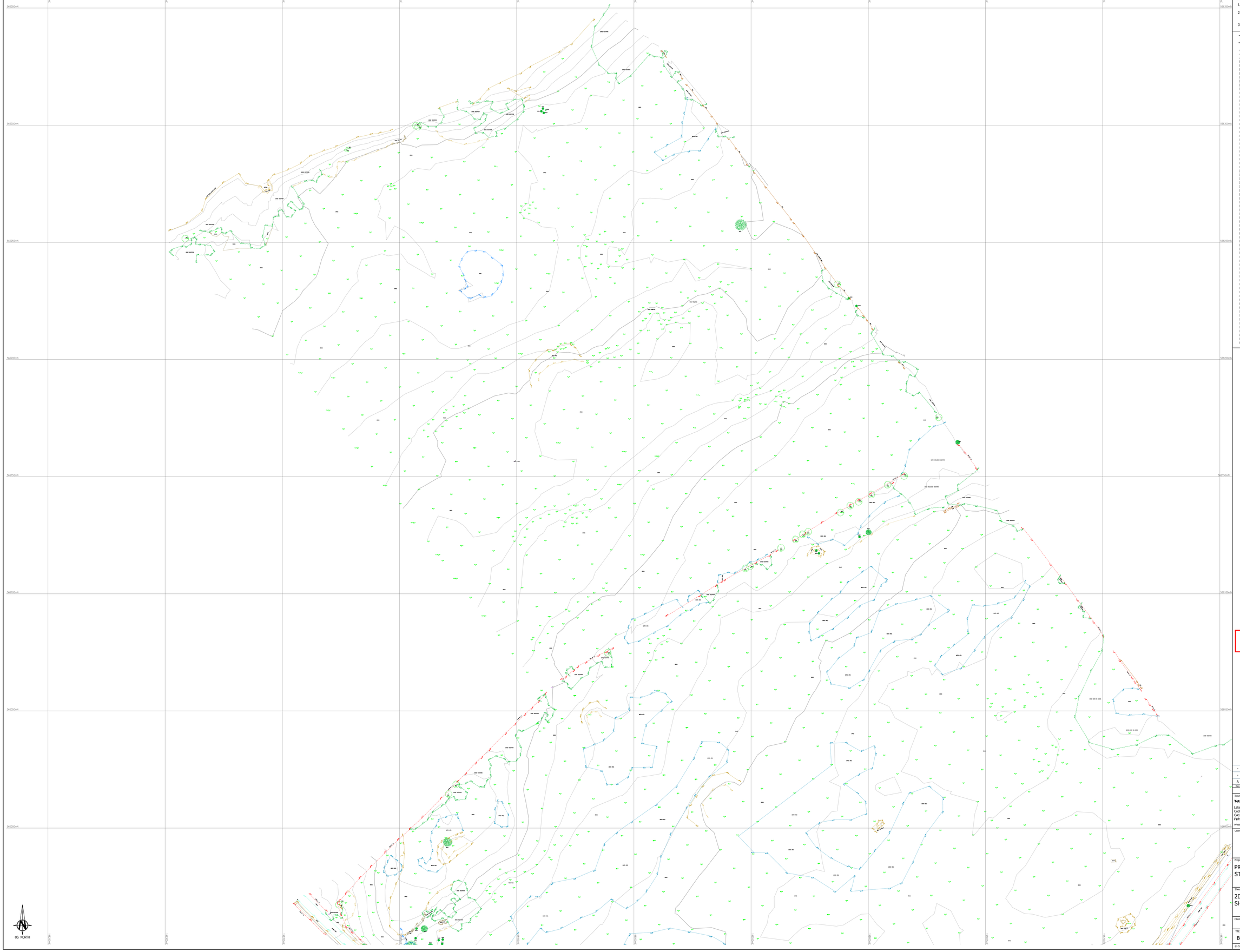
APPENDIX A: TOPOGRAPHIC SURVEY



NOTES

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2. ALL LEVELS ARE IN METRES AND RELATED TO NEWLYN DATUM, ALL CO–ORDINATES ARE RELATED TO BRITISH NATION GRID (ORDNANCE SURVEY OSGB36).
3. LOCAL SCALE IS APPLIED TO THIS SURVEY

TOPO LEGEND

AERIAL MAST	AM	LADDER	LAD
AIR CON UNIT	AC	LAMPPOST	LP
AIR VALVE	AV	LAY DOWN AREA	LDA
BARRIER	BA Ht. ?.?	LETTER BOX	LB
BED LEVEL	BL:	MANHOLE	MH
BELISHA BEACON	BB	MARKER PLATE BT.	MP/B
BINS	BIN	MARKER PLATE ELEC.	MP/E
BOLLARD	B	MARKER PLATE GAS	MP/G
BORE HOLE	BH	MARKER PLATE UNKNOWN	MP/U
BUILDING CONTAINER	CONT/CONTAINER	MARKER PLATE WATER	MP/W
BUS SHELTER/STOP	BS	MARKER POST	MK
CABINET	CAB/(E/G/W)	MARKER POST BT	MK/B
CABLE	CBL	MARKER POST ELEC.	MK/E
CABLE TRAY	CT	MARKER POST GAS	MK/G
CABLE TV POINT	CTV	MARKER POST WATER	MK/W
CAMERA	CAM	MARSH AREA	MA
CANOPY	CY	METAL PLATE	MPL
CANOPY LEVEL	CYL:	MILE POST	MP
CATTLE GRID	CG	MISCELLANEOUS ITEM	MISC.
CHANNEL DRAIN	CD	MONITORING PIN	MON
CHILDS PLAY EQUIPMENT	CPE	MONUMENT	MO
CHIMNEY	CHY	OH BUILDING	OHB
COLUMN	CLM	OH DUCT	OHD
CONCRETE	CONC.	OH ELECTRIC LINES	OHE
CONCRETE BASE	CNB	OH PIPEBRIDGE	OHPB
COPING LEVEL	COL:	OH PIPES	OHPI
CRASH BARRIER	CB Ht. ?.?	OH PLATFORM	OHP
CROWN PIPES LEVEL	CPL:	OH TELECOM LINES	OHT
CROWN ROAD LEVEL	CRL:	ORNAMENTAL MASONRY	OM
CYCLE RACK	CR	OVERHEAD ITEMS	OH
CYCLE SHED	CS	PARKING TICKET MACHINE	TM
DROP BARRIER	DB	PED. BOLLARD LIGHT	PBL
DROP BARRIER BOX	DBB	PETROL PUMP	PP
DROP BARRIER POST	DBP	PIEZOMETER	PZ
DUCT	DU	PLINTH	CNP
DUCT GRATED	GDU	POLE	P
EARTH ROD	ER	POST	PO
EAVES LEVEL	EL:	RAIL JOINT	RJ
ELECTRICITY POLE	EP	RAIL SIGNAL POST	SIG
FE CHAINLINK	FECL Ht. ?.?	RAIL SIGNALS GANTRY	RSG
FE HERAS	FEHE Ht. ?.?	RAIL TRACK	RT
FE PALISADE	FEPE Ht. ?.?	RAIN WATER PIPE	RWP
FE PANEL	FEPA Ht. ?.?	REFLECTOR POST	RP
FE POST+RAIL	FEPR Ht. ?.?	RETAINING WALL BASE	RWB
FE POST+WIRE	FEPW Ht. ?.?	RETAINING WALL TOP	RWT
FE POSTS ONLY	FEP Ht. ?.?	RIDGE LEVEL	RL:
FE WELDMESH	FEWM Ht. ?.?	ROAD NAME PLATE	RNP
FENCE	FE(XX) Ht. ?.?	ROAD SIGN	RS
FIRE HYDRANT	FH	ROAD SIGN	RS
FLOOD LIGHT	FL	ROCK FACE BTM	RFB
FLOOR LEVEL	FL:	ROCK FACE TOP	RFT
FOOTPATH	FP	RODDING EYE	RE
FRENCH DRAIN	FD	SETTING OUT	SOP
GABION EDGE	GE	SIGN	SN
GAS BOTTLE STORE	GBS	SIGN	SN
GAS INLET	GI	SOFFIT LEVEL	SL:
GAS VALVE	GV	SPEED RESTRICTOR	SR
GATE DOUBLE	GD	STAND PIPE	SP
GATE POST	GP	STAYWIRE	STAY
GATE SINGLE	GS	STILE	STI
GATE TURNSTILE	GT	STOP TAP	ST
GRILLE	IG	STOP VALVE	SV
GRIT BIN	GB	STORAGE SHED	SH
GULLY	GY	SURFACE SCAR	S
HANDRAIL	HDR Ht. ?.?	TACTILE PAVING	TAC.
HEIGHT	Ht.	TELEGRAPH POLE	TP
HEIGHT RESTRICTOR	HR	TELEPHONE CALL BOX	TCB
IC BRITISH TELECOM	IC/BT	THRESHOLD LEVEL	TL:
IC CABLE TV	IC/CA	TRAFFIC LIGHT	TL
IC ELECTRIC	IC/EL	TREE STUMP	TS
INSPECTION BOX	IB	VENT PIPE	VP
INSPECTION COVER	IC	WALL	WA Ht.?.?
INVERT LEVEL	IL:	WASHOUT VALVE	WO
KERB DROP	KD	WATER LEVEL	WL:
KERB OUTLET	KO	WATER METER	WM
KERB TOP HIGHRISE	KTHR	WEIR LEVEL	WRL:

0 5 10 15 20 25m
SCALE 1:500

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PROPOSED PRODUCTION FACILITY
STRANRAER, DG9 0RF

Sheet Title

2D TOPOGRAPHICAL SURVEY
SHEET 1 OF 4

Client Project Number	Drawn By	Date	Checked By	Date	Approved By	Date	Scale @ A0	Suitability
XXXXXX	MD	12/09/24	CP	13/09/24	SP	13/09/24	1:500	S3

TTE Project Number		Originator		Volume/System		Level/Location		Type/Code		Role		Number	Revision
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OS NORTH

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AIR VALVE	AV	LAY DOWN AREA	LDA
BARRIER	BA Ht. ?.?	LETTER BOX	LB
BCD LEVEL	BL:	MANHOLE	MH
BELISHA BEACON	BB	MARKER PLATE BT.	MP/B
BINS	BIN	MARKER PLATE ELEC.	MP/E
BOLLARD	B	MARKER PLATE GAS	MP/G
BORE HOLE	BH	MARKER PLATE UNKNOWN	MP/U
BUILDING CONTAINER	CONT/CONTAINER	MARKER PLATE WATER	MP/W
BUS SHELTER/STOP	BS	MARKER POST	MK
CABINET	CAB/(E/G/W)	MARKER POST BT	MK/B
CABLE	CBL	MARKER POST ELEC.	MK/E
CABLE TRAY	CT	MARKER POST GAS	MK/G
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CONCRETE BASE	CNB	OH PIPEBRIDGE	OHPB
COPING LEVEL	COL:	OH PIPES	OHPI
CRASH BARRIER	CB Ht. ?.?	OH PLATFORM	OHP
CROWN PIPES LEVEL	CPL:	OH TELECOM LINES	OHT
CROWN ROAD LEVEL	CRL:	ORNAMENTAL MASONRY	OM
CYCLE RACK	CR	OVERHEAD ITEMS	OH
CYCLE SHED	CS	PARKING TICKET MACHINE	TM
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EARTH ROD	ER	POST	PO
EAVES LEVEL	EL:	RAIL JOINT	RJ
ELECTRICITY POLE	EP	RAIL SIGNAL POST	SIG
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FE HERAS	FEHE Ht. ?.?	RAIL TRACK	RT
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FENCE	FE(XX) Ht. ?.?	ROAD SIGN	RS
FIRE HYDRANT	FH	ROAD SIGN	RS
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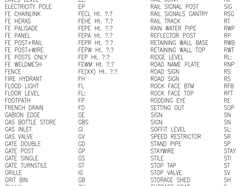

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XXXXXX	MD	12/09/24	CP	13/09/24	SP	13/09/24	1:500	S3

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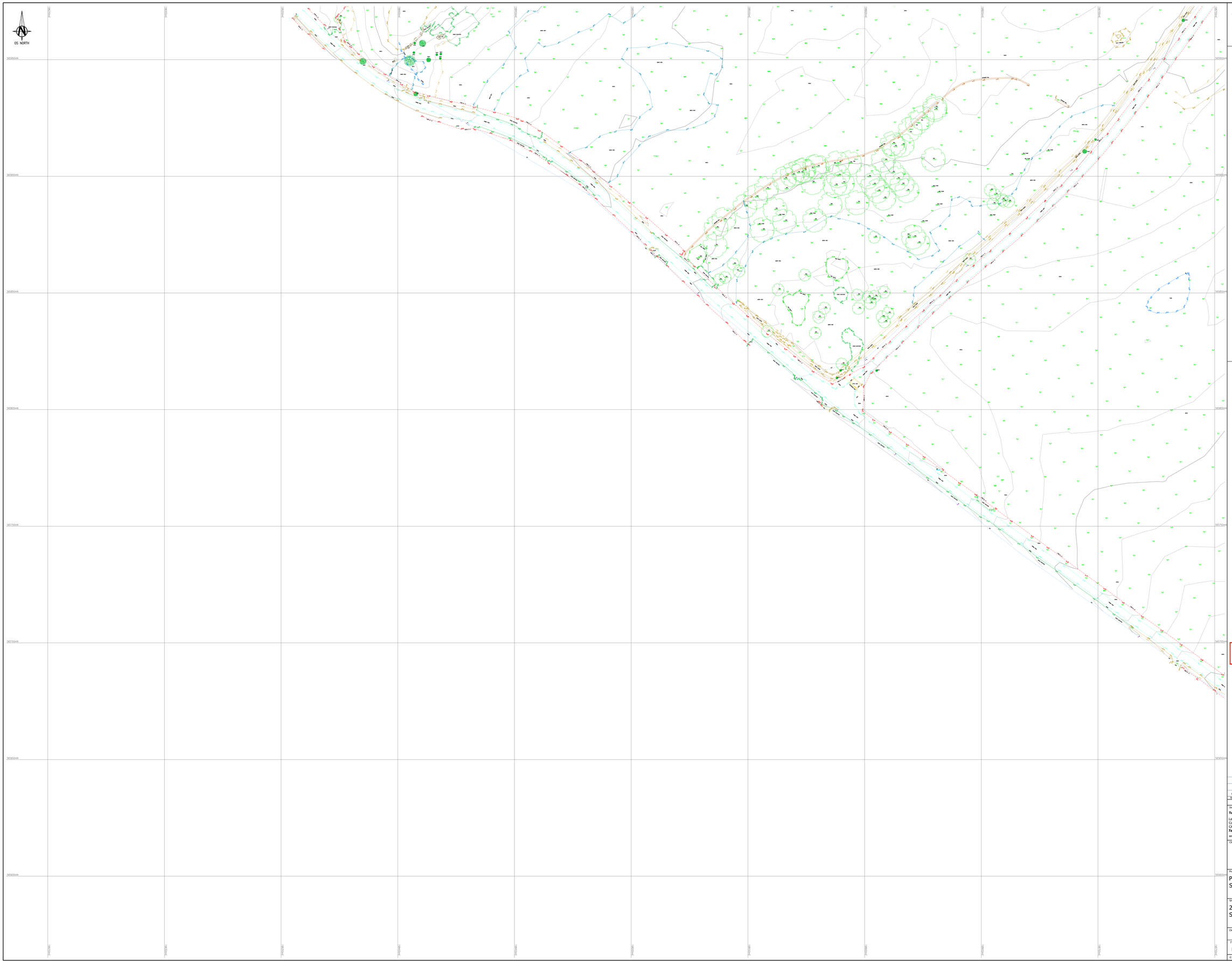

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COPING LEVEL	COL:	OH PIPES	OHPI
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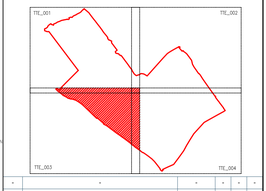

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SHEET 3 OF 4

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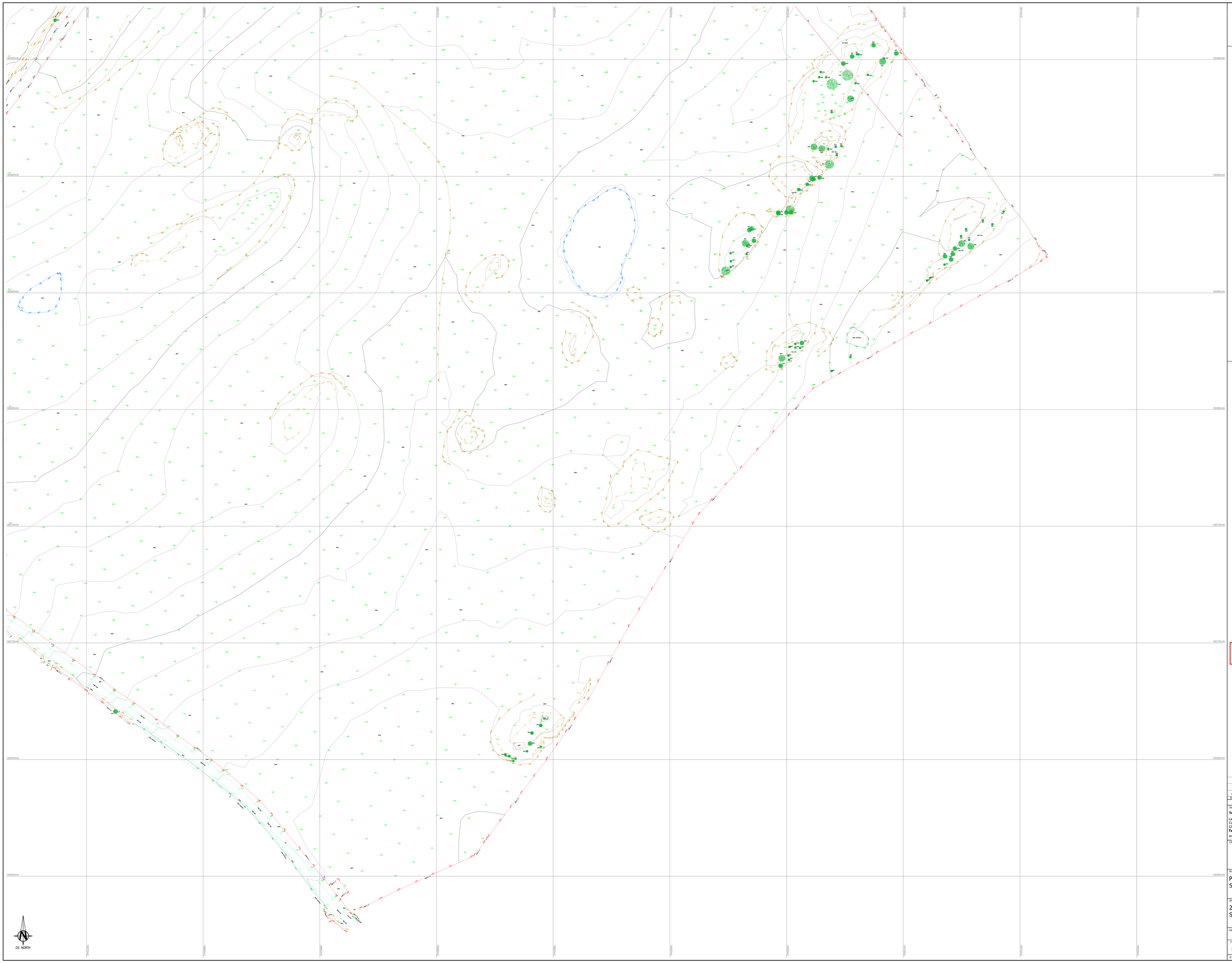

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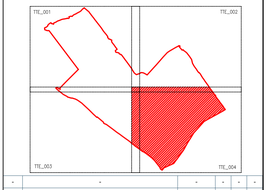

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Client Project Number	Drawn By	Date	Checked By	Date	Approved By	Date	Scale @ A0	Suitability
XXXXXX	MD	12/09/24	CP	13/09/24	SP	13/09/24	1:500	S3

TTE Project Number	Originator	Volume/System	Level/Location	Type/Code	Role	Number	Revision
B067657	- TTE	- 00	- 2D	- PL	- G	- 004	A

TTE_G_v1.4

APPENDIX B: SCOTTISH WATER SEWER ASSET PLAN

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: sheila.macvicar@national-one-call.co.uk

N

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.

Date: 19/09/2024

OP-WOOXK552 Waste Water Plan

0 12.5 25 50 Meters

SCALE: 1:2,646

Scottish Water
Trusted to serve Scotland

The Bridge
6 Buchanan Gate
Stepps
Glasgow
G33 6FB

Tel No: 08000 778 778

APPENDIX C: SEPA GROUNDWATER FLOOD RISK MAP

Flood Maps

Map Legend

Groundwater

- Low Likelihood

Potentially Vulnerable Areas

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The maps are indicative and of a strategic nature. Whilst all reasonable effort has been made to ensure that the flood maps are accurate for their intended purpose, no warranty is given by SEPA in this regard. Within any modelling technique there is inherent uncertainty. SEPA has assessed the confidence it has in the maps and has shaded areas where data is not appropriate for use or where no data is available. It is inappropriate for these maps to be used to assess flood risk to an individual property.

Acknowledgements
The maps were developed using data from various sources. Full acknowledgement of data providers and participating parties is from the flood maps.

Maps creation dates
Created: January 2014 This supersedes the Indicative River and Coastal Flood Map (Scotland)
Updated: 3 March 2015
Updated: 2 December 2015

The flood maps reflect the knowledge and data that was available to be incorporated at the time of publication.

For further queries please contact flooding@sepa.org.uk

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APPENDIX D: SEPA RESERVOIRS INUNDATION MAP

Reservoirs Map

Map Legend

Reservoirs Inundation Map

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Within any modelling technique there is inherent uncertainty. The reservoir inundation maps are indicative only and of a strategic nature. Whilst all reasonable effort has been made to ensure that the reservoir inundation maps are accurate for their intended purpose, no warranty is given by SEPA in this regard.

The Controlled Reservoirs Register displays the potential extent of uncontrolled releases of water from a reservoir should they occur. They do not reflect the potential consequences of an uncontrolled release of water occurring or the current flood risk that exists.

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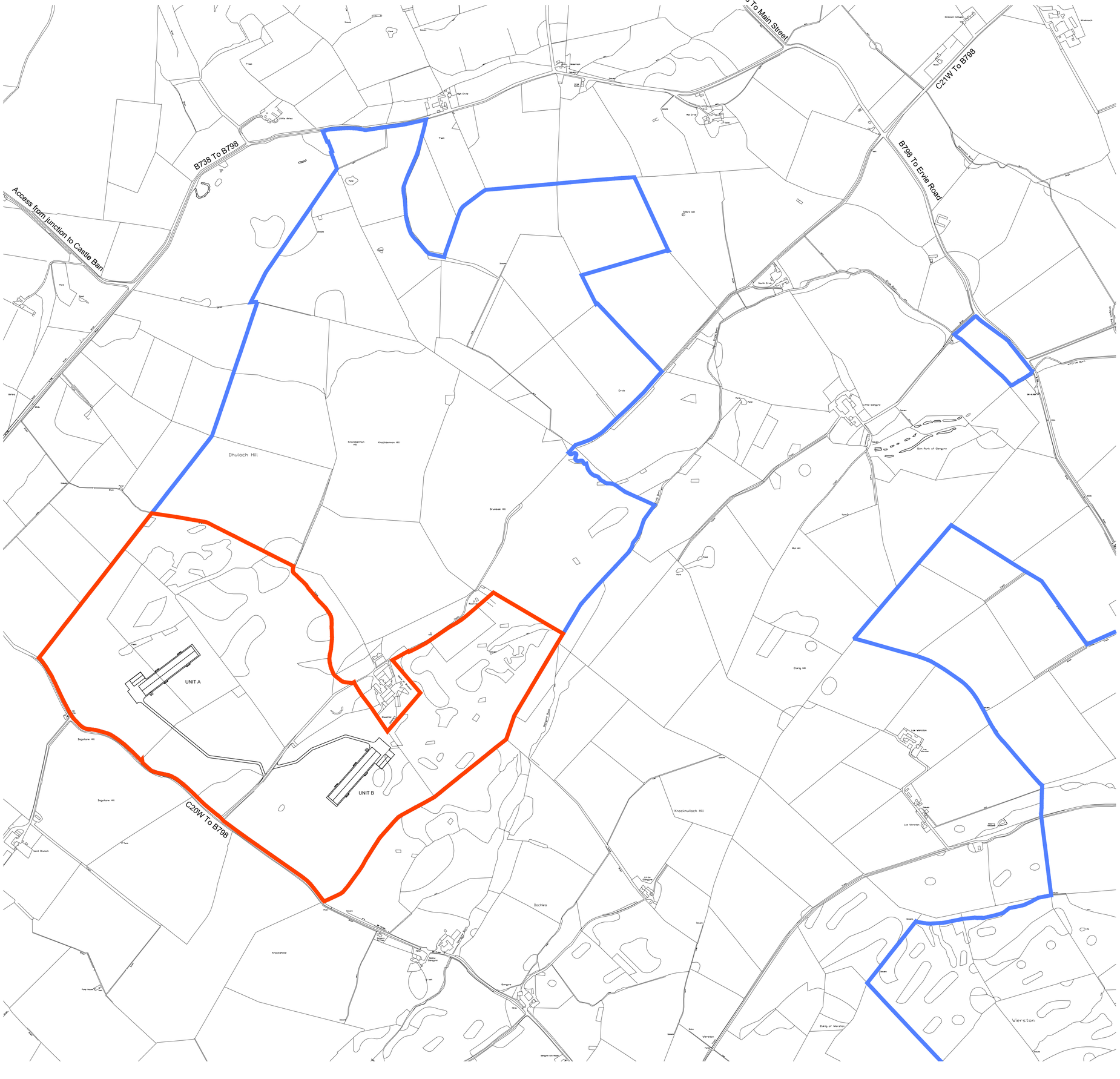
APPENDIX E: DEVELOPMENT PROPOSALS



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0 20 50 100 200 500

Scale 1:5000

Revision	Description	By	Chk

project

Mr T Drummond

Proposed Egg Production Plant
Mains of Dhuloch
Kirkcolm
Stranraer

title

Location Plan

scale	size	date	drawn	checked
1/5000	A1	SEP 2024	SB	MB

drawing status
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project no.	drawing no.	revision
AT3887	P001	

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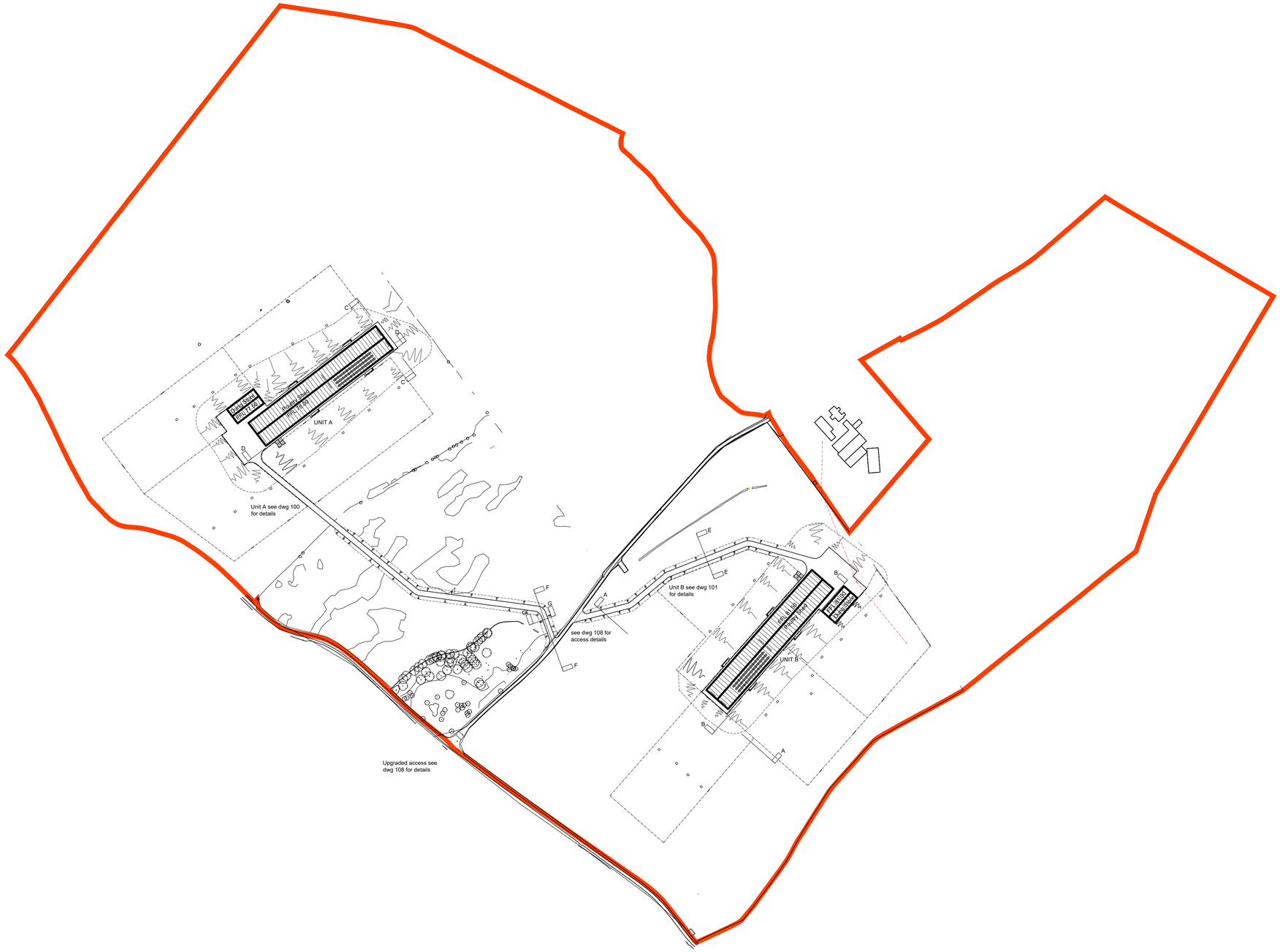

0 20 40 60 80 100 200
Scale 1:2500

Revision	Description	By	Chk

project

Mr T Drummond

Proposed Egg Production Plant
Mains of Dhuloch
Kirkcolm
Stranraer

title

Block Plan as Proposed

scale	size	date	drawn	checked
1/2500	A1	SEP 2024	SB	MB

drawing status
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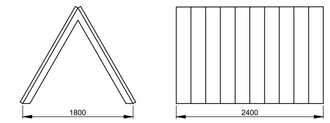
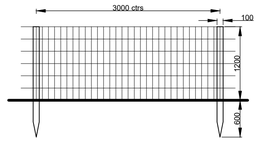


Timber Chicken Shelter Details



Timber Post and Wire Mesh Fence Detail

Symbol Key

- 2.4mx1.8m Shelter Hut
- 3.6m wide gate
- Mesh Fence

0 1 2 3 4 5

Scale 1:50

0 2 5 10 20 50

Scale 1:500

Revision	Description	By	Chk

project

Mr T Drummond

Proposed Egg Production Plant
Mains of Dhuloch
Kirkcolm
Stranraer

title

Unit A Site Plan and Fence Details as Proposed

scale	size	date	drawn	checked
1/50 1/500	A1	SEP 2024	SB	MB

drawing status
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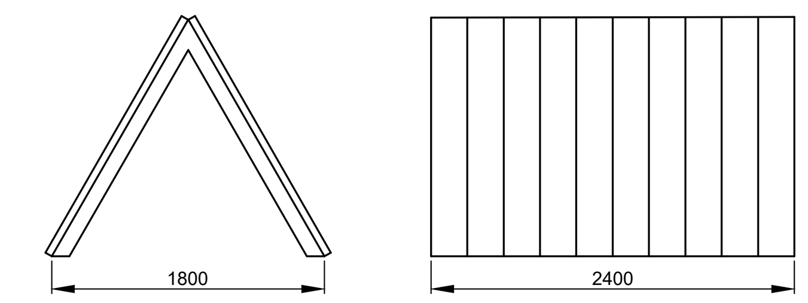
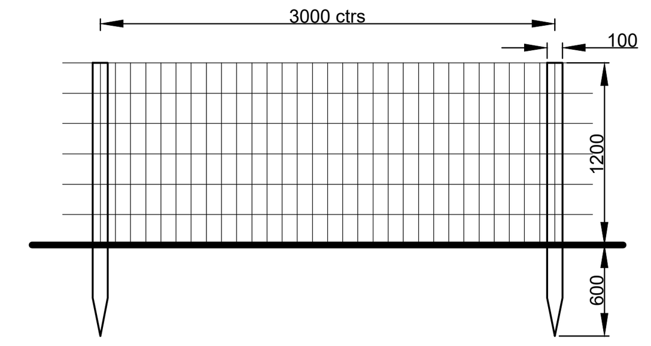


Timber Chicken Shelter Details



Timber Post and Wire Mesh Fence Detail

Symbol Key

2.4mx1.8m Shelter Hut

3.6m wide gate

Mesh Fence

Scale 1:50

Scale 1:500

Revision	Description	By	Chk

project

Mr T Drummond

Proposed Egg Production Plant
Mains of Dhuloch
Kirkcolm
Stranraer

title

Unit B Site Plan and Fence Details as Proposed

scale	size	date	drawn	checked
1/50 1/500	A1	SEP 2024	SB	MB

drawing status

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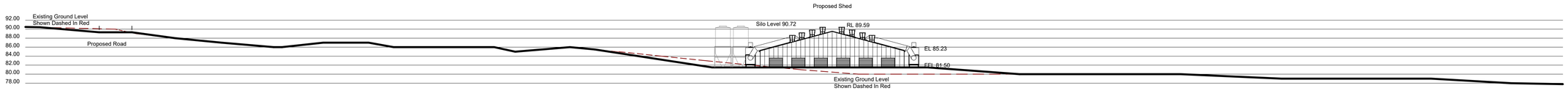

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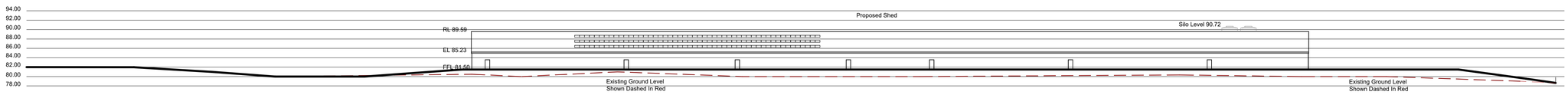
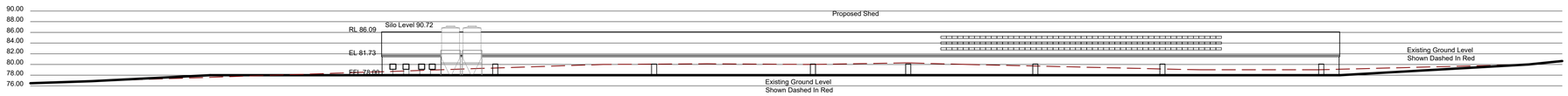


Section B-B

Section C-C



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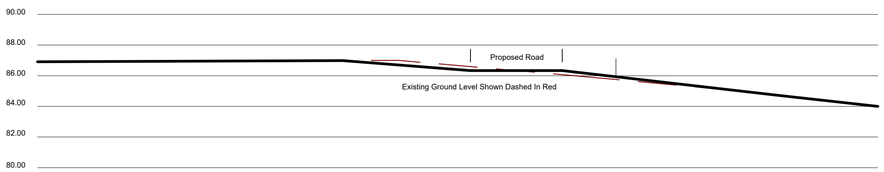

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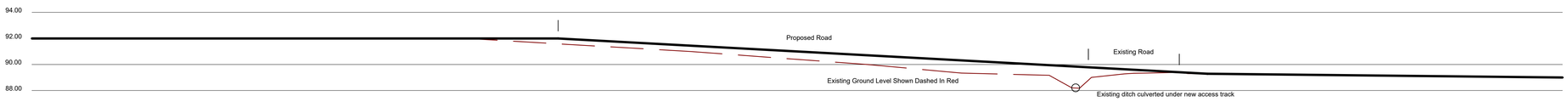

Section F-F

Section G-G

0 1 2 3 4 5 10

Scale 1:200

0 2 5 10 20 50

Scale 1:500

Revision	Description	By	Chk

project

Mr T Drummond

Proposed Egg Production Plant
Mains of Dhuloch
Kirkcolm
Stranraer

title

Site Sections as Proposed

scale	size	date	drawn	checked
1/200 1/500	A1	SEP 2024	SB	MB

drawing status
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AT3887	P102	

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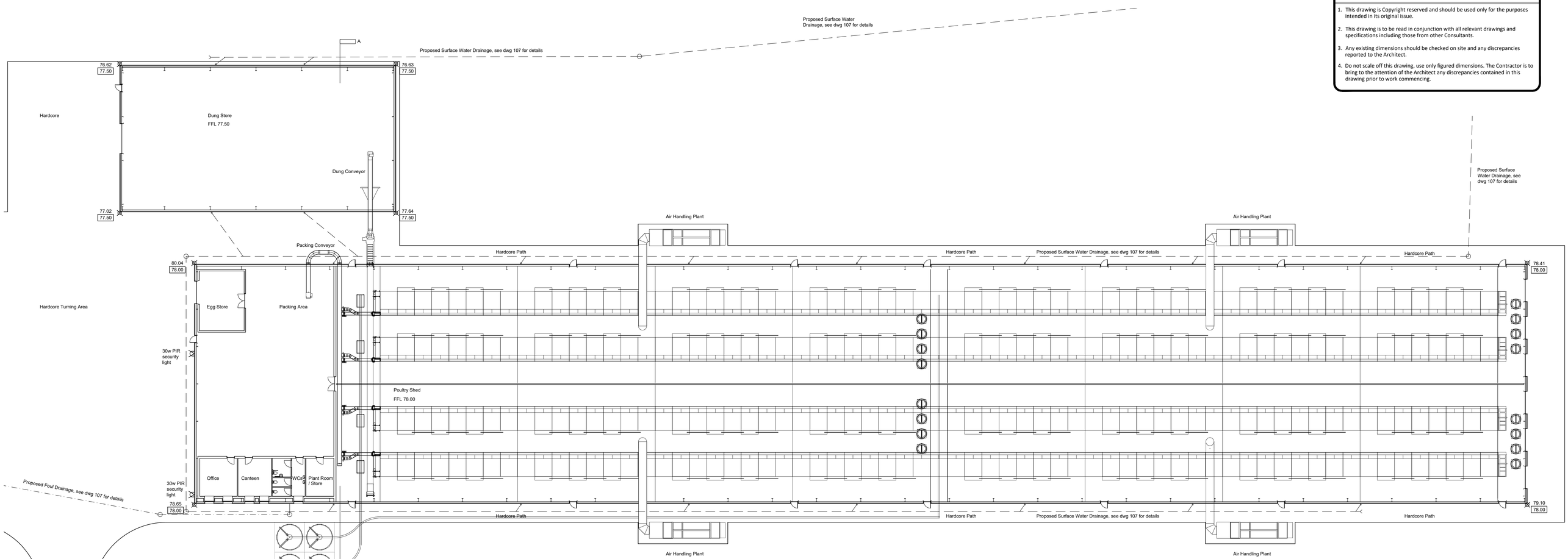
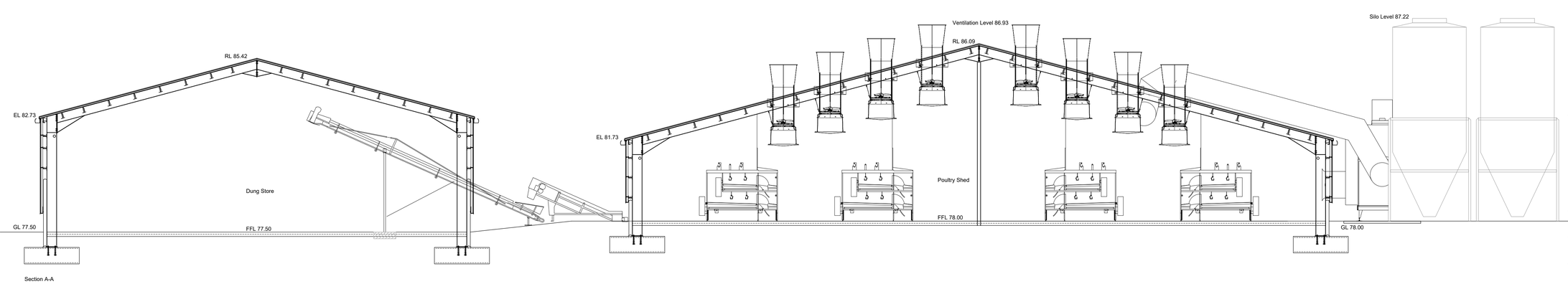


Floor Plan

0 2 4 6 8 10 20

Scale 1:250



Section A-A

0 1 2 3 4 5

Scale 1:100

Revision	Description	By	Chk

project

Mr T Drummond

Proposed Egg Production Plant
Mains of Dhuloch
Kirkcolm
Stranraer

title

Unit A Floor Plan and Section as Proposed

scale	size	date	drawn	checked
1/100 1/250	A1	OCT 2024	SB	MB

drawing status
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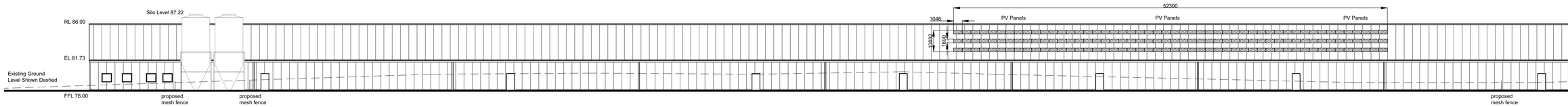
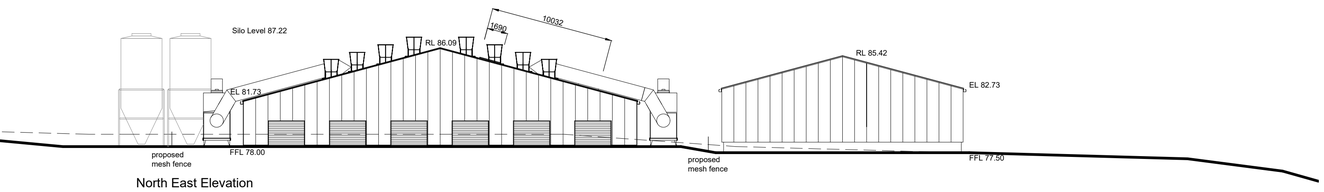
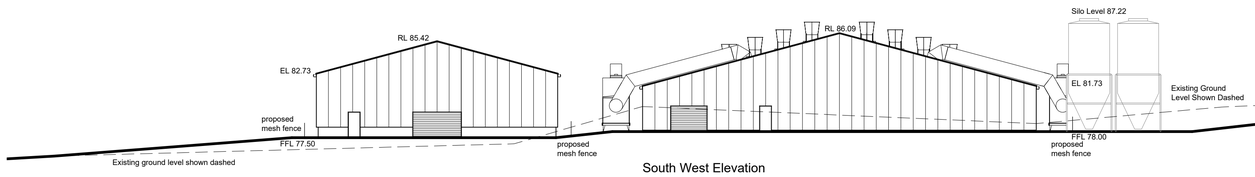


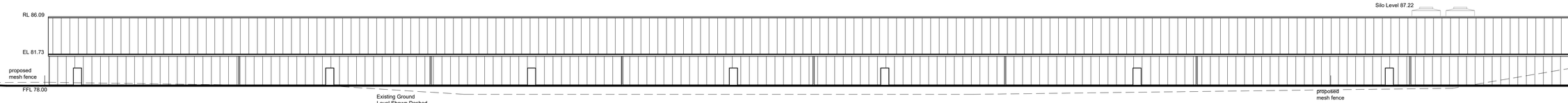
South East Elevation



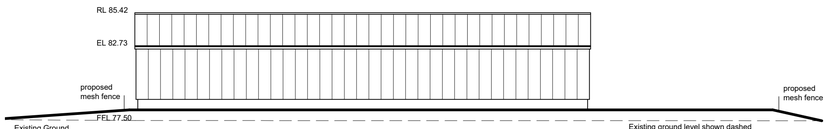
North East Elevation



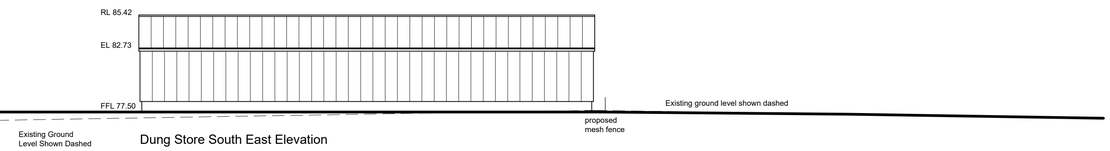
South West Elevation



North West Elevation



Dung Store North West Elevation



Dung Store South East Elevation

Schedule of Finishes:

Roof -	Juniper Green profiled PP coated steel roof cladding panels (no rooflights) with matching flashings.
Rainwater Goods -	Black PP coated aluminium rainwater goods.
Walls -	Juniper Green profiled PP coated steel wall cladding panels with matching flashings & precast concrete panel base course.
Windows and Doors -	Black PP coated aluminium roller doors. Black painted timber fire exit doors. Black upvc windows.

0 2 4 6 8 10 20

Scale 1:250

Revision	Description	By	Chk

project

Mr T Drummond

Proposed Egg Production Plant
Mains of Dhuloch
Kirkcolm
Stranraer

title

Unit A Elevations as Proposed

scale	size	date	drawn	checked
1/250	A1	OCT 2024	SB	MB

drawing status
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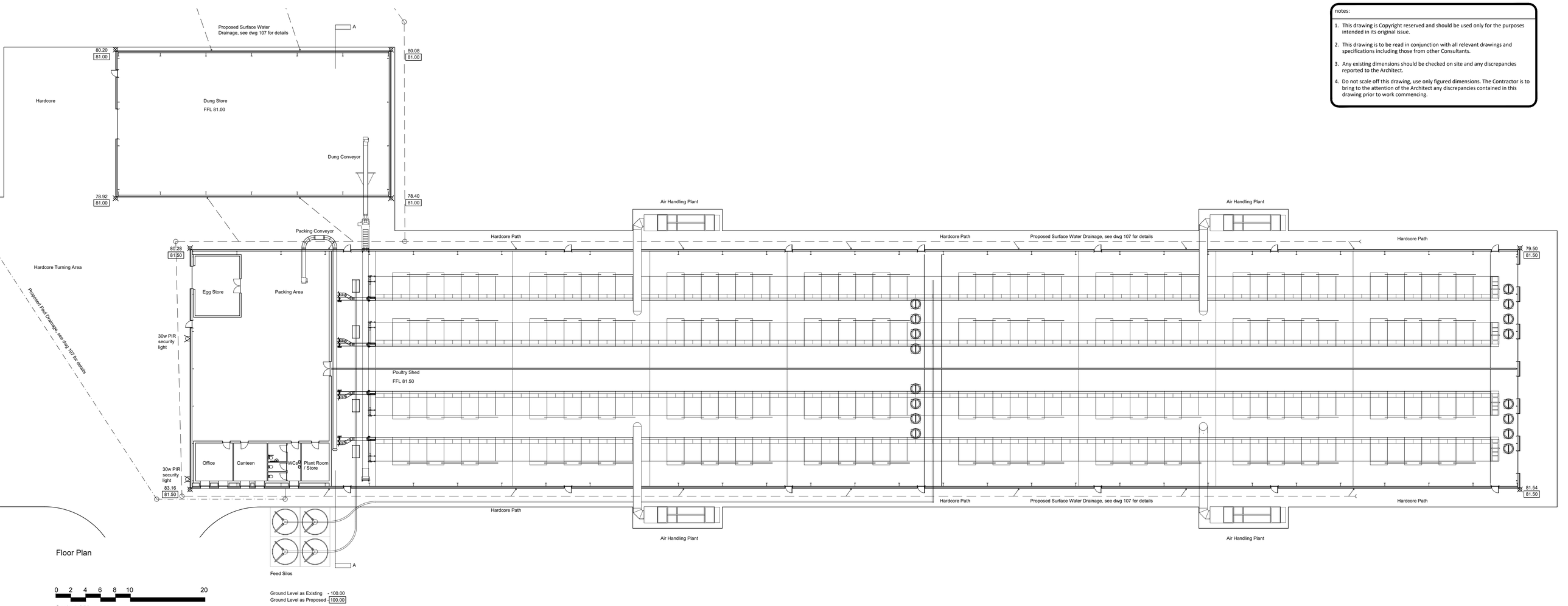
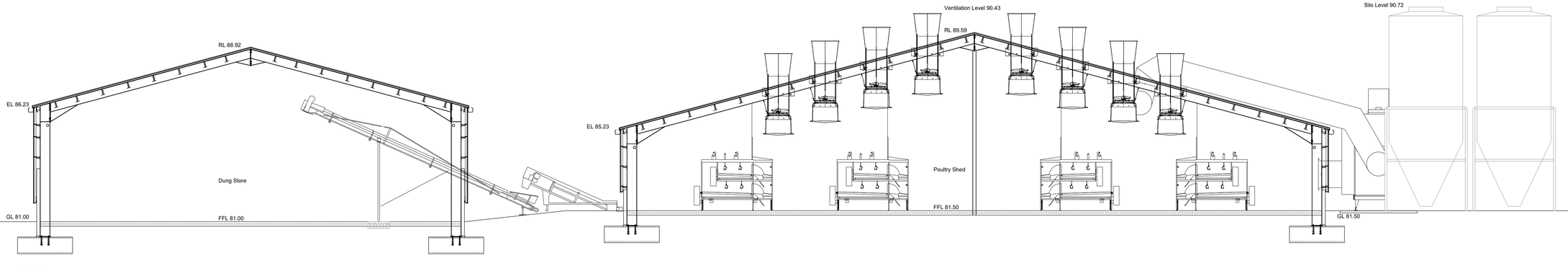
AT3887	P104	



Floor Plan

0 2 4 6 8 10 20

Scale 1:250



0 1 2 3 4 5

Scale 1:100

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Revision	Description	By	Chk

project

Mr T Drummond

Proposed Egg Production Plant
Mains of Dhuloch
Kirkcolm
Stranraer

title

Unit B Floor Plan and Section as Proposed

scale	size	date	drawn	checked
1/100 1/250	A1	OCT 2024	SB	MB

drawing status
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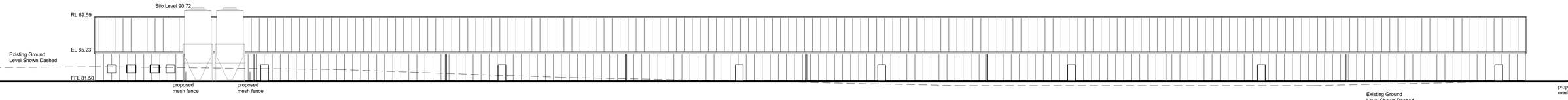
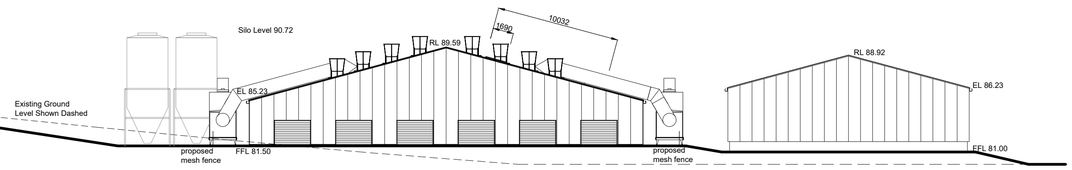
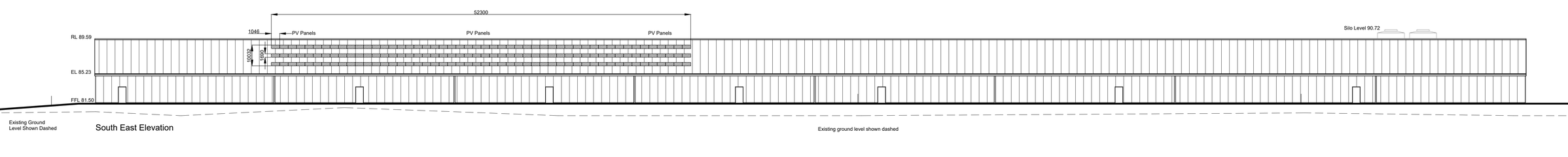


North West Elevation

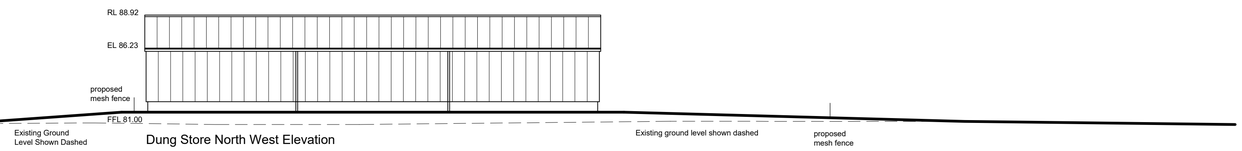


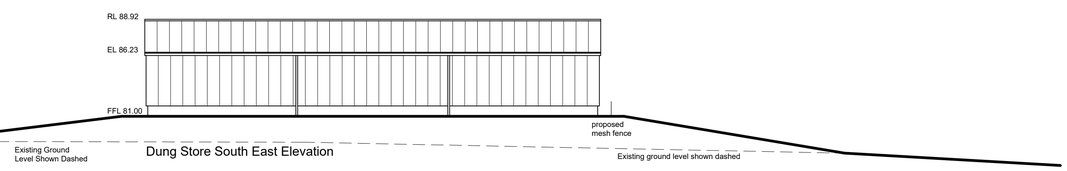
South West Elevation

North East Elevation



South East Elevation





Schedule of Finishes:

Roof -	Juniper Green profiled PP coated steel roof cladding panels (no rooflights) with matching flashings.
Rainwater Goods -	Black PP coated aluminium rainwater goods.
Walls -	Juniper Green profiled PP coated steel wall cladding panels with matching flashings & precast concrete panel base course.
Windows and Doors -	Black PP coated aluminium roller doors. Black painted timber fire exit doors. Black upvc windows.

0 2 4 6 8 10 20

Scale 1:250

Revision	Description	By	Chk

project

Mr T Drummond

Proposed Egg Production Plant
Mains of Dhuloch
Kirkcolm
Stranraer

title

Unit B Elevations as Proposed

scale	size	date	drawn	checked
1/250	A1	OCT 2024	SB	MB

drawing status

PLANNING APPLICATION

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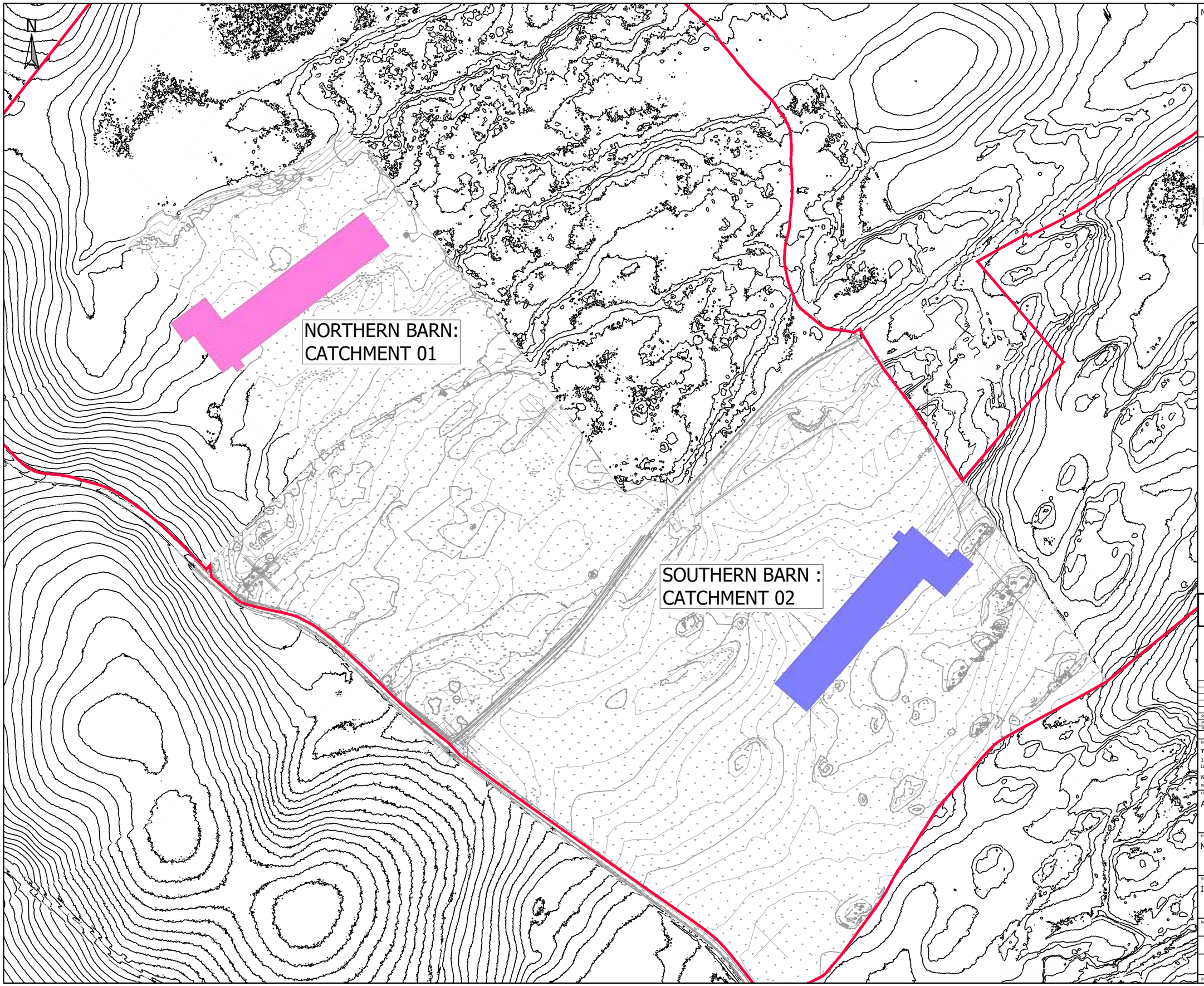
project no.	drawing no.	revision
AT3887	P106	

APPENDIX F: CATCHMENT AREAS PLAN



NOTES:

1. ALL DIMENSIONS IN METERS UNLESS STATED OTHERWISE.
2. DO NOT SCALE FOR COSTING OR CONSTRUCTION PURPOSES.
3. DRAWING BASED ON PLANNING SITE BASE.DWG AS RECEIVED.
4. PROPOSED BARNS' TURNING CIRCLES / YARDS AREAS AND ACCESS TRACKS TO BE OF CRUSHED STONE AND THEREFORE CONSIDERED AS PERMEABLE.

LEGEND

CATCHMENT 01 HARDSTANDING AREA: 0.778 HA

CATCHMENT 02 HARDSTANDING AREA: 0.778 HA

DRAFT ISSUE

Rev	Description	Date	Drn	Chk	App
P02	UPDATED DUNG STORE LOCATION	17.12.2024	TK	LL	FH
P01	PRELIMINARY FIRST ISSUE	30.10.2024	TK	LL	FH

Document Control

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Leeds, LS1 4ER, United Kingdom

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Client

AITKEN TURNBULL ARCHITECTS

Project Name

MAINS OF DHULOCH

Sheet Title

INDICATIVE IMPERMEABLE CATCHMENTS

Model Reference

N/A

TTE Project Number	Drawn By	Date	Checked By	Date	Approved By	Date	Scale @ A3	Status
784-B067657	TK	Oct '24	LL	Octt' 24	FH	Oct' 24	1:3,000	S0

Client Project Number	Originator	Function	Spatial	Form	Role	Number	Revision
PRJ01	- TTE -	00	- ZZ	- DR	- S	- 0000	P02

TTE_MT_v3

APPENDIX G: GREENFIELD RUNOFF RATE CALCULATIONS

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Tom Kearsey
Site name:	Mains of Dhuloch
Site location:	Mains of Dhuloch, DG9 0RF

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	54.94927° N
Longitude:	5.14172° W
Reference:	3790443442
Date:	Sep 17 2024 17:09

Runoff estimation approach

IH124

Site characteristics

Total site area (ha):	50

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	3	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.37	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	1107	1122
Hydrological region:	2	2
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	1.95	1.95
Growth curve factor 100 years:	2.63	2.63
Growth curve factor 200 years:	2.99	2.99

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited

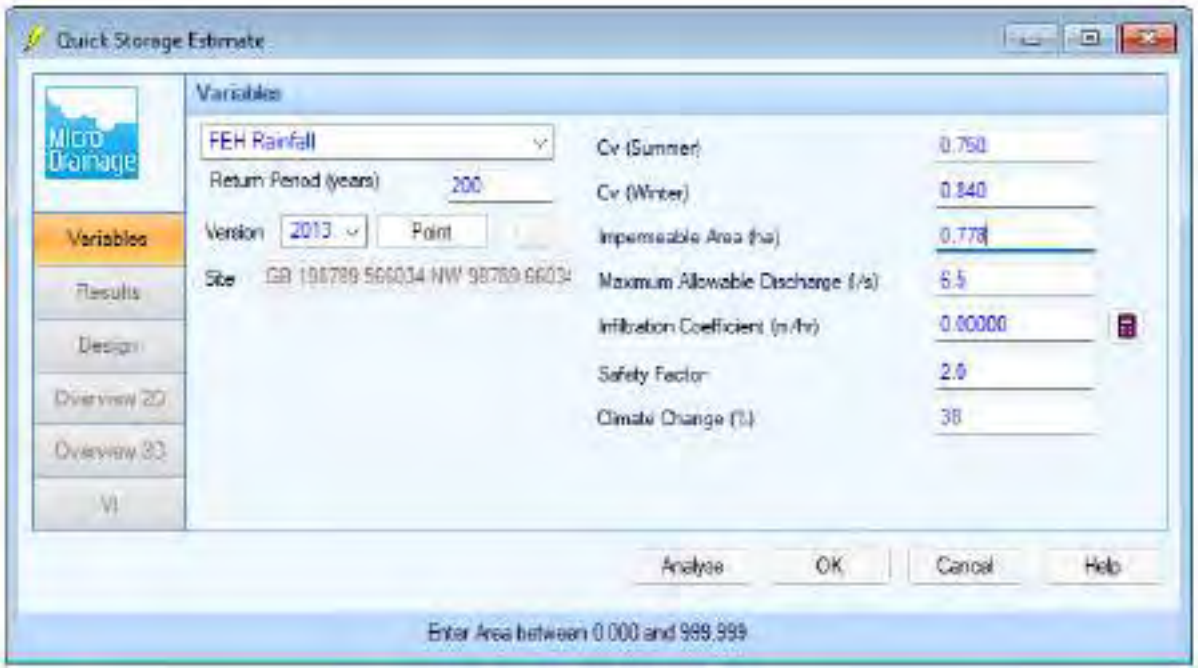
Q_{BAR} (l/s):	245.56	419.23
1 in 1 year (l/s):	213.64	364.73
1 in 30 years (l/s):	478.84	817.5
1 in 100 year (l/s):	645.82	1102.57
1 in 200 years (l/s):	734.22	1253.49

APPENDIX H: QUICK STORAGE ESTIMATION CALCULATIONS

784-B067657 Mains of Dhuloch

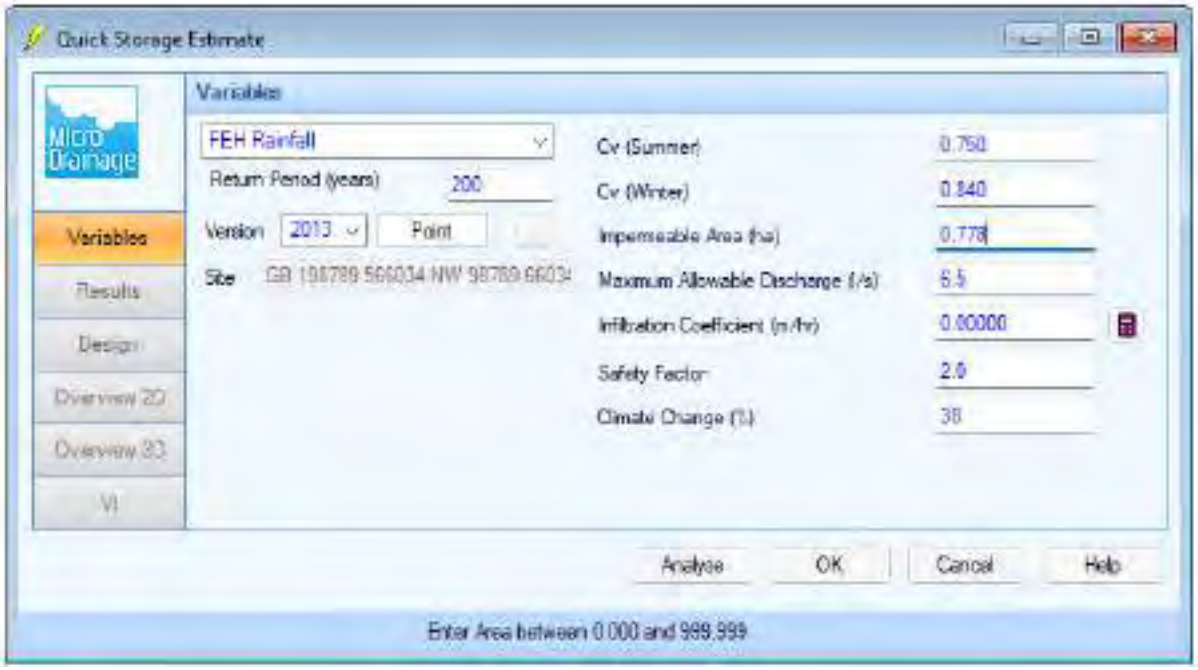
Quick Storage Estimates 1 in 200 years plus 38% CC

Catchment 01:



784-B067657 Mains of Dhuloch

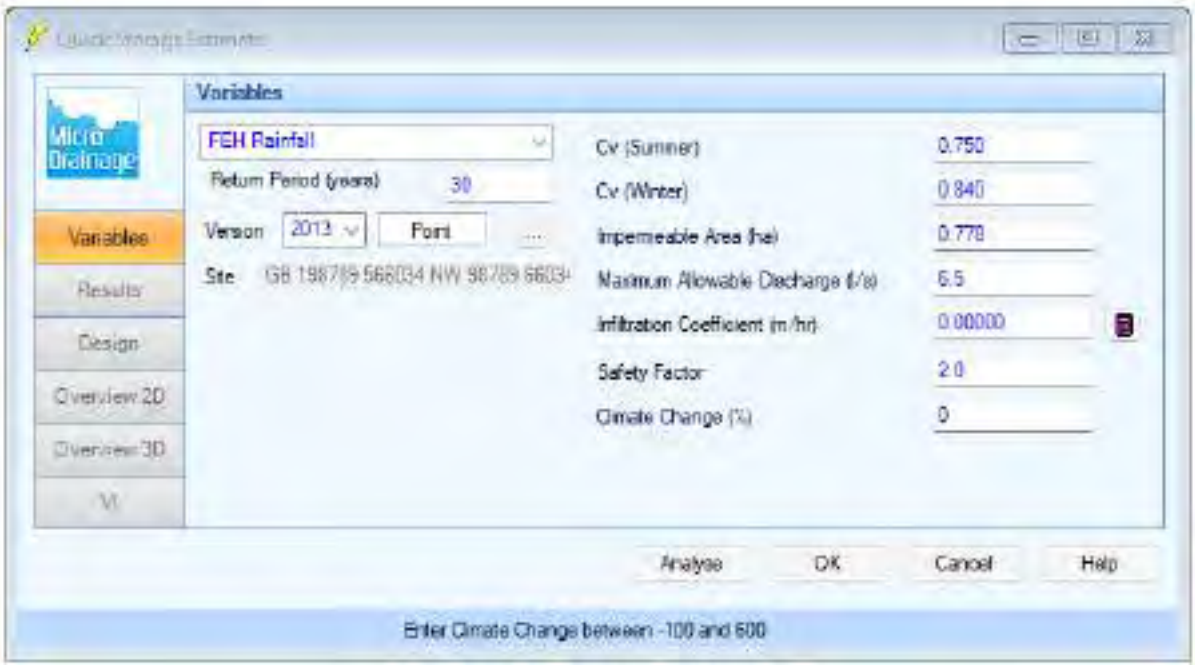
Catchment 02:

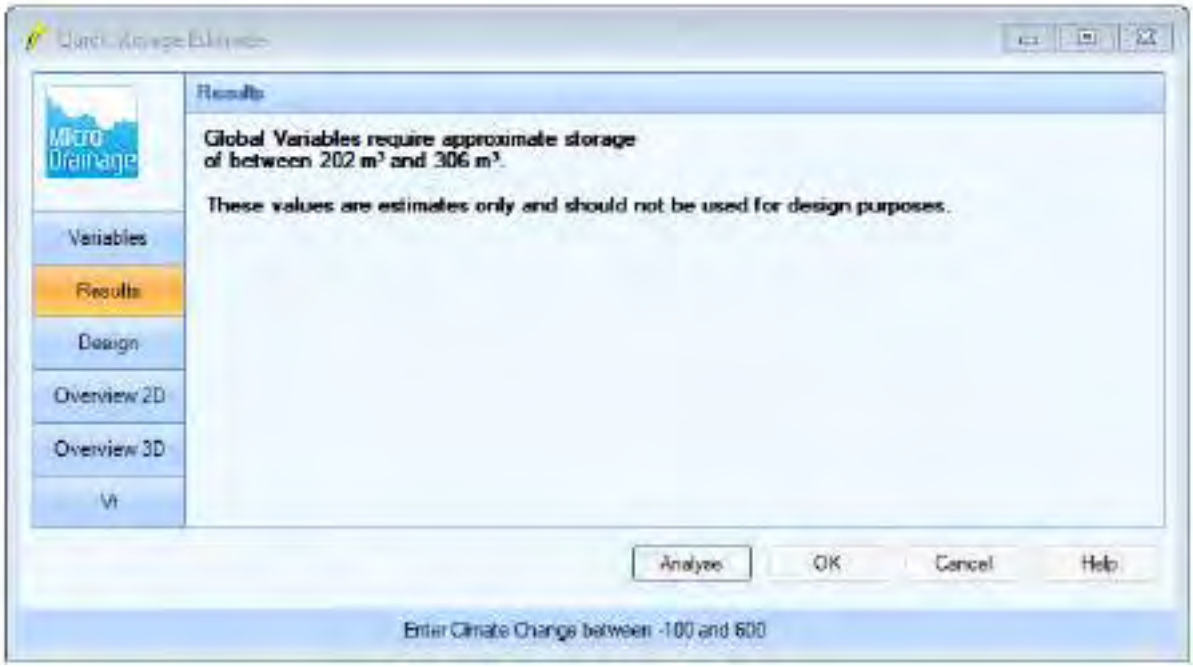


784-B067657 Mains of Dhuloch

Quick Storage Estimates 1 in 30 years

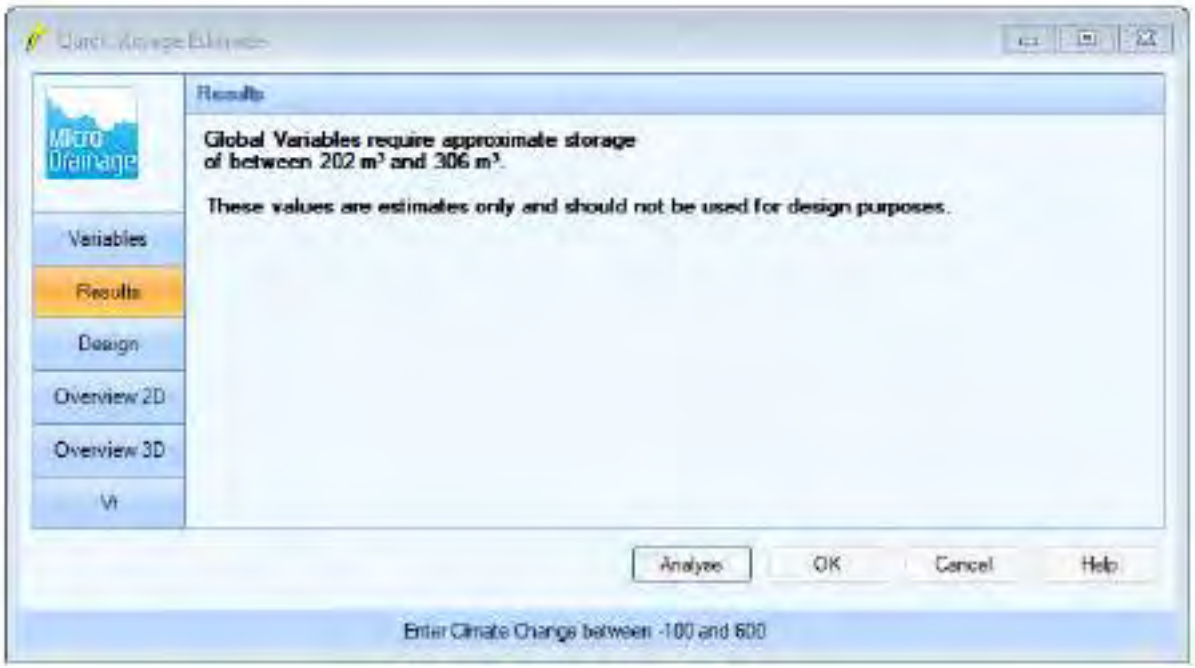
Catchment 01:



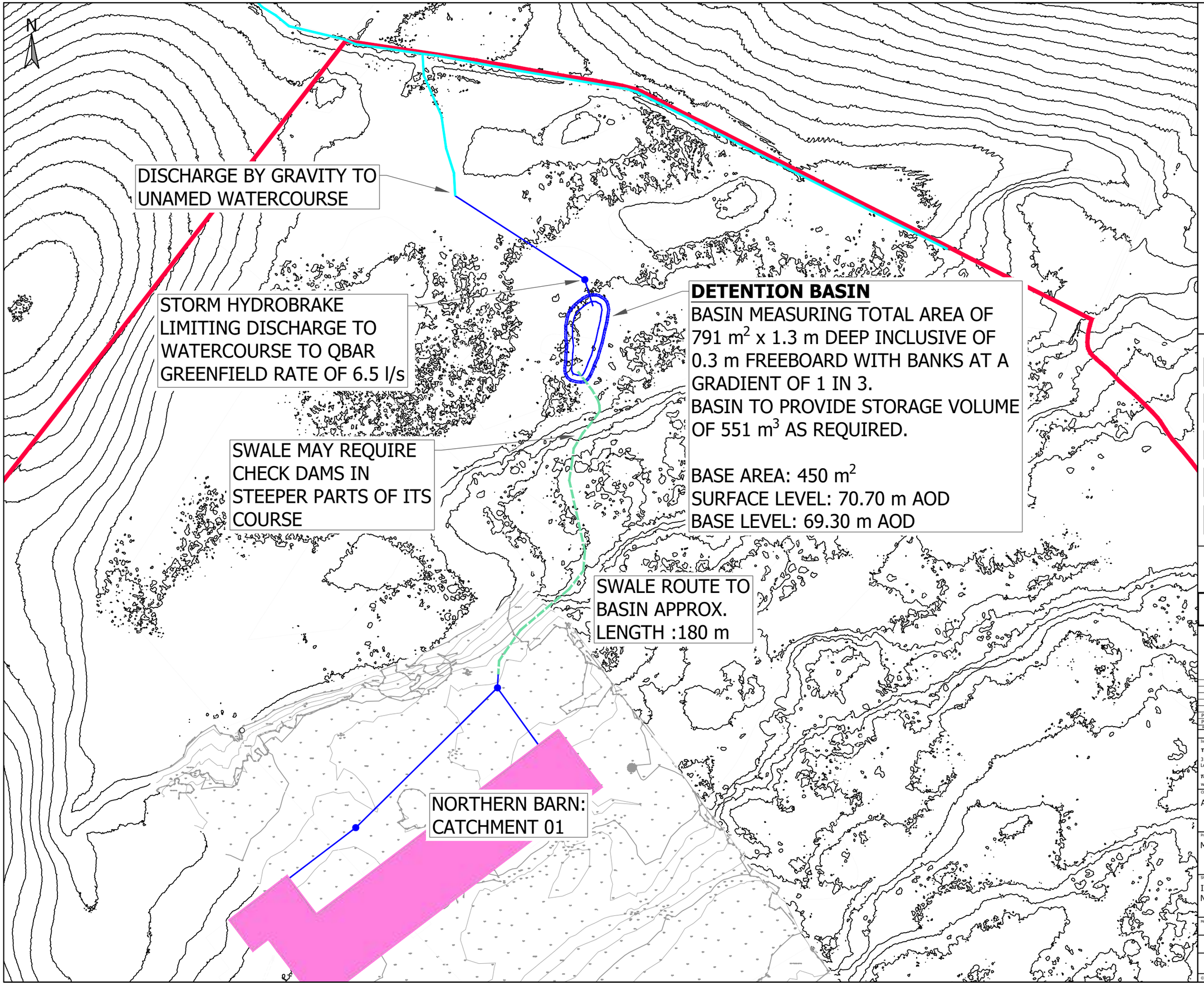


784-B067657 Mains of Dhuloch

Catchment 02:



APPENDIX I: SURFACE WATER DRAINAGE STRATEGY



NOTES:

1. ALL DIMENSIONS IN METERS UNLESS STATED OTHERWISE.
2. DO NOT SCALE FOR COSTING OR CONSTRUCTION PURPOSES.
3. DETAILED DESIGN WILL BE REQUIRED AT THE DETAILED DESIGN STAGE
4. DRAWING BASED ON PROPOSED SITE PLAN, DWG PROPOSED SITE BASE AS RECEIVED IN OCTOBER 2024. DRAFT O BE UPDATED WITH LATEST DWG FILE WHEN RECEIVED.
5. INFILTRATION TESTING IN ACCORDANCE WITH BRE365 MAY BE REQUIRED BY DUMFRIES AND GALLOWAY COUNCIL AT THE DETAILED DESIGN STAGE TO CONFIRM SITE SPECIFIC INFILTRATION RATES.
6. SUDS DIMENSIONS AND LOCATIONS ARE INDICATIVE AND SUBJECT TO CHANGE.
7. SURFACE WATER RUNOFF TO DISCHARGE INTO EXISTING WATERCOURSE AT EXISTING QBAR GREENFIELD RUNOFF RATE OF 6.5 l/s FOR THE NORTHERN BARN CATCHMENT DURING ALL EVENTS UP TO AND INCLUDING THE 1 IN 200 YEAR PLUS 38% CLIMATE CHANGE SCENARIO, SUBJECT TO AGREEMENT WITH DUMFRIES AND GALLOWAY COUNCIL.

LEGEND

- DETENTION BASIN
- PROPOSED PRIVATE SURFACE WATER SEWER
- PROPOSED PRIVATE SURFACE WATER SEWER MANHOLE
- PROPOSED SWALE
- EXISTING WATERCOURSE

DRAFT ISSUE

Rev	Description	Date	Drn	Chk	App
P02	UPDATED DUNG STORE LOCATION	17.12.2024	TK	LL	FH
P01	PRELIMINARY FIRST ISSUE	20.11.2024	TK	LL	FH

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TETRA TECH

Client
AITKEN TURNBULL ARCHITECTS

Project Name
MAINS OF DHULOCH

Sheet Title
INDICATIVE SURFACE WATER LAYOUT - NORTHERN CATCHMENT (01)

Model Reference
N/A

TTE Project Number	Drawn By	Date	Checked By	Date	Approved By	Date	Scale @ A3	Status
784-B067657	TK	Oct '24	LS	Octt' 24	FH	Oct' 24	1:1,750	S0

Client Project Number	Originator	Function	Spatial	Form	Role	Number	Revision
PRJ01	- TTE -	00	- ZZ	- DR	- S	- 0000	P02

TTE_MT_v3

N

DISCHARGE BY GRAVITY TO UNAMED WATERCOURSE

STORM HYDROBRAKE LIMITING DISCHARGE TO WATERCOURSE TO QBAR GREENFIELD RATE OF 6.5 l/s

SWALE MAY REQUIRE CHECK DAMS IN STEEPER PARTS OF ITS COURSE

DETENTION BASIN

BASIN MEASURING TOTAL AREA OF 791 m^2 x 1.3 m DEEP INCLUSIVE OF 0.3 m FREEBOARD WITH BANKS AT A GRADIENT OF 1 IN 3.
POND TO PROVIDE STORAGE VOLUME OF 551 m^3 AS REQUIRED.

BASE AREA: 450 m^2
SURFACE LEVEL: 69.80 m AOD
BASE LEVEL: 68.50 m AOD

SWALE ROUTE TO BASIN: APPROX. 230 m

SOUTHERN BARN: CATCHMENT 02

NOTES:

1. ALL DIMENSIONS IN METERS UNLESS STATED OTHERWISE.
2. DO NOT SCALE FOR COSTING OR CONSTRUCTION PURPOSES.
3. DETAILED DESIGN WILL BE REQUIRED AT THE DETAILED DESIGN STAGE
4. DRAWING BASED ON PLANNING SITE BASE.DWG AS RECEIVED IN NOVEMBER 2024.
5. INFILTRATION TESTING IN ACCORDANCE WITH BRE365 MAY BE REQUIRED BY DUMFRIES AND GALLOWAY COUNCIL AT THE DETAILED DESIGN STAGE TO CONFIRM SITE SPECIFIC INFILTRATION RATES.
6. SURFACE WATER RUNOFF TO DISCHARGE INTO EXISTING WATERCOURSE AT EXISTING QBAR GREENFIELD RUNOFF RATE OF 6.5 l/s FOR THE SOUTHERN BARN CATCHMENT DURING ALL EVENTS UP TO AND INCLUDING THE 1 IN 200 YEAR PLUS 38% CLIMATE CHANGE SCENARIO, AS AGREED WITH DUMFRIES AND GALLOWAY COUNCIL.

LEGEND

- DETENTION BASIN
- PROPOSED PRIVATE SURFACE WATER SEWER
- PROPOSED PRIVATE SURFACE WATER SEWER MANHOLE
- PROPOSED SWALE
- EXISTING WATERCOURSE

DRAFT ISSUE

Rev	Description	Date	Drn	Chk	App
P02	UPDATED DUNG STORE LOCATION	17.12.2024	TK	LL	FH
P01	PRELIMINARY FIRST ISSUE	20.11.2024	TK	LL	FH

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www.tetratecheurope.com

TETRA TECH

Client
AITKEN TURNBULL ARCHITECTS

Project Name
MAINS OF DHULOCH

Sheet Title
INDICATIVE SURFACE WATER LAYOUT - SOUTHERN CATCHMENT (02)

Model Reference
N/A

TTE Project Number	Drawn By	Date	Checked By	Date	Approved By	Date	Scale @ A3	Status
784-B067657	TK	Oct '24	LS	Octt' 24	FH	Oct' 24	1:1,750	S0

Client Project Number	Originator	Function	Spatial	Form	Role	Number	Revision
PRJ01	- TTE -	00	- ZZ	- DR	- S	- 0000	P02

TTE_MT_v3

APPENDIX J: MICRO DRAINAGE SOURCE CONTROL CALCULATIONS

Summary of Results for 200 year Return Period (+38%)

Half Drain Time : 731 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	68.843	0.443	0.0	6.5	6.5	222.4	O K
30 min Summer	68.991	0.591	0.0	6.5	6.5	307.3	O K
60 min Summer	69.131	0.731	0.0	6.5	6.5	393.0	O K
120 min Summer	69.206	0.806	0.0	6.5	6.5	441.1	O K
180 min Summer	69.239	0.839	0.0	6.5	6.5	462.8	O K
240 min Summer	69.256	0.856	0.0	6.5	6.5	473.9	O K
360 min Summer	69.268	0.868	0.0	6.5	6.5	481.6	O K
480 min Summer	69.265	0.865	0.0	6.5	6.5	479.7	O K
600 min Summer	69.255	0.855	0.0	6.5	6.5	473.0	O K
720 min Summer	69.244	0.844	0.0	6.5	6.5	465.6	O K
960 min Summer	69.223	0.823	0.0	6.5	6.5	452.3	O K
1440 min Summer	69.187	0.787	0.0	6.5	6.5	428.6	O K
2160 min Summer	69.138	0.738	0.0	6.5	6.5	397.2	O K
2880 min Summer	69.091	0.691	0.0	6.5	6.5	368.0	O K
4320 min Summer	68.989	0.589	0.0	6.5	6.5	305.9	O K
5760 min Summer	68.899	0.499	0.0	6.5	6.5	253.9	O K
7200 min Summer	68.826	0.426	0.0	6.5	6.5	212.7	O K
8640 min Summer	68.764	0.364	0.0	6.5	6.5	179.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	156.962	0.0	223.7	26
30 min Summer	108.843	0.0	310.6	41
60 min Summer	70.419	0.0	408.4	70
120 min Summer	40.816	0.0	473.5	128
180 min Summer	29.455	0.0	512.6	188
240 min Summer	23.330	0.0	541.3	246
360 min Summer	16.790	0.0	584.3	364
480 min Summer	13.309	0.0	617.4	482
600 min Summer	11.126	0.0	645.0	588
720 min Summer	9.620	0.0	669.0	632
960 min Summer	7.666	0.0	710.1	760
1440 min Summer	5.598	0.0	775.0	1020
2160 min Summer	4.125	0.0	865.4	1440
2880 min Summer	3.343	0.0	935.0	1852
4320 min Summer	2.512	0.0	1053.0	2644
5760 min Summer	2.070	0.0	1159.9	3400
7200 min Summer	1.794	0.0	1256.4	4112
8640 min Summer	1.604	0.0	1347.4	4840

Summary of Results for 200 year Return Period (+38%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
10080 min Summer	68.714	0.314	0.0	6.5	6.5	153.0	O K
15 min Winter	68.892	0.492	0.0	6.5	6.5	249.8	O K
30 min Winter	69.055	0.655	0.0	6.5	6.5	345.6	O K
60 min Winter	69.207	0.807	0.0	6.5	6.5	441.8	O K
120 min Winter	69.292	0.892	0.0	6.5	6.5	497.5	O K
180 min Winter	69.330	0.930	0.0	6.5	6.5	523.5	O K
240 min Winter	69.351	0.951	0.0	6.5	6.5	537.7	O K
360 min Winter	69.368	0.968	0.0	6.5	6.5	549.8	O K
480 min Winter	69.370	0.970	0.0	6.5	6.5	551.1	O K
600 min Winter	69.364	0.964	0.0	6.5	6.5	546.9	O K
720 min Winter	69.353	0.953	0.0	6.5	6.5	539.6	O K
960 min Winter	69.326	0.926	0.0	6.5	6.5	520.7	O K
1440 min Winter	69.280	0.880	0.0	6.5	6.5	490.1	O K
2160 min Winter	69.210	0.810	0.0	6.5	6.5	443.2	O K
2880 min Winter	69.138	0.738	0.0	6.5	6.5	397.1	O K
4320 min Winter	68.967	0.567	0.0	6.5	6.5	293.4	O K
5760 min Winter	68.821	0.421	0.0	6.5	6.5	210.0	O K
7200 min Winter	68.709	0.309	0.0	6.5	6.5	150.2	O K
8640 min Winter	68.632	0.232	0.0	6.4	6.4	110.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Summer	1.465	0.0	1433.9	5544
15 min Winter	156.962	0.0	250.8	26
30 min Winter	108.843	0.0	347.4	40
60 min Winter	70.419	0.0	457.5	70
120 min Winter	40.816	0.0	530.4	126
180 min Winter	29.455	0.0	574.2	184
240 min Winter	23.330	0.0	606.3	242
360 min Winter	16.790	0.0	654.3	356
480 min Winter	13.309	0.0	691.2	470
600 min Winter	11.126	0.0	722.0	580
720 min Winter	9.620	0.0	748.7	686
960 min Winter	7.666	0.0	794.3	800
1440 min Winter	5.598	0.0	864.4	1096
2160 min Winter	4.125	0.0	969.4	1560
2880 min Winter	3.343	0.0	1047.2	2020
4320 min Winter	2.512	0.0	1179.8	2820
5760 min Winter	2.070	0.0	1299.2	3528
7200 min Winter	1.794	0.0	1407.3	4192
8640 min Winter	1.604	0.0	1509.4	4848

Summary of Results for 200 year Return Period (+38%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
10080 min Winter	68.581	0.181	0.0	6.2	6.2	85.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Winter	1.465	0.0	1606.6	5456

Rainfall Details

Rainfall Model	FEH
Return Period (years)	200
FEH Rainfall Version	2013
Site Location	GB 198789 566034 NW 98789 66034
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+38

Time Area Diagram

Total Area (ha) 0.779

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.260	4	8	0.259	8	12	0.259

Model Details

Storage is Online Cover Level (m) 69.700

Infiltration Basin Structure

Invert Level (m) 68.400 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	450.0	1.000	703.9	1.300	791.1

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0119-6500-1000-6500
Design Head (m)	1.000
Design Flow (l/s)	6.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	119
Invert Level (m)	68.400
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	6.5	Kick-Flo®	0.649	5.3
Flush-Flo™	0.296	6.5	Mean Flow over Head Range	-	5.6

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	4.2	1.200	7.1	3.000	10.9	7.000	16.3
0.200	6.3	1.400	7.6	3.500	11.7	7.500	16.9
0.300	6.5	1.600	8.1	4.000	12.5	8.000	17.4
0.400	6.4	1.800	8.6	4.500	13.2	8.500	17.9
0.500	6.2	2.000	9.0	5.000	13.9	9.000	18.4
0.600	5.8	2.200	9.4	5.500	14.5	9.500	18.9
0.800	5.9	2.400	9.8	6.000	15.2		
1.000	6.5	2.600	10.2	6.500	15.7		

Summary of Results for 200 year Return Period (+38%)

Half Drain Time : 731 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	68.843	0.443	0.0	6.5	6.5	222.4	O K
30 min Summer	68.991	0.591	0.0	6.5	6.5	307.3	O K
60 min Summer	69.131	0.731	0.0	6.5	6.5	393.0	O K
120 min Summer	69.206	0.806	0.0	6.5	6.5	441.1	O K
180 min Summer	69.239	0.839	0.0	6.5	6.5	462.8	O K
240 min Summer	69.256	0.856	0.0	6.5	6.5	473.9	O K
360 min Summer	69.268	0.868	0.0	6.5	6.5	481.6	O K
480 min Summer	69.265	0.865	0.0	6.5	6.5	479.7	O K
600 min Summer	69.255	0.855	0.0	6.5	6.5	473.0	O K
720 min Summer	69.244	0.844	0.0	6.5	6.5	465.6	O K
960 min Summer	69.223	0.823	0.0	6.5	6.5	452.3	O K
1440 min Summer	69.187	0.787	0.0	6.5	6.5	428.6	O K
2160 min Summer	69.138	0.738	0.0	6.5	6.5	397.2	O K
2880 min Summer	69.091	0.691	0.0	6.5	6.5	368.0	O K
4320 min Summer	68.989	0.589	0.0	6.5	6.5	305.9	O K
5760 min Summer	68.899	0.499	0.0	6.5	6.5	253.9	O K
7200 min Summer	68.826	0.426	0.0	6.5	6.5	212.7	O K
8640 min Summer	68.764	0.364	0.0	6.5	6.5	179.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	156.962	0.0	223.7	26
30 min Summer	108.843	0.0	310.6	41
60 min Summer	70.419	0.0	408.4	70
120 min Summer	40.816	0.0	473.5	128
180 min Summer	29.455	0.0	512.6	188
240 min Summer	23.330	0.0	541.3	246
360 min Summer	16.790	0.0	584.3	364
480 min Summer	13.309	0.0	617.4	482
600 min Summer	11.126	0.0	645.0	588
720 min Summer	9.620	0.0	669.0	632
960 min Summer	7.666	0.0	710.1	760
1440 min Summer	5.598	0.0	775.0	1020
2160 min Summer	4.125	0.0	865.4	1440
2880 min Summer	3.343	0.0	935.0	1852
4320 min Summer	2.512	0.0	1053.0	2644
5760 min Summer	2.070	0.0	1159.9	3400
7200 min Summer	1.794	0.0	1256.4	4112
8640 min Summer	1.604	0.0	1347.4	4840

Summary of Results for 200 year Return Period (+38%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
10080 min Summer	68.714	0.314	0.0	6.5	6.5	153.0	O K
15 min Winter	68.892	0.492	0.0	6.5	6.5	249.8	O K
30 min Winter	69.055	0.655	0.0	6.5	6.5	345.6	O K
60 min Winter	69.207	0.807	0.0	6.5	6.5	441.8	O K
120 min Winter	69.292	0.892	0.0	6.5	6.5	497.5	O K
180 min Winter	69.330	0.930	0.0	6.5	6.5	523.5	O K
240 min Winter	69.351	0.951	0.0	6.5	6.5	537.7	O K
360 min Winter	69.368	0.968	0.0	6.5	6.5	549.8	O K
480 min Winter	69.370	0.970	0.0	6.5	6.5	551.1	O K
600 min Winter	69.364	0.964	0.0	6.5	6.5	546.9	O K
720 min Winter	69.353	0.953	0.0	6.5	6.5	539.6	O K
960 min Winter	69.326	0.926	0.0	6.5	6.5	520.7	O K
1440 min Winter	69.280	0.880	0.0	6.5	6.5	490.1	O K
2160 min Winter	69.210	0.810	0.0	6.5	6.5	443.2	O K
2880 min Winter	69.138	0.738	0.0	6.5	6.5	397.1	O K
4320 min Winter	68.967	0.567	0.0	6.5	6.5	293.4	O K
5760 min Winter	68.821	0.421	0.0	6.5	6.5	210.0	O K
7200 min Winter	68.709	0.309	0.0	6.5	6.5	150.2	O K
8640 min Winter	68.632	0.232	0.0	6.4	6.4	110.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Summer	1.465	0.0	1433.9	5544
15 min Winter	156.962	0.0	250.8	26
30 min Winter	108.843	0.0	347.4	40
60 min Winter	70.419	0.0	457.5	70
120 min Winter	40.816	0.0	530.4	126
180 min Winter	29.455	0.0	574.2	184
240 min Winter	23.330	0.0	606.3	242
360 min Winter	16.790	0.0	654.3	356
480 min Winter	13.309	0.0	691.2	470
600 min Winter	11.126	0.0	722.0	580
720 min Winter	9.620	0.0	748.7	686
960 min Winter	7.666	0.0	794.3	800
1440 min Winter	5.598	0.0	864.4	1096
2160 min Winter	4.125	0.0	969.4	1560
2880 min Winter	3.343	0.0	1047.2	2020
4320 min Winter	2.512	0.0	1179.8	2820
5760 min Winter	2.070	0.0	1299.2	3528
7200 min Winter	1.794	0.0	1407.3	4192
8640 min Winter	1.604	0.0	1509.4	4848

Summary of Results for 200 year Return Period (+38%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
10080 min Winter	68.581	0.181	0.0	6.2	6.2	85.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Winter	1.465	0.0	1606.6	5456

Rainfall Details

Rainfall Model	FEH
Return Period (years)	200
FEH Rainfall Version	2013
Site Location	GB 198789 566034 NW 98789 66034
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+38

Time Area Diagram

Total Area (ha) 0.779

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.260	4	8	0.259	8	12	0.259

Model Details

Storage is Online Cover Level (m) 69.700

Infiltration Basin Structure

Invert Level (m) 68.400 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	450.0	1.000	703.9	1.300	791.1

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0119-6500-1000-6500
Design Head (m)	1.000
Design Flow (l/s)	6.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	119
Invert Level (m)	68.400
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	6.5	Kick-Flo®	0.649	5.3
Flush-Flo™	0.296	6.5	Mean Flow over Head Range	-	5.6

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	4.2	1.200	7.1	3.000	10.9	7.000	16.3
0.200	6.3	1.400	7.6	3.500	11.7	7.500	16.9
0.300	6.5	1.600	8.1	4.000	12.5	8.000	17.4
0.400	6.4	1.800	8.6	4.500	13.2	8.500	17.9
0.500	6.2	2.000	9.0	5.000	13.9	9.000	18.4
0.600	5.8	2.200	9.4	5.500	14.5	9.500	18.9
0.800	5.9	2.400	9.8	6.000	15.2		
1.000	6.5	2.600	10.2	6.500	15.7		

APPENDIX K: CORRESPONDENCE WITH DGC

From:	Communities Flooding
To:	Kearsey, Tom
Cc:	Stewart, Liam; Langdon, Elizabeth
Subject:	RE: EXTERNAL: RE: DGC surface water drainage planning inbox
Date:	16 December 2024 11:43:55
Attachments:	image001.jpg image002.png image003.png image004.png image005.jpg

OFFICIAL

Good morning Tom

Thank you for sending the plans. The FRMT would have no objection to these proposals if formally consulted on a future planning application.

Kind regards,

Katia Rajovic (on behalf of)
Flood Risk Management Team

Economy and Infrastructure
Transport and Infrastructure
Dumfries and Galloway Council
Cargen Tower, Garroch Business Centre,
Cargenbridge, Dumfries, DG2 8PN

Tel: 030 33 33 3000
Email: communitiesflooding@dumgal.gov.uk
Web: www.dumgal.gov.uk/flooding

OFFICIAL

From: Kearsey, Tom <TOM.KEARSEY@tetratech.com>
Sent: Monday, December 9, 2024 4:44 PM
To: Communities Flooding <CommunitiesFlooding@dumgal.gov.uk>
Cc: Stewart, Liam <LIAM.STEWART@tetratech.com>; Langdon, Elizabeth <ELIZABETH.LANGDON@tetratech.com>
Subject: RE: EXTERNAL: RE: DGC surface water drainage planning inbox

OFFICIAL

Good evening, Katia.

Thank you for your swift response to my query.

Further to my initial message, please find attached for your consideration, our proposed hardstanding catchment plans, and catchments' surface water layout plans for the site at Mains of Dhuloch.

Kind regards,
Tom.

Tom Kearsey, MSc, BSc | Flood Risk Consultant
Pronouns: he, him, his
Direct **+44 020 7250 7545**

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OFFICIAL

From: Communities Flooding <CommunitiesFlooding@dumgal.gov.uk>
Sent: 09 December 2024 16:00
To: Kearsey, Tom <TOM.KEARSEY@tetratech.com>
Subject: RE: EXTERNAL: RE: DGC surface water drainage planning inbox

OFFICIAL

Good afternoon Tom,

Thanks for your email. The proposal seems acceptable in principle, but for completeness, would you be able to send us a plan showing the location of the barns / detention basins etc, please?

Regards,

Katia Rajovic (on behalf of)
Flood Risk Management Team

Economy and Infrastructure
Transport and Infrastructure
Dumfries and Galloway Council
Cargen Tower, Garroch Business Centre,
Cargenbridge, Dumfries, DG2 8PN

Tel: 030 33 33 3000
Email: communitiesflooding@dumgal.gov.uk
Web: www.dumgal.gov.uk/flooding

OFFICIAL

From: Kearsey, Tom <TOM.KEARSEY@tetratech.com>
Sent: Monday, December 9, 2024 12:08 PM
To: Communities Flooding <CommunitiesFlooding@dumgal.gov.uk>
Subject: EXTERNAL: RE: DGC surface water drainage planning inbox

OFFICIAL

Good afternoon, Euan.

Thanks for getting in touch. Please see the attached enquiry message.

Kind regards,
Tom.

Tom Kearsey, MSc, BSc | Flood Risk Consultant
Pronouns: he, him, his
Direct **+44 020 7250 7545**

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OFFICIAL

From: Communities Flooding <CommunitiesFlooding@dumgal.gov.uk>
Sent: 06 December 2024 12:01
To: Kearsey, Tom <TOM.KEARSEY@tetratech.com>
Subject: DGC surface water drainage planning inbox

OFFICIAL

Good afternoon Tom

I have been forwarded your request for a Contact Email address to allow you to communicate on works.

If you use this shared email group – a member of the team will respond when able.

Kind regards.
Euan

Flood Risk Management Team

Economy and Infrastructure
Transport and Infrastructure
Dumfries and Galloway Council
Cargen Tower, Garroch Business Centre,
Cargenbridge, Dumfries, DG2 8PN

Tel: 030 33 33 3000
Email: communitiesflooding@dumgal.gov.uk
Web: www.dumgal.gov.uk/flooding

DGC Logo

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