

Appendix B – Review of Publicly Available Information (SEPA)

Search Map and Data:

Search

[Quick help](#)

[Full help](#)

[Terms and conditions](#)

Navigation Panel

I'm interested in

Overall status

for:

groundwaters

I would like to see an:

interactive map only

What is the latest condition?

What about previous years?

How can I download all the data?

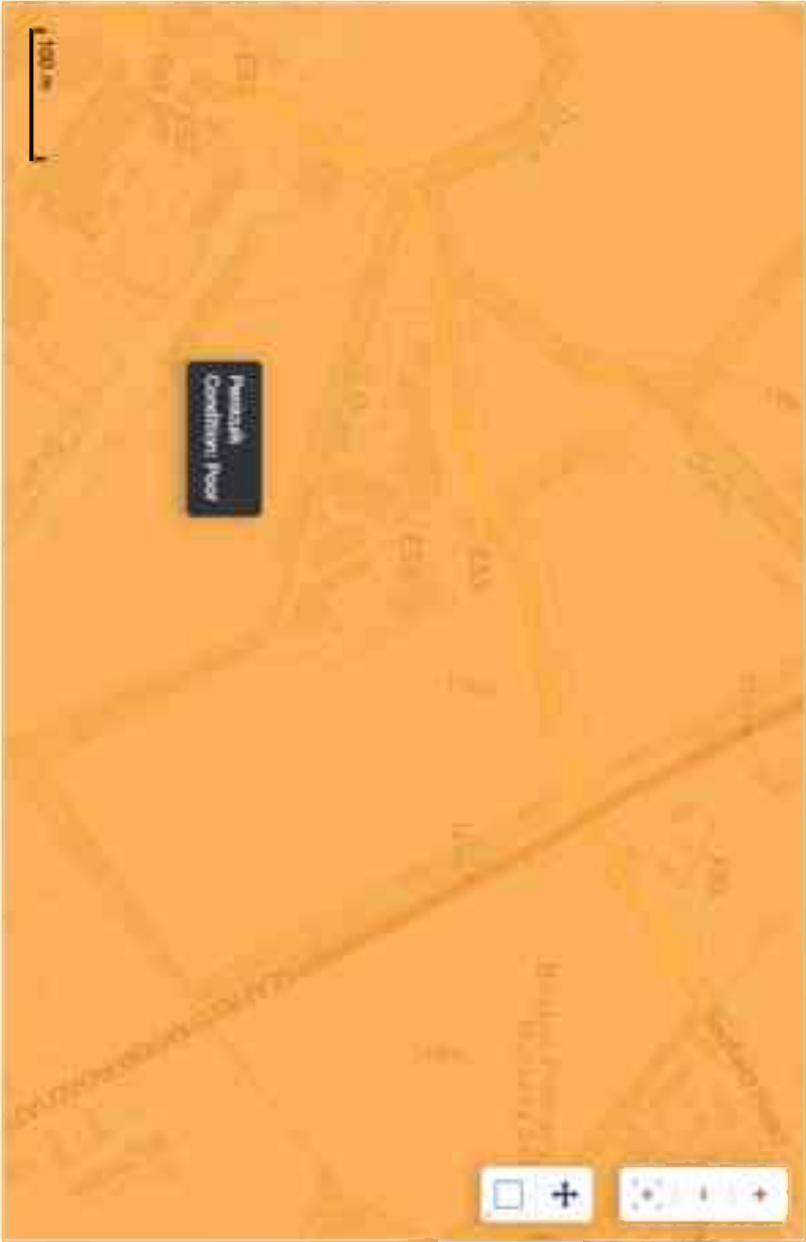
Looking for detailed information on a single water body or protected area? [Click here...](#)

[Clear all filters](#)

Geographical Filters

Additional Filters

Data are displayed for the latest available year: 2018.



Select a water body from the map to view further details here.

ID and Name	Local Authority	Catchment	Category
150563: Penicuik	City of Edinburgh...	Available for	Groundwater

[Click here to view further details...](#)

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(2015).

This map displays bodies of
groundwaters coloured by
overall status for the latest
available year

Condition

Good

Poor

Appendix C – Envirocheck Report (with Historical Ordnance Survey Maps)

Envirocheck[®] Report:

Datasheet

Order Details:

Order Number:

277808321_1_1

Customer Reference:

P21-019 CMcD

National Grid Reference:

325550, 664360

Slice:

A

Site Area (Ha):

11.58

Search Buffer (m):

1000

Site Details:

114, Penicuik Road

ROSLIN

EH25 9NT

Client Details:

Ms P Morton

Mason Evans Partnership

The Piazza

95 Morrison Street

(office side door on Dalenober St)

Glasgow

G5 8BE

Report Section	Page Number
Summary	-
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Waste	24
Hazardous Substances	-
Geological	26
Industrial Land Use	30
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Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination.

For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency/Natural Resources Wales and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.

In this datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

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Report Version v53.0

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
BGS Groundwater Flooding Susceptibility	pg 1	Yes	Yes	Yes	n/a
Contaminated Land Register Entries and Notices					
Discharge Consents	pg 3		2		4
Prosecutions Relating to Controlled Waters			n/a	n/a	n/a
Enforcement and Prohibition Notices					
Integrated Pollution Controls					
Integrated Pollution Prevention And Control					
Local Authority Integrated Pollution Prevention And Control					
Local Authority Pollution Prevention and Controls	pg 4			1	1
Local Authority Pollution Prevention and Control Enforcements					
Nearest Surface Water Feature	pg 5	Yes			
Pollution Incidents to Controlled Waters					
Prosecutions Relating to Authorised Processes					
Registered Radioactive Substances	pg 5			4	4
River Quality					
Substantiated Pollution Incident Register					
Water Abstractions					
Water Industry Act Referrals					
Groundwater Vulnerability	pg 6	Yes	n/a	n/a	n/a
Drift Deposits	pg 6	1	n/a	n/a	n/a
Source Protection Zones					
River Flood Data (Scotland)				n/a	n/a
OS Water Network Lines	pg 6	2	21	44	82
Waste					
BGS Recorded Landfill Sites					
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)					
Licensed Waste Management Facilities (Locations)					
Local Authority Landfill Coverage	pg 24	1	n/a	n/a	n/a
Local Authority Recorded Landfill Sites	pg 24				2
Registered Landfill Sites	pg 24				4
Registered Waste Transfer Sites					
Registered Waste Treatment or Disposal Sites					

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents					
Planning Hazardous Substance Enforcements					
Geological					
BGS 1:625,000 Solid Geology	pg 26	Yes	n/a	n/a	n/a
BGS Recorded Mineral Sites	pg 26				9
CBSCB Compensation District			n/a	n/a	n/a
Coal Mining Affected Areas	pg 27	Yes	n/a	n/a	n/a
Mining Instability	pg 27	Yes	n/a	n/a	n/a
Man-Made Mining Cavities	pg 27				3
Natural Cavities					
Non Coal Mining Areas of Great Britain	pg 28	Yes		n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 28	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards	pg 28	Yes	Yes	n/a	n/a
Potential for Ground Dissolution Stability Hazards				n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 28	Yes		n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 28	Yes	Yes	n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 29	Yes		n/a	n/a
Radon Potential - Radon Affected Areas			n/a	n/a	n/a
Radon Potential - Radon Protection Measures			n/a	n/a	n/a
Industrial Land Use					
Contemporary Trade Directory Entries	pg 30		13	3	15
Fuel Station Entries	pg 32			1	1
Gas Pipelines					

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Sensitive Land Use					
Ancient Woodland	pg 33	1			3
Areas of Adopted Green Belt	pg 33		1		
Areas of Unadopted Green Belt					
Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves					
Marine Nature Reserves					
National Nature Reserves					
National Parks					
National Scenic Areas					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones					
Ramsar Sites					
Sites of Special Scientific Interest	pg 33				1
Special Areas of Conservation					
Special Protection Areas					
World Heritage Sites					

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NE (E)	0	1	325700 664361
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SE (E)	0	1	325650 664400
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SE (E)	0	1	325700 664400
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A8NW (W)	0	1	325350 664300
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A8NE (S)	0	1	325548 664361
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NW (SW)	0	1	325500 664300
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A7NE (W)	157	1	325150 664300
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A7NE (W)	160	1	325150 664361
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A9NW (E)	172	1	325950 664300
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A9NW (E)	187	1	325950 664250
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A7NE (W)	220	1	325100 664200
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A8SW (S)	221	1	325500 663900
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A9NW (SE)	246	1	325950 664150
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A9NW (E)	255	1	326000 664200
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A8SE (S)	271	1	325548 663850
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8SW (S)	271	1	325500 663850
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A8SW (S)	278	1	325450 663850
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NE (N)	289	1	325548 664900
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A7NE (W)	307	1	325000 664361
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A13NW (N)	313	1	325500 664900
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NE (N)	340	1	325550 664950
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A8SW (SW)	345	1	325300 663850

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A12SE (W)	355	1	325000 664450
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A14SW (E)	363	1	326100 664500
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A9NW (E)	371	1	326150 664361
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A8SE (S)	373	1	325550 663750
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A12SE (W)	383	1	325000 664500
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NE (N)	389	1	325600 665000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NE (N)	389	1	325650 665000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NE (N)	390	1	325550 665000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NE (N)	397	1	325548 665000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A13NE (N)	407	1	325750 665000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A7NE (W)	408	1	324900 664250
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NW (N)	408	1	325500 665000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A9NW (E)	420	1	326200 664350
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A13NW (N)	423	1	325450 665000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SE (N)	439	1	325650 665050
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SE (N)	444	1	325700 665050
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A7SE (SW)	446	1	325000 663950
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SE (N)	446	1	325548 665050
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A7SE (SW)	447	1	325200 663800
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12NE (NW)	451	1	325200 664900
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SE (N)	455	1	325750 665050
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8SW (SW)	455	1	325250 663750

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A9SW (SE)	456	1	325900 663850
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A8SE (SE)	461	1	325850 663800
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A18SE (N)	471	1	325800 665050
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A7NW (W)	473	1	324850 664150
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A12NE (NW)	481	1	325100 664850
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12NE (NW)	482	1	325150 664900
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A7SE (SW)	485	1	325200 663750
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SE (N)	490	1	325550 665100
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A7SE (SW)	495	1	325050 663850
1	Discharge Consents Operator: Edmond, P Property Type: Not Supplied Location: Pentland Grove House Seafield By Roslin Authority: Scottish Environment Protection Agency, East Region Catchment Area: Not Supplied Reference: Wpc/E/1390 Permit Version: 1 Effective Date: Not Supplied Issued Date: 7th May 1975 Revocation Date: Not Supplied Discharge Type: Septic tank Discharge: Not Supplied Environment: Not Supplied Receiving Water: Not Supplied Status: Not Supplied Positional Accuracy: Located by supplier to within 100m	A13NW (N)	217	2	325500 664800
1	Discharge Consents Operator: Ferguson, G S Property Type: Not Supplied Location: Coach House Pentland Grove House Seafield By Roslin Authority: Scottish Environment Protection Agency, East Region Catchment Area: Not Supplied Reference: Wpc/E/1379 Permit Version: 1 Effective Date: Not Supplied Issued Date: 23rd April 1973 Revocation Date: Not Supplied Discharge Type: Septic tank Discharge: Not Supplied Environment: Not Supplied Receiving Water: Not Supplied Status: Not Supplied Positional Accuracy: Located by supplier to within 100m	A13NW (N)	246	2	325500 664830

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
2	Discharge Consents Operator: Esw Property Type: Not Supplied Location: Bilston Authority: Scottish Environment Protection Agency, East Region Catchment Area: Not Supplied Reference: Wpc/E/806 Permit Version: 1 Effective Date: Not Supplied Issued Date: 29th September 1967 Revocation Date: Not Supplied Discharge Type: Storm Water Overflow Discharge: Not Supplied Environment: Receiving Water: Not Supplied Status: Not Supplied Positional Accuracy: Located by supplier to within 100m	A14SE (E)	721	2	326400 664700
3	Discharge Consents Operator: Blyth & Blyth Assoc. Property Type: Not Supplied Location: Pentlands Science Park International Research Centre, Bush Estate Penicuik Authority: Scottish Environment Protection Agency, East Region Catchment Area: Esk Reference: Wpc/E/7181 Permit Version: 1 Effective Date: Not Supplied Issued Date: 21st March 1996 Revocation Date: Not Supplied Discharge Type: Surface Water/Others (BMP Industrial) Discharge: Not Supplied Environment: Receiving Water: Not Supplied Status: Not Supplied Positional Accuracy: Located by supplier to within 100m	A3SW (S)	903	2	325240 663260
4	Discharge Consents Operator: Black, Dr W J M Property Type: Not Supplied Location: Langhill Farm Roslin Midlothian Authority: Scottish Environment Protection Agency, East Region Catchment Area: Esk Reference: Wpc/E/3915 Permit Version: 1 Effective Date: Not Supplied Issued Date: 16th February 1982 Revocation Date: Not Supplied Discharge Type: Non Water Company (Private) Sewage: Septic Tank Discharge: Not Supplied Environment: Receiving Water: Not Supplied Status: Not Supplied Positional Accuracy: Located by supplier to within 100m	A15NW (NE)	914	2	326570 664790
5	Discharge Consents Operator: Russell, W Property Type: Not Supplied Location: Pentland Mains Cottage Nivensknowe Midlothian Authority: Scottish Environment Protection Agency, East Region Catchment Area: Not Supplied Reference: Wpc/E/1423 Permit Version: 1 Effective Date: Not Supplied Issued Date: 22nd April 1974 Revocation Date: Not Supplied Discharge Type: Septic tank Discharge: Not Supplied Environment: Receiving Water: Not Supplied Status: Not Supplied Positional Accuracy: Located by supplier to within 100m	A19NW (NE)	934	2	326130 665400
6	Local Authority Pollution Prevention and Controls Name: Sac Location: Seafeld Mill, Bilston, Roslin, Midlothian, EH25 9RQ Authority: Scottish Environment Protection Agency, East Region Permit Reference: Apc/E/20182 Dated: 23rd September 1998 Process Type: Air Pollution Controls (Part B Processes) Description: Other Industries: Treatment & Processing of Animal or Vegetable Matter Status: Not Supplied Positional Accuracy: Automatically positioned to the address	A13NW (N)	292	2	325415 664843

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
7	Local Authority Pollution Prevention and Controls Name: Moredun Research Foundation Location: Moredun Research Institute, Pentlands Science Park, Bush Estate, Penicuik Authority: Scottish Environment Protection Agency, East Region Permit Reference: Apc/E/0000159 Dated: 1st June 1995 Process Type: Local Authority Air Pollution Control Description: Not Supplied Status: Not Supplied Positional Accuracy: Manually positioned to the address or location	A3SW (S)	832	2	325285 663321
	Nearest Surface Water Feature	A8NE (S)	0	-	325568 664167
8	Registered Radioactive Substances Name: University Of Edinburgh Location: The Faculty Of Veterinary Med., Veterinary Field Station, Easter Bush, ROSLIN, Midlothian, EH25 9RG Authority: Scottish Environment Protection Agency, East Region Permit Reference: IPB/3/5/3/040 Dated: 16th July 1996 Process Type: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1) Description: Registration under S7 RSA of 1 or more open sources Status: Not Given Positional Accuracy: Unknown	A7NE (W)	283	2	325025 664295
8	Registered Radioactive Substances Name: University Of Edinburgh Location: The Faculty Of Veterinary Med., Veterinary Field Station, Easter Bush, ROSLIN, Midlothian, EH25 9RG Authority: Scottish Environment Protection Agency, Head Office Permit Reference: IPB/3/5/3/040 Dated: 30th January 1996 Process Type: Authorisation under S13 or S14 RSA for the accumulation or disposal of Radioactive waste (was RSA60 S6/S7) Description: Authorisation under RSA Status: Not Given Positional Accuracy: Unknown	A7NE (W)	284	3	325025 664300
8	Registered Radioactive Substances Name: University Of Edinburgh Location: The Faculty Of Veterinary Med., Veterinary Field Station, Easter Bush, ROSLIN, Midlothian, EH25 9RG Authority: Scottish Environment Protection Agency, East Region Permit Reference: IPB/3/5/3/040 Dated: 30th January 1996 Process Type: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1) Description: Registration under S7 RSA of 1 or more open sources Status: Not Given Positional Accuracy: Unknown	A7NE (W)	288	2	325020 664295
8	Registered Radioactive Substances Name: University Of Edinburgh Location: The Faculty Of Veterinary Med., Veterinary Field Station, Easter Bush, ROSLIN, Midlothian, EH25 9RG Authority: Scottish Environment Protection Agency, East Region Permit Reference: IPB/3/5/3/040 Dated: 1st July 1996 Process Type: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1) Description: Registration under S7 RSA for 1 or more closed sources Status: Not Given Positional Accuracy: Unknown	A7NE (W)	289	2	325020 664300
9	Registered Radioactive Substances Name: Macaulay Land Use Research Inst Location: Bush Estate, Penicuik, ROSLIN, Midlothian, EH25 9SY Authority: Scottish Environment Protection Agency, Head Office Permit Reference: IPB/3/7/LC/006 Dated: 29th January 1985 Process Type: Authorisation under S13 or S14 of RSA 93 to accumulate or dispose of radioactive waste Description: Process under S13 or S14 of RSA 93 Status: Application has been authorised and any conditions apply to the operator Positional Accuracy: Unknown	A7SE (SW)	501	3	324897 663985

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
10	Registered Radioactive Substances Name: Macaulay Land Use Research Inst Location: Bush Estate, PENICUIK, Midlothian, EH26 0NX Authority: Scottish Environment Protection Agency, Head Office Permit Reference: IPB/3/7/LC/006 Dated: 25th October 1988 Process Type: Registration under S7 of RSA to keep or accumulate radioactive material Description: Use of one or more open source(s) Status: Application has been authorised and any conditions apply to the operator Positional Accuracy: Unknown	A3NE (S)	717	3	325740 663440
11	Registered Radioactive Substances Name: Institute Of Terrestrial Ecology Location: Bush Estate, PENICUIK, Midlothian, EH26 0QB Authority: Scottish Environment Protection Agency, East Region Permit Reference: IPB/3/7/LC/008 Dated: 24th April 1984 Process Type: Authorisation under S13 or S14 RSA for the accumulation or disposal of Radioactive waste (was RSA60 S6/S7) Description: Authorisation under RSA Status: Not Given Positional Accuracy: Unknown	A7SW (SW)	856	2	324585 663813
11	Registered Radioactive Substances Name: Institute Of Terrestrial Ecology Location: Bush Estate, PENICUIK, Midlothian, EH26 0QB Authority: Scottish Environment Protection Agency, Head Office Permit Reference: IPB/3/7/LC/008 Dated: 23rd June 1989 Process Type: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1) Description: Registration under S7 RSA of 1 or more open sources Status: Not Given Positional Accuracy: Unknown	A7SW (SW)	859	3	324585 663808
	Groundwater Vulnerability Geological Classification: Minor or Moderately Permeable Aquifer - Fractured or potentially fractured rocks which do not have a high primary permeability or other formations of variable permeability Soil Classification: Not classified Map Sheet: Map of Scotland Scale: 1:625,000	A8NE (S)	0	3	325548 664361
	Drift Deposits Drift Deposit: Low permeability drift deposits which include till, head, peat, lacustrine deposits, clay-with-flints and brick earths Map Sheet: Map of Scotland Scale: 1:625,000	A8NE (S)	0	3	325548 664361
	River Flood Data (Scotland) None				
12	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 100.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A8NE (S)	0	4	325578 664176
13	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 583.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A8NW (SW)	0	4	325506 664343
14	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 270.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A8NE (SE)	1	4	325633 664218

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
15	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 12.9 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A8NE (E)	4	4	325782 664325
16	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 312.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A8NE (E)	13	4	325792 664333
17	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 0.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A8NW (S)	16	4	325505 664109
18	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 48.6 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A8NW (S)	16	4	325465 664137
19	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 14.9 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A8NW (S)	17	4	325504 664108
20	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 81.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A8NW (SW)	18	4	325413 664175
21	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 93.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A8NW (SW)	19	4	325393 664189
22	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 6.8 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A8NW (SW)	23	4	325399 664185
23	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 150.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A8NW (S)	31	4	325493 664098

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
24	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 131.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Bilston Burn Catchment Name: River Esk (Lothian) Primacy: 1	A13NE (NE)	109	4	325691 664704
25	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 7.2 Watercourse Level: Underground Permanent: True Watercourse Name: Bilston Burn Catchment Name: River Esk (Lothian) Primacy: 1	A13NE (NE)	111	4	325691 664704
26	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 10.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Bilston Burn Catchment Name: River Esk (Lothian) Primacy: 1	A13SE (NE)	112	4	325697 664701
27	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 82.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Bilston Burn Catchment Name: River Esk (Lothian) Primacy: 1	A13SE (NE)	120	4	325708 664703
28	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 56.6 Watercourse Level: Underground Permanent: True Watercourse Name: Bilston Burn Catchment Name: River Esk (Lothian) Primacy: 1	A13NE (N)	162	4	325577 664766
29	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 9.7 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A8SW (SW)	178	4	325379 664000
30	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 168.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A8SW (SW)	188	4	325372 663994
31	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 103.0 Watercourse Level: Underground Permanent: True Watercourse Name: Bilston Burn Catchment Name: River Esk (Lothian) Primacy: 1	A13NE (NE)	193	4	325777 664735
32	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 47.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Bilston Burn Catchment Name: River Esk (Lothian) Primacy: 1	A13NW (N)	211	4	325535 664804

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
33	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 184.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A13SW (NW)	225	4	325307 664696
34	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 87.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A13NW (N)	246	4	325421 664794
35	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 21.9 Watercourse Level: Underground Permanent: True Watercourse Name: Bilston Burn Catchment Name: River Esk (Lothian) Primacy: 1	A13NW (N)	254	4	325504 664839
36	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 17.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Boghall Burn Catchment Name: River Esk (Lothian) Primacy: 1	A13NW (N)	271	4	325487 664853
37	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 13.6 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A12SE (W)	273	4	325151 664501
38	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 325.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A12SE (W)	286	4	325141 664511
39	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 6.9 Watercourse Level: Underground Permanent: True Watercourse Name: Boghall Burn Catchment Name: River Esk (Lothian) Primacy: 1	A13NW (N)	288	4	325476 664867
40	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 97.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Bilston Burn Catchment Name: River Esk (Lothian) Primacy: 1	A13NE (NE)	289	4	325875 664764
41	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 241.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Boghall Burn Catchment Name: River Esk (Lothian) Primacy: 1	A13NW (N)	294	4	325471 664871

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
42	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 17.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A14SW (E)	296	4	326013 664524
43	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 125.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A14SW (E)	312	4	326029 664528
44	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 31.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A8SW (SW)	353	4	325247 663883
45	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 49.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A8SW (SW)	353	4	325247 663883
46	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 12.5 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	367	4	325202 663902
47	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 416.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Kill Burn Catchment Name: River Esk (Lothian) Primacy: 1	A8SE (SE)	370	4	325865 663931
48	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 152.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	372	4	325144 663928
49	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 13.9 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A8SW (SW)	374	4	325249 663853
50	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 7.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	378	4	325191 663897

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
51	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 208.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	382	4	325065 663977
52	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 249.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Bilston Burn Catchment Name: River Esk (Lothian) Primacy: 1	A14NW (NE)	383	4	325963 664800
53	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 115.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A8SW (S)	383	4	325519 663738
54	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 25.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	384	4	325184 663894
55	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 176.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A8SW (SW)	386	4	325248 663839
56	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 243.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Boghall Burn Catchment Name: River Esk (Lothian) Primacy: 1	A13NW (NW)	386	4	325255 664858
57	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 39.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	405	4	325162 663883
58	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 16.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	405	4	325162 663883
59	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 70.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	407	4	325117 663906

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
60	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 147.6 Watercourse Level: Underground Permanent: True Watercourse Name: Kill Burn Catchment Name: River Esk (Lothian) Primacy: 1	A9SW (SE)	409	4	325965 663958
61	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 38.0 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A14SW (NE)	417	4	326111 664598
62	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 63.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	418	4	325146 663879
63	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 61.8 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7NE (W)	427	4	324911 664115
64	OS Water Network Lines Watercourse Form: Lake Watercourse Length: 22.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A8SE (S)	429	4	325629 663708
65	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 65.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	442	4	325133 663858
66	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 42.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	442	4	325133 663858
67	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 31.7 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A8SE (S)	443	4	325650 663699
68	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 4.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A14SW (NE)	455	4	326146 664612

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
69	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 21.3 Watercourse Level: Underground Permanent: True Watercourse Name: Bilston Burn Catchment Name: River Esk (Lothian) Primacy: 1	A14SW (NE)	456	4	326121 664662
70	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 34.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Bilston Burn Catchment Name: River Esk (Lothian) Primacy: 1	A14SW (NE)	458	4	326133 664644
71	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 228.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Bilston Burn Catchment Name: River Esk (Lothian) Primacy: 1	A14SW (NE)	460	4	326150 664614
72	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 13.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7NE (SW)	463	4	324888 664076
73	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 25.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7NE (SW)	463	4	324888 664076
74	OS Water Network Lines Watercourse Form: Lake Watercourse Length: 14.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3NE (S)	466	4	325678 663685
75	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 79.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3NE (S)	472	4	325692 663684
76	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 180.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7NE (SW)	472	4	324884 664063
77	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 23.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	482	4	325100 663832

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
78	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 25.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	482	4	325100 663832
79	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 325.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Kill Burn Catchment Name: River Esk (Lothian) Primacy: 1	A9SW (SE)	505	4	326112 663948
80	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 6.4 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	505	4	325114 663795
81	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 6.4 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	505	4	325091 663811
82	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 4.0 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	506	4	325079 663817
83	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 60.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	510	4	325076 663815
84	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 65.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	511	4	325112 663789
85	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 82.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	511	4	325088 663805
86	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 458.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A12NE (NW)	526	4	325062 664874

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
87	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 103.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Boghall Burn Catchment Name: River Esk (Lothian) Primacy: 1	A12NE (NW)	526	4	325002 664799
88	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 263.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Boghall Burn Catchment Name: River Esk (Lothian) Primacy: 1	A12NE (NW)	529	4	325000 664792
89	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 3.9 Watercourse Level: Underground Permanent: True Watercourse Name: Boghall Burn Catchment Name: River Esk (Lothian) Primacy: 1	A12NE (NW)	530	4	325001 664795
90	OS Water Network Lines Watercourse Form: Lake Watercourse Length: 44.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3NE (S)	544	4	325775 663644
91	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 11.5 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3NE (S)	544	4	325775 663644
92	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 71.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3NW (SW)	544	4	325214 663668
93	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 2.4 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3NE (S)	546	4	325740 663624
94	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 2.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3NE (S)	548	4	325741 663622
95	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 52.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Kill Burn Catchment Name: River Esk (Lothian) Primacy: 1	A3NE (S)	550	4	325786 663643

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
96	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 23.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A2NE (SW)	558	4	325194 663664
97	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 93.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Edinburgh Coastal Primacy: 1	A18SW (N)	559	4	325402 665127
98	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 17.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	560	4	325144 663699
99	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 9.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	560	4	325144 663699
100	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 39.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	562	4	325150 663692
101	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 13.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 2	A2NE (SW)	562	4	325164 663680
102	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 19.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	562	4	325150 663692
103	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 75.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	565	4	325027 663781
104	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 38.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 2	A7SE (SW)	565	4	325027 663781

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
105	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 18.1 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	570	4	324964 663817
106	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 35.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	573	4	324948 663826
107	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 3.6 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	576	4	325080 663732
108	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 85.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A2NE (SW)	577	4	325130 663688
109	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 83.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A2NE (SW)	577	4	325130 663688
110	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 9.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	579	4	325079 663728
111	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 125.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3NW (S)	585	4	325500 663536
112	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 96.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SE (SW)	589	4	325039 663745
113	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 37.0 Watercourse Level: Underground Permanent: True Watercourse Name: Kill Burn Catchment Name: River Esk (Lothian) Primacy: 1	A3NE (S)	590	4	325777 663592

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
114	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 202.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Kill Burn Catchment Name: River Esk (Lothian) Primacy: 1	A3NE (S)	603	4	325750 663566
115	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 88.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Boghall Burn Catchment Name: River Esk (Lothian) Primacy: 1	A12SW (W)	625	4	324802 664640
116	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 3.3 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Edinburgh Coastal Primacy: 1	A18SW (N)	630	4	325438 665214
117	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 26.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Edinburgh Coastal Primacy: 1	A18SW (N)	633	4	325440 665217
118	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 100.4 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Edinburgh Coastal Primacy: 1	A18SW (N)	654	4	325450 665241
119	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 79.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Kill Burn Catchment Name: River Esk (Lothian) Primacy: 1	A3NE (S)	670	4	325590 663455
120	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 26.9 Watercourse Level: Underground Permanent: True Watercourse Name: Bilston Burn Catchment Name: River Esk (Lothian) Primacy: 1	A14SE (NE)	683	4	326356 664701
121	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 269.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Bilston Burn Catchment Name: River Esk (Lothian) Primacy: 1	A14SE (E)	697	4	326379 664687
122	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 430.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Boghall Burn Catchment Name: River Esk (Lothian) Primacy: 1	A12SW (W)	701	4	324723 664658

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
123	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 297.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A12SW (W)	701	4	324723 664658
124	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 24.0 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3NW (S)	727	4	325532 663394
125	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 3.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3NW (S)	727	4	325540 663394
126	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 7.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3NW (S)	727	4	325532 663394
127	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 19.2 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3NW (S)	730	4	325537 663391
128	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 528.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Edinburgh Coastal Primacy: 1	A18SW (N)	736	4	325488 665334
129	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 52.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3NW (S)	740	4	325512 663381
130	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 13.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3NW (S)	749	4	325541 663372
131	OS Water Network Lines Watercourse Form: Lake Watercourse Length: 63.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SW (SW)	750	4	324809 663711

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
132	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 75.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Kill Burn Catchment Name: River Esk (Lothian) Primacy: 1	A9SE (SE)	755	4	326299 663780
133	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 39.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A7SW (SW)	755	4	324814 663701
134	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 145.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A2NE (S)	756	4	325199 663433
135	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 74.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3NE (S)	762	4	325546 663360
136	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 52.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3NE (S)	762	4	325546 663360
137	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 20.2 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3SW (S)	782	4	325481 663340
138	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 271.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A2NW (SW)	787	4	324810 663663
139	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 10.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3SW (S)	801	4	325472 663321
140	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 235.8 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A19SE (NE)	806	4	326238 665140

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
141	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 16.7 Watercourse Level: Underground Permanent: True Watercourse Name: Kill Burn Catchment Name: River Esk (Lothian) Primacy: 1	A9SE (SE)	809	4	326374 663780
142	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 81.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3SW (S)	811	4	325470 663311
143	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 119.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3SW (S)	811	4	325470 663311
144	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 274.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A19SE (NE)	819	4	326249 665147
145	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 291.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Kill Burn Catchment Name: River Esk (Lothian) Primacy: 1	A9SE (SE)	822	4	326391 663779
146	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 7.5 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3SW (S)	828	4	325519 663292
147	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 139.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3SW (S)	836	4	325516 663285
148	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 4.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3SW (S)	867	4	325356 663268
149	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 18.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A3SW (S)	868	4	325360 663267

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
150	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 6.5 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A11SE (W)	868	4	324476 664521
151	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 231.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A11SE (W)	871	4	324471 664516
152	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 19.6 Watercourse Level: Underground Permanent: True Watercourse Name: Bilston Burn Catchment Name: River Esk (Lothian) Primacy: 1	A14NE (NE)	901	4	326552 664799
153	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 414.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Bilston Burn Catchment Name: River Esk (Lothian) Primacy: 1	A15NW (NE)	912	4	326569 664789
154	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 71.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A19SE (NE)	949	4	326445 665095
155	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 255.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Kill Burn Catchment Name: River Esk (Lothian) Primacy: 1	A10SW (SE)	975	4	326646 663879
156	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 6.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A19SE (NE)	991	4	326511 665070
157	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 3.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A19SE (NE)	991	4	326511 665070
158	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 12.2 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A19SE (NE)	994	4	326512 665073

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
159	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 27.0 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A19SE (NE)	995	4	326517 665067
160	OS Water Network Lines Watercourse Form: Lake Watercourse Length: 23.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: River Esk (Lothian) Primacy: 1	A19SE (NE)	999	4	326511 665085

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Local Authority Landfill Coverage Name: Midlothian Council - Has supplied landfill data		0	5	325548 664361
161	Local Authority Recorded Landfill Sites Location: Pentland Mains (Wimpey) Reference: Not Supplied Authority: Midlothian Council, Waste Management Department Last Reported Status: Closed Types of Waste: Industrial And Commercial Date of Closure: 31/12/1992 Positional Accuracy: Positioned by the supplier Boundary Quality: Good	A18SE (N)	625	5	325732 665228
162	Local Authority Recorded Landfill Sites Location: Pentland Mains (Council) Reference: Not Supplied Authority: Midlothian Council, Waste Management Department Last Reported Status: Closed Types of Waste: Domestic Date of Closure: 31/12/1980 Positional Accuracy: Positioned by the supplier Boundary Quality: Good	A18SE (N)	729	5	325856 665304
163	Registered Landfill Sites Licence Holder: Lothian Recycling 1996 Ltd Licence Reference: WML/E/20175 Site Location: Pentland Mains No 2 Landfill, Loanhead, Midlothian Licence Easting: Not Supplied Licence Northing: Not Supplied Operator Location: Cousland Limeworks, Cousland, DALKEITH, Midlothian, EH22 2PJ Authority: Scottish Environment Protection Agency, East Region Site Category: Landfill - with treatment Max Input Rate: Medium (Equal to or greater than 25,000 and less than 75,000 tonnes per year) Waste Source: No known restriction on source of waste Restrictions: Status: Site Closed Dated: 2nd March 2000 Preceded By: Not Given Licence: Superseded By: Not Given Licence: Positional Accuracy: Positioned by the supplier Boundary Accuracy: Moderate Authorised Waste Excavated Road Metal Glass, China, Enamels, Ceramics, Mica, Abrasives Hardcore, Brickwork, Stone, Concrete, Plaster (Not Plasterboard) Inert Materials (As In Post'98 E.A.Lics And Equivalent To 21.00.00) - Comprising Maximum Waste Permitted By Licence Sub/Topsoil, Clay, Sand, Gravel, Hassock, Blaes, Silica (Not Fine Powder) Prohibited Waste Contaminated Soils Liquid/Slurry/Sludge Wastes Other Waste/Waste Not Otherwise Specified Special Waste (As In Epa 1990:S62 Of 1996 Regs) Waste Contam. With Pcb's/Pc's Waste With > 50 Mg/Kg Pcb's/pc's (All Analogues)	A18SE (N)	529	2	325765 665122

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
164	Registered Landfill Sites Licence Holder: Lothian Recycling 1996 Ltd Licence Reference: WML/E/20145 Site Location: Pentland Mains, Loanhead, Midlothian Licence Easting: Not Supplied Licence Northing: Not Supplied Operator Location: Cousland Limeworks, Cousland, DALKEITH, Midlothian, EH22 2PJ Authority: Scottish Environment Protection Agency, East Region Site Category: Landfill Max Input Rate: Medium (Equal to or greater than 25,000 and less than 75,000 tonnes per year) Waste Source: No known restriction on source of waste Restrictions: Status: Site Closed Dated: 17th November 1997 Preceded By: Not Given Licence: Superseded By: Not Given Licence: Positional Accuracy: Positioned by the supplier Boundary Accuracy: Moderate Authorised Waste: Max.Waste Permitted By Licence Sepa East Cat. A 'Inert' Prohibited Waste: Liquid Wastes List I Substances In Eec Dir. 80/68 Poisonous, Noxious, Polluting Wastes Sludge Wastes Spec.Waste (Epa'90:S62/1996 Regs) Waste N.O.S.	A18SE (N)	610	2	325878 665169
165	Registered Landfill Sites Licence Holder: Wimpey Construction (Uk) Ltd Licence Reference: 8 Site Location: Pentland Mains Farm, Loanhead, Midlothian Licence Easting: 325750 Licence Northing: 665400 Operator Location: Barnton Grove, Edinburgh, Lothian, Eh4 6bt Authority: Scottish Environment Protection Agency, East Region Site Category: Landfill Max Input Rate: Very Small (Less than 10,000 tonnes per year) Waste Source: No known restriction on source of waste Restrictions: Status: Licence lapsed/cancelled/defunct/not applicable/surrenderedCancelled Dated: 1st September 1981 Preceded By: Not Given Licence: Superseded By: Not Given Licence: Positional Accuracy: Manually positioned to the address or location Boundary Accuracy: Not Applicable Authorised Waste: Excavated Material Inert Builders Waste Prohibited Waste: Liquid Wastes Toxic Wastes	A18NE (N)	798	2	325750 665400
166	Registered Landfill Sites Licence Holder: Midlothian Council Licence Reference: WML/E/ 101 Site Location: Pentland Mains Landfill, Rosewell, Roslin, Midlothian Licence Easting: 325900 Licence Northing: 665400 Operator Location: 14 Lothian Street, BONNYRIGG, Midlothian, EH19 3AN Authority: Scottish Environment Protection Agency, East Region Site Category: Landfill Max Input Rate: Undefined Waste Source: No known restriction on source of waste Restrictions: Status: Record supersededSuperseded Dated: 1st October 1979 Preceded By: Not Given Licence: Superseded By: Not Given Licence: Positional Accuracy: Manually positioned to the address or location Boundary Accuracy: Not Applicable Authorised Waste: Local Authority Collected Waste	A19NW (N)	834	2	325900 665400

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid Geology Description: Strathclyde Group	A8NE (S)	0	1	325548 664361
167	BGS Recorded Mineral Sites Site Name: Bilston Sand Pit Location: Bilston, Penicuik, Midlothian Source: British Geological Survey, National Geoscience Information Service Reference: 62623 Type: Opencast Status: Ceased Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Quaternary Geology: Glaciofluvial Sheet Deposits Commodity: Sand Positional Accuracy: Located by supplier to within 10m	A9NE (E)	558	1	326300 664125
168	BGS Recorded Mineral Sites Site Name: Pentland Mains Sand Pit Location: Bilston, Penicuik, Midlothian Source: British Geological Survey, National Geoscience Information Service Reference: 62620 Type: Opencast Status: Ceased Operator: John & James Lawrence Ltd. Operator Location: Not Supplied Periodic Type: Quaternary Geology: Glaciofluvial Sheet Deposits Commodity: Sand Positional Accuracy: Located by supplier to within 10m	A18SE (N)	715	1	325780 665310
169	BGS Recorded Mineral Sites Site Name: Pentland Mains Sand Pit Location: Bilston, Penicuik, Midlothian Source: British Geological Survey, National Geoscience Information Service Reference: 62621 Type: Opencast Status: Ceased Operator: John & James Lawrence Ltd. Operator Location: Not Supplied Periodic Type: Quaternary Geology: Glaciofluvial Sheet Deposits Commodity: Sand Positional Accuracy: Located by supplier to within 10m	A18SE (N)	761	1	325690 665370
170	BGS Recorded Mineral Sites Site Name: Old Bilston Sand Pit Location: Bilston, Penicuik, Midlothian Source: British Geological Survey, National Geoscience Information Service Reference: 62624 Type: Opencast Status: Ceased Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Quaternary Geology: Glaciofluvial Sheet Deposits Commodity: Sand Positional Accuracy: Located by supplier to within 10m	A9NE (E)	771	1	326515 664095
171	BGS Recorded Mineral Sites Site Name: Pentland Mains Sand Pit Location: Bilston, Penicuik, Midlothian Source: British Geological Survey, National Geoscience Information Service Reference: 62619 Type: Opencast Status: Ceased Operator: John & James Lawrence Ltd. Operator Location: Not Supplied Periodic Type: Quaternary Geology: Glaciofluvial Sheet Deposits Commodity: Sand Positional Accuracy: Located by supplier to within 10m	A19NW (N)	861	1	325925 665420

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
172	BGS Recorded Mineral Sites Site Name: Loanhead Pit Location: Loanhead, Midlothian Source: British Geological Survey, National Geoscience Information Service Reference: 231638 Type: Underground Status: Ceased Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Hopetoun Member Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A15NW (E)	958	1	326618 664794
173	BGS Recorded Mineral Sites Site Name: Roslin Colliery Location: Roslin, Midlothian Source: British Geological Survey, National Geoscience Information Service Reference: 18777 Type: Underground Status: Ceased Operator: Individual's Name Withheld Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Limestone Coal Formation Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A4NE (SE)	961	1	326310 663525
173	BGS Recorded Mineral Sites Site Name: Roslin Colliery Location: Roslin, Midlothian Source: British Geological Survey, National Geoscience Information Service Reference: 18777 Type: Underground Status: Ceased Operator: Individual's Name Withheld Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Lower Limestone Formation Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A4NE (SE)	961	1	326310 663525
174	BGS Recorded Mineral Sites Site Name: Langhill Sand Pit Location: Bilston, Penicuik, Midlothian Source: British Geological Survey, National Geoscience Information Service Reference: 62622 Type: Opencast Status: Ceased Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Quaternary Geology: Glaciofluvial Sheet Deposits Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A10NW (E)	993	1	326730 664040
	Coal Mining Affected Areas Description: In an area which may be affected by coal mining activity. It is recommended that a coal mining report is obtained from the Coal Authority. Contact details are included in the Useful Contacts section of this report.	A8NE (S)	0	6	325548 664361
	Mining Instability Mining Evidence: Conclusive Rock Mining Source: Ove Arup & Partners Boundary Quality: As Supplied	A13SE (N)	0	-	325548 664500
	Man-Made Mining Cavities Easting: 325000 Northing: 665400 Distance: 982 Quadrant Reference: A17 Quadrant Reference: NE Bearing Ref: NW Cavity Type: Not supplied Commodity: Oil Solid Geology Detail: No Details Superficial Geology: No Details Detail:	A17NE (NW)	982	7	325000 665400

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Man-Made Mining Cavities Easting: 326200 Northing: 663400 Distance: 992 Quadrant Reference: A4 Quadrant Reference: NW Bearing Ref: SE Cavity Type: Not supplied Commodity: Fireclay Solid Geology Detail: No Details Superficial Geology No Details Detail:	A4NW (SE)	992	7	326200 663400
	Man-Made Mining Cavities Easting: 326200 Northing: 663400 Distance: 992 Quadrant Reference: A4 Quadrant Reference: NW Bearing Ref: SE Cavity Type: Not supplied Commodity: Fireclay Solid Geology Detail: No Details Superficial Geology No Details Detail:	A4NW (SE)	992	7	326200 663400
	Non Coal Mining Areas of Great Britain Risk: Highly Unlikely Source: British Geological Survey, National Geoscience Information Service	A8NE (S)	0	1	325548 664361
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A8NE (S)	0	1	325548 664361
	Potential for Collapsible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A8NE (SE)	0	1	325606 664276
	Potential for Collapsible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SE (N)	81	1	325646 664691
	Potential for Collapsible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	235	1	325216 664514
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A8NE (S)	0	1	325548 664361
	Potential for Compressible Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A8NE (SE)	0	1	325606 664276
	Potential for Compressible Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A13SE (N)	81	1	325646 664691
	Potential for Compressible Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	235	1	325216 664514
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A8NE (S)	0	1	325548 664361
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A8NE (S)	0	1	325548 664361
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A8NE (S)	0	1	325548 664361
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A8NE (SE)	0	1	325606 664276
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13SE (N)	81	1	325646 664691

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	235	1	325216 664514
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A8NE (S)	0	1	325548 664361
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A14SW (E)	166	1	325940 664372
	Radon Potential - Radon Affected Areas Affected Area: The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level). Source: British Geological Survey, National Geoscience Information Service	A8NE (S)	0	1	325548 664361
	Radon Potential - Radon Protection Measures Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A8NE (S)	0	1	325548 664361

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
175	Contemporary Trade Directory Entries Name: Arrayjet Ltd Location: Midlothian Innovation Centre, Roslin, EH25 9RE Classification: Laboratories Status: Active Positional Accuracy: Automatically positioned to the address	A13SW (NW)	16	-	325458 664502
176	Contemporary Trade Directory Entries Name: Glenallan Print Location: Unit D2 Midlothian Innovation Centre Pentland Field, Roslin, Midlothian, EH25 9RE Classification: Printers Status: Inactive Positional Accuracy: Manually positioned to the address or location	A13SW (NW)	24	-	325470 664412
176	Contemporary Trade Directory Entries Name: Mercury Solutions Location: Unit D2, Pentlandfield Business Park, Roslin, Midlothian, EH25 9RE Classification: Distribution Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A13SW (NW)	25	-	325469 664413
176	Contemporary Trade Directory Entries Name: A V G Ryo Tek Location: Pentlandfield Business Park, Roslin, Midlothian, EH25 9RE Classification: Printers Status: Inactive Positional Accuracy: Automatically positioned to the address	A13SW (NW)	25	-	325469 664413
176	Contemporary Trade Directory Entries Name: Mercury Solutions (Scotland) Ltd Location: Unit D2, Pentlandfield Business Park, Roslin, Midlothian, EH25 9RE Classification: Road Haulage Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A13SW (NW)	25	-	325469 664413
177	Contemporary Trade Directory Entries Name: Wright Automotive Location: Unit A3 Midlothian Innovation Centre, Roslin, Midlothian, EH25 9RE Classification: Garage Services Status: Active Positional Accuracy: Manually positioned to the address or location	A13SW (NW)	82	-	325382 664465
177	Contemporary Trade Directory Entries Name: Capital Roller Shutters Location: Unit A1, Pentlandfield Business Park, Roslin, Midlothian, EH25 9RE Classification: Roller Shutter Manufacturers Status: Inactive Positional Accuracy: Automatically positioned to the address	A13SW (NW)	83	-	325378 664463
177	Contemporary Trade Directory Entries Name: Customize Print Location: Unit A3B, Pentlandfield Business Park, Roslin, Midlothian, EH25 9RE Classification: Screen Process Printers Status: Inactive Positional Accuracy: Automatically positioned to the address	A13SW (NW)	123	-	325336 664478
177	Contemporary Trade Directory Entries Name: Albatern Ltd Location: Midlothian Innovation Centre, Roslin, Midlothian, EH25 9RE Classification: Electricity Generating & Distributing Equipment Status: Inactive Positional Accuracy: Manually positioned to the address or location	A13SW (NW)	126	-	325340 664495
177	Contemporary Trade Directory Entries Name: Jim Brackenridge (Transport) Ltd Location: Pentlandfield Business Park, Roslin, Midlothian, EH25 9RE Classification: Road Haulage Services Status: Inactive Positional Accuracy: Manually positioned to the address or location	A13SW (NW)	127	-	325340 664494
178	Contemporary Trade Directory Entries Name: Mercury Solutions Location: Unit 1, Pentlandfield Business Park, Roslin, Midlothian, EH25 9RE Classification: Distribution Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A13SW (NW)	127	-	325340 664495

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
179	Contemporary Trade Directory Entries Name: Boxes & Bubbles Location: Midlothian Innovation Centre, Unit B7, Roslin, Midlothian, EH25 9RE Classification: Boxes & Cartons Status: Inactive Positional Accuracy: Manually positioned within the geographical locality	A7NE (W)	160	-	325161 664338
179	Contemporary Trade Directory Entries Name: Boxes & Bobbles Location: Pentlandfield Business Park, 7b, Roslin, Midlothian, EH25 9RE Classification: Boxes & Cartons Status: Inactive Positional Accuracy: Manually positioned within the geographical locality	A7NE (W)	160	-	325161 664338
180	Contemporary Trade Directory Entries Name: Synpromics Location: The Roslin Innovation Centre, Easter Bush, Roslin, Midlothian, EH25 9RG Classification: Laboratories Status: Active Positional Accuracy: Manually positioned to the address or location	A7NE (W)	293	-	325019 664219
180	Contemporary Trade Directory Entries Name: Greengage Lighting Ltd Location: Easter Bush Veterinary Centre, Bush Farm, Roslin, EH25 9RG Classification: Lighting Manufacturers Status: Inactive Positional Accuracy: Automatically positioned to the address	A7NE (W)	317	-	325005 664178
181	Contemporary Trade Directory Entries Name: Clark Commercials Edinburgh Location: Moorfoot View, Bilston, Roslin, Midlothian, EH25 9SL Classification: Commercial Vehicle Dealers Status: Active Positional Accuracy: Manually positioned within the geographical locality	A14SE (E)	467	-	326230 664453
182	Contemporary Trade Directory Entries Name: Quotient Location: Biocampus, 5, James Hamilton Way, Milton Bridge, Penicuik, EH26 0BF Classification: Pharmaceutical Manufacturers & Distributors Status: Inactive Positional Accuracy: Automatically positioned to the address	A3NE (S)	547	-	325555 663575
183	Contemporary Trade Directory Entries Name: Dolphin Lifts Scotland Location: 4, Damhead, Lothianburn, EDINBURGH, EH10 7DZ Classification: Stairlifts - Manufacturers & Installers Status: Inactive Positional Accuracy: Automatically positioned to the address	A18SW (N)	631	-	325424 665210
184	Contemporary Trade Directory Entries Name: Abercromby Motor Group Location: Bilston, Roslin, Midlothian, EH25 9RS Classification: Car Dealers Status: Inactive Positional Accuracy: Automatically positioned to the address	A14NE (NE)	781	-	326389 664853
184	Contemporary Trade Directory Entries Name: Volkswagen Van Centre Ltd Location: Bilston, Roslin, EH25 9RS Classification: Commercial Vehicle Dealers Status: Active Positional Accuracy: Automatically positioned to the address	A14NE (NE)	782	-	326392 664850
184	Contemporary Trade Directory Entries Name: Clark Commercials Edinburgh Location: Moorfoot View, Bilston, Roslin, Midlothian, EH25 9SL Classification: Car Dealers Status: Inactive Positional Accuracy: Manually positioned to the address or location	A14NE (NE)	788	-	326404 664838
185	Contemporary Trade Directory Entries Name: Edinburgh Laser Optics Ltd Location: Pentland Science Park, Bush Loan, PENICUIK, Midlothian, EH26 0PL Classification: Testing, Inspection & Calibration Equipment Manufacturers Status: Active Positional Accuracy: Automatically positioned to the address	A3SW (S)	787	-	325455 663336
186	Contemporary Trade Directory Entries Name: Optical Flow Systems Location: Technipole Centre, Bush Estate, Penicuik, Midlothian, EH26 0PJ Classification: Scientific Apparatus & Instruments - Manufacturers Status: Inactive Positional Accuracy: Automatically positioned to the address	A2NE (SW)	818	-	324981 663499

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
187	Contemporary Trade Directory Entries Name: Moredun Isolators Ltd Location: Pentlands Science Park, Bush Loan, Penicuik, Midlothian, EH26 0PZ Classification: Laboratory Equipment Status: Inactive Positional Accuracy: Automatically positioned to the address	A3SW (S)	824	-	325275 663332
187	Contemporary Trade Directory Entries Name: Viragen Ltd Location: Pentlands Science Park, Bush Loan, Penicuik, Midlothian, EH26 0PZ Classification: Pharmaceutical Manufacturers & Distributors Status: Inactive Positional Accuracy: Automatically positioned to the address	A3SW (S)	824	-	325275 663332
187	Contemporary Trade Directory Entries Name: Excell Biotech Ltd Location: Pentlands Science Park, Bush Loan, Penicuik, Midlothian, EH26 0PZ Classification: Pharmaceutical Manufacturers & Distributors Status: Inactive Positional Accuracy: Automatically positioned to the address	A3SW (S)	824	-	325275 663332
188	Contemporary Trade Directory Entries Name: Renewable Devices Swift Turbines Ltd Location: Bush Estate, Penicuik, Midlothian, EH26 0PH Classification: Windmills & Wind Power Equipment Status: Inactive Positional Accuracy: Automatically positioned to the address	A7SW (SW)	856	-	324585 663813
189	Contemporary Trade Directory Entries Name: Biobest Location: 6 Charles Darwin House, Milton Bridge, Penicuik, EH26 0PY Classification: Laboratories Status: Active Positional Accuracy: Automatically positioned to the address	A2NE (SW)	864	-	325028 663407
190	Contemporary Trade Directory Entries Name: Carmichael Scotia Ltd Location: Pentland Mains, Loanhead, EH20 9QG Classification: Engineers - General Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SE (NE)	951	-	326331 665253
190	Contemporary Trade Directory Entries Name: Environmental Engineering Scotland Ltd Location: Pentland Mains, Loanhead, Midlothian, EH20 9QG Classification: Ventilators & Ventilation Systems Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SE (NE)	951	-	326331 665253
191	Contemporary Trade Directory Entries Name: Pentland Precision Engineering Ltd Location: Bush Est, Penicuik, Midlothian, EH26 0PH Classification: Precision Engineers Status: Inactive Positional Accuracy: Manually positioned within the geographical locality	A2NW (SW)	977	-	324645 663555
192	Fuel Station Entries Name: Abercromby Vauxhall Location: Edinburgh Road Meadow Place, Bilston, Roslin, Midlothian, EH25 9RS Brand: Obsolete Premises Type: Not Applicable Status: Obsolete Positional Accuracy: Approximate location provided by supplier	A14SW (E)	298	-	326025 664504
193	Fuel Station Entries Name: Milton Bridge Garage Location: Edinburgh Road, Milton Bridge, Penicuik, Midlothian, EH26 0RD Brand: Obsolete Premises Type: Not Applicable Status: Obsolete Positional Accuracy: Manually positioned to the road within the address or location	A3NE (S)	768	-	325729 663384

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
194	Ancient Woodland Name: Not Supplied Reference: 34772 Area(m²): 475251.71 Type: Long-Established Woodland of Plantation Origin	A8NW (SW)	0	8	325529 664350
195	Ancient Woodland Name: Not Supplied Reference: 34771 Area(m²): 117255.77 Type: Ancient and Semi-Natural Woodland	A14SE (E)	748	8	326438 664683
196	Ancient Woodland Name: Not Supplied Reference: 34776 Area(m²): 32270.53 Type: Ancient Woodland of Plantation Origin	A15SW (E)	799	8	326575 664411
197	Ancient Woodland Name: Not Supplied Reference: 34790 Area(m²): 45318.31 Type: Long-Established Woodland of Plantation Origin	A4SW (S)	995	8	325939 663220
198	Areas of Adopted Green Belt Authority: Midlothian Council Plan Name: Midlothian Local Development Plan Status: Adopted Plan Date: 7th November 2017	A13SW (NW)	223	9	325229 664584
199	Sites of Special Scientific Interest Name: Bilston Burn Multiple Areas: Y Total Area (m2): 166265.83000000002 Source: Scottish Natural Heritage Reference: 204 Designation Details: Mixed Designation Date: 11th March 1986 Date Type: Designated	A15NW (NE)	937	8	326583 664814

Agency & Hydrological	Version	Update Cycle
Contaminated Land Register Entries and Notices City of Edinburgh Council Scottish Environment Protection Agency - Head Office Midlothian Council	January 2015 June 2020 October 2017	Annual Rolling Update Annually Annual Rolling Update
Discharge Consents Scottish Environment Protection Agency - East Region	June 2001	Not Applicable
Enforcement and Prohibition Notices Scottish Environment Protection Agency - East Region	January 2012	Not Applicable
Integrated Pollution Controls Scottish Environment Protection Agency - Head Office Scottish Environment Protection Agency - East Region	February 1998 March 2002	Variable Variable
Local Authority Pollution Prevention and Controls Scottish Environment Protection Agency - East Region	March 2002	Not Applicable
Local Authority Pollution Prevention and Control Enforcements Scottish Environment Protection Agency - East Region	June 2001	Variable
Nearest Surface Water Feature Ordnance Survey	January 2021	
Prosecutions Relating to Authorised Processes Scottish Environment Protection Agency - East Region	March 2007	Not Applicable
Prosecutions Relating to Controlled Waters Scottish Environment Protection Agency - East Region	March 2007	Annual Rolling Update
Registered Radioactive Substances Scottish Environment Protection Agency - East Region Scottish Environment Protection Agency - Head Office	April 1996 January 1998	Not Applicable Not Applicable
River Quality Scottish Environment Protection Agency - East Region Scottish Environment Protection Agency - Head Office	December 1990 December 1990	Not Applicable Not Applicable
Water Abstractions Scottish Government - Agriculture, Environment and Fisheries Department	December 1997	Not Applicable
Water Industry Act Referrals Scottish Environment Protection Agency - East Region	April 1996	As Designated
Groundwater Vulnerability Scottish Environment Protection Agency - East Region Scottish Environment Protection Agency - Head Office	December 1995 December 1995	Not Applicable Not Applicable
Drift Deposits Scottish Environment Protection Agency - East Region Scottish Environment Protection Agency - Head Office	December 1995 December 1995	Not Applicable Not Applicable
OS Water Network Lines Ordnance Survey	September 2020	Quarterly
BGS Groundwater Flooding Susceptibility British Geological Survey - National Geoscience Information Service	May 2013	Annually

Waste	Version	Update Cycle
BGS Recorded Landfill Sites British Geological Survey - National Geoscience Information Service	June 1996	Not Applicable
Integrated Pollution Control Registered Waste Sites Scottish Environment Protection Agency - Head Office Scottish Environment Protection Agency - East Region	January 1998 March 2002	Not Applicable Not Applicable
Local Authority Landfill Coverage City of Edinburgh Council Midlothian Council - Waste Management Department	May 2000 May 2000	Not Applicable Not Applicable
Local Authority Recorded Landfill Sites City of Edinburgh Council Midlothian Council - Waste Management Department	May 2000 May 2000	Not Applicable Not Applicable
Registered Landfill Sites Scottish Environment Protection Agency - East Region Scottish Environment Protection Agency - East Region - Alloa Office Scottish Environment Protection Agency - East Region - Arboath Office Scottish Environment Protection Agency - East Region - Galashiels Office Scottish Environment Protection Agency - East Region - Glenrothes Office Scottish Environment Protection Agency - East Region - Perth Office Scottish Environment Protection Agency - East Region - Stirling Office Scottish Environment Protection Agency - Head Office	December 2005 December 2005 December 2005 December 2005 December 2005 December 2005 December 2005 December 2005 December 2005	Not Applicable Not Applicable Not Applicable Not Applicable Not Applicable Not Applicable Not Applicable Not Applicable Not Applicable
Registered Waste Transfer Sites Scottish Environment Protection Agency - East Region Scottish Environment Protection Agency - East Region - Alloa Office Scottish Environment Protection Agency - East Region - Arboath Office Scottish Environment Protection Agency - East Region - Galashiels Office Scottish Environment Protection Agency - East Region - Glenrothes Office Scottish Environment Protection Agency - East Region - Perth Office Scottish Environment Protection Agency - East Region - Stirling Office Scottish Environment Protection Agency - Head Office	December 2005 December 2005 December 2005 December 2005 December 2005 December 2005 December 2005 December 2005 December 2005	Not Applicable Not Applicable Not Applicable Not Applicable Not Applicable Not Applicable Not Applicable Not Applicable Not Applicable
Registered Waste Treatment or Disposal Sites Scottish Environment Protection Agency - East Region Scottish Environment Protection Agency - East Region - Alloa Office Scottish Environment Protection Agency - East Region - Arboath Office Scottish Environment Protection Agency - East Region - Galashiels Office Scottish Environment Protection Agency - East Region - Glenrothes Office Scottish Environment Protection Agency - East Region - Perth Office Scottish Environment Protection Agency - East Region - Stirling Office Scottish Environment Protection Agency - Head Office	December 2005 December 2005 December 2005 December 2005 December 2005 December 2005 December 2005 December 2005 December 2005	Not Applicable Not Applicable Not Applicable Not Applicable Not Applicable Not Applicable Not Applicable Not Applicable Not Applicable
Hazardous Substances	Version	Update Cycle
Control of Major Accident Hazards Sites (COMAH) Health and Safety Executive	April 2018	Bi-Annually
Explosive Sites Health and Safety Executive	March 2017	Annually
Notification of Installations Handling Hazardous Substances (NIHHS) Health and Safety Executive	November 2000	Not Applicable
Planning Hazardous Substance Enforcements City of Edinburgh Council - City Development Department Midlothian Council - Planning Department	February 2016 February 2016	Variable Variable
Planning Hazardous Substance Consents City of Edinburgh Council - City Development Department Midlothian Council - Planning Department	February 2016 February 2016	Variable Variable

Geological	Version	Update Cycle
BGS 1:625,000 Solid Geology British Geological Survey - National Geoscience Information Service	January 2009	Not Applicable
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	November 2020	Bi-Annually
CBSCB Compensation District Cheshire Brine Subsidence Compensation Board (CBSCB)	August 2011	Not Applicable
Coal Mining Affected Areas The Coal Authority - Property Searches	March 2014	Annual Rolling Update
Mining Instability Ove Arup & Partners	October 2000	Not Applicable
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	May 2015	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	April 2020	Annually
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	Annually
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	Annually
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	Annually
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	Annually
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	Annually
Radon Potential - Radon Affected Areas British Geological Survey - National Geoscience Information Service	July 2011	Annually
Radon Potential - Radon Protection Measures British Geological Survey - National Geoscience Information Service	July 2011	Annually
Industrial Land Use	Version	Update Cycle
Contemporary Trade Directory Entries Thomson Directories	April 2021	Quarterly
Fuel Station Entries Catalist Ltd - Experian	February 2021	Quarterly
Gas Pipelines National Grid	January 2021	

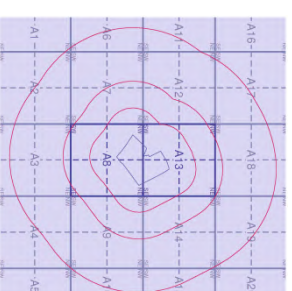
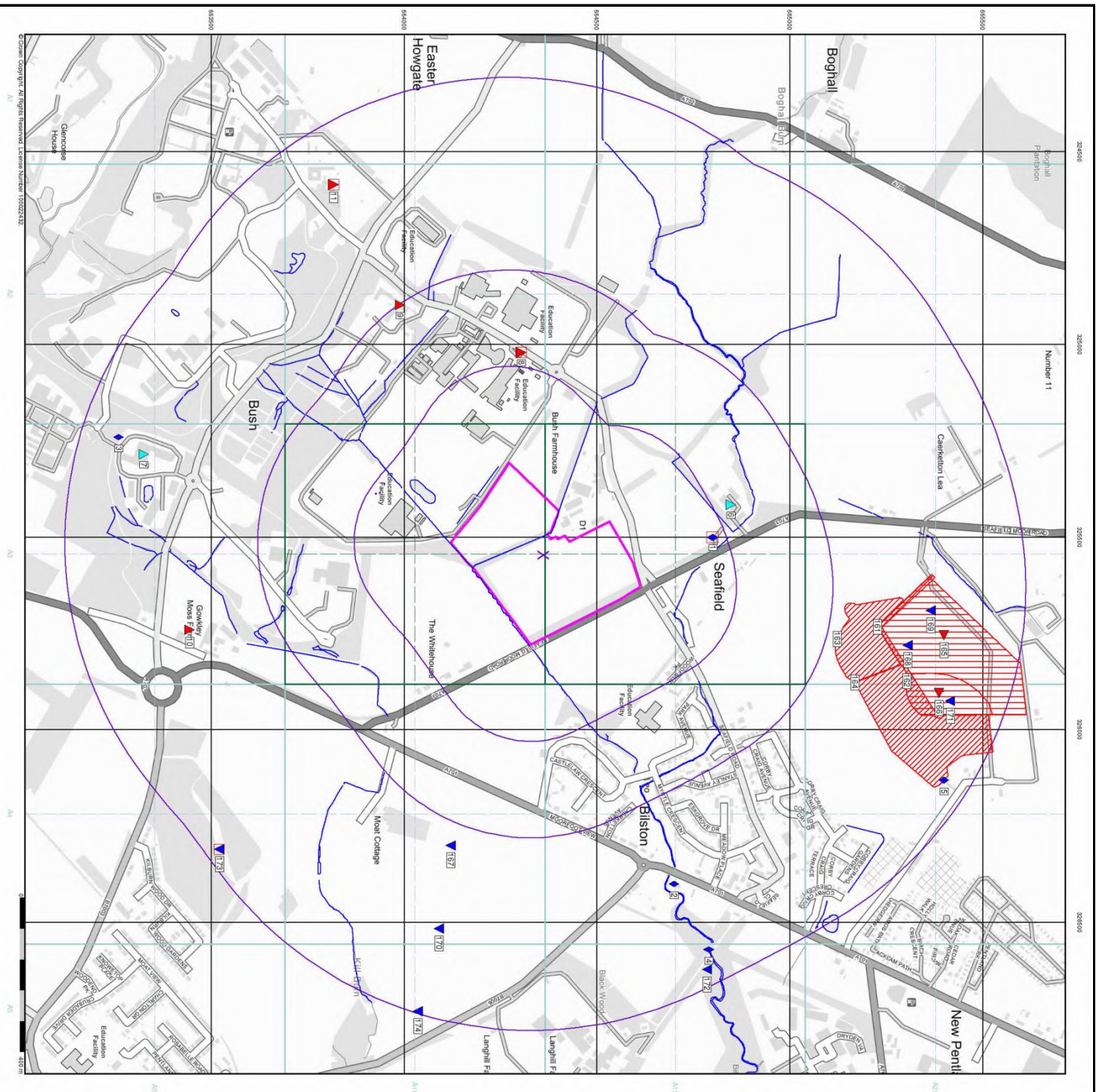
Sensitive Land Use	Version	Update Cycle
Ancient Woodland Scottish Natural Heritage	July 2014	Bi-Annually
Areas of Adopted Green Belt City of Edinburgh Council Midlothian Council	June 2020 June 2020	As notified As notified
Areas of Unadopted Green Belt City of Edinburgh Council Midlothian Council	June 2020 June 2020	As notified As notified
Environmentally Sensitive Areas Scottish Government	January 2017	
Forest Parks Forestry Commission	April 1997	Not Applicable
Local Nature Reserves City of Edinburgh Council Midlothian Council	February 2018 February 2018	Bi-Annually Bi-Annually
Marine Nature Reserves Scottish Natural Heritage	July 2019	Bi-Annually
National Nature Reserves Scottish Natural Heritage	June 2018	Bi-Annually
National Parks Scottish Government	December 2013	Bi-Annually
National Scenic Areas Scottish Government	December 2013	Bi-Annually
Nitrate Vulnerable Zones Scottish Government	July 2019	Annually
Ramsar Sites Scottish Natural Heritage	April 2019	Bi-Annually
Sites of Special Scientific Interest Scottish Natural Heritage	March 2019	Bi-Annually
Special Areas of Conservation Scottish Natural Heritage	August 2020	Bi-Annually
Special Protection Areas Scottish Natural Heritage	February 2021	Bi-Annually

A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
Environment Agency	
Scottish Environment Protection Agency	
The Coal Authority	
British Geological Survey	 British Geological Survey NATURAL ENVIRONMENT RESEARCH COUNCIL
Centre for Ecology and Hydrology	 Centre for Ecology & Hydrology NATURAL ENVIRONMENT RESEARCH COUNCIL
Natural Resources Wales	
Scottish Natural Heritage	
Natural England	
Public Health England	
Ove Arup	
Stantec UK Ltd	

Contact	Name and Address	Contact Details
1	British Geological Survey - Enquiry Service British Geological Survey, Environmental Science Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
2	Scottish Environment Protection Agency - East Region Clearwater House, Heriot Watt Research Park, Avenue North, Riccarton, Edinburgh, Midlothian, EH14 4AP	Telephone: 0131 449 7296 Fax: 0131 449 7277
3	Scottish Environment Protection Agency - Head Office Erskine Court, The Castle Business Park, Stirling, Stirlingshire, FK9 4TR	Telephone: 01786 457700 Fax: 01786 446885
4	Ordnance Survey Adanac Drive, Southampton, Hampshire, SO16 0AS	Telephone: 03456 05 05 05 Email: customerservices@ordnancesurvey.co.uk Website: www.ordnancesurvey.gov.uk
5	Midlothian Council - Waste Management Department Fairfield House, 8 Lothian Road, Dalkeith, Midlothian, EH22 3AA	Telephone: 0131 271 3337 Website: www.midlothian.gov.uk
6	The Coal Authority - Property Searches 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG	Telephone: 0345 762 6848 Fax: 01623 637 338 Email: groundstability@coal.gov.uk Website: www2.groundstability.com
7	Stantec UK Ltd Caversham Bridge House, Waterman Place, Reading, RG1 8DN	Telephone: 0118 950 0761 Email: pba.reading@stantec.com Website: www.stantec.com
8	Scottish Natural Heritage 12 Hope Terrace, Edinburgh, Midlothian, EH9 2AS	Telephone: 01463 725000
9	Midlothian Council Midlothian House, Buccleuch Street, Dalkeith, Lothian, EH22 1DN	Telephone: 0131 270 7500 Fax: 0131 271 3050 Website: www.midlothian.gov.uk
10	City of Edinburgh Council Council Headquarters, Wellington Court, 10 Waterloo Place, Edinburgh, EH1 3EG	Telephone: 0131 200 2000 Email: council.info@edinburgh.gov.uk Website: www.edinburgh.gov.uk
-	Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards Chilton, Didcot, Oxfordshire, OX11 0RQ	Telephone: 01235 822622 Fax: 01235 833891 Email: radon@phe.gov.uk Website: www.ukradon.org
-	Landmark Information Group Limited Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk

Please note that the Environment Agency / Natural Resources Wales / SEPA have a charging policy in place for enquiries.



Site Sensitivity Map - Slice A

Industrial Land Use

- ✧ Contemporary Trade Directory Entry
- ✧ Fuel Station Entry

Substantiated Pollution Incident Register

- ◊ Water Abstraction
- ◊ Water Industry Act Referral

Pollution Incident to Controlled Waters

- ### Pollution Incident to Controlled Waters

Integrated Pollution Prevention Control

- Integrated Pollution Prevention Control

☒ Contaminated Land Register Entry or Notice

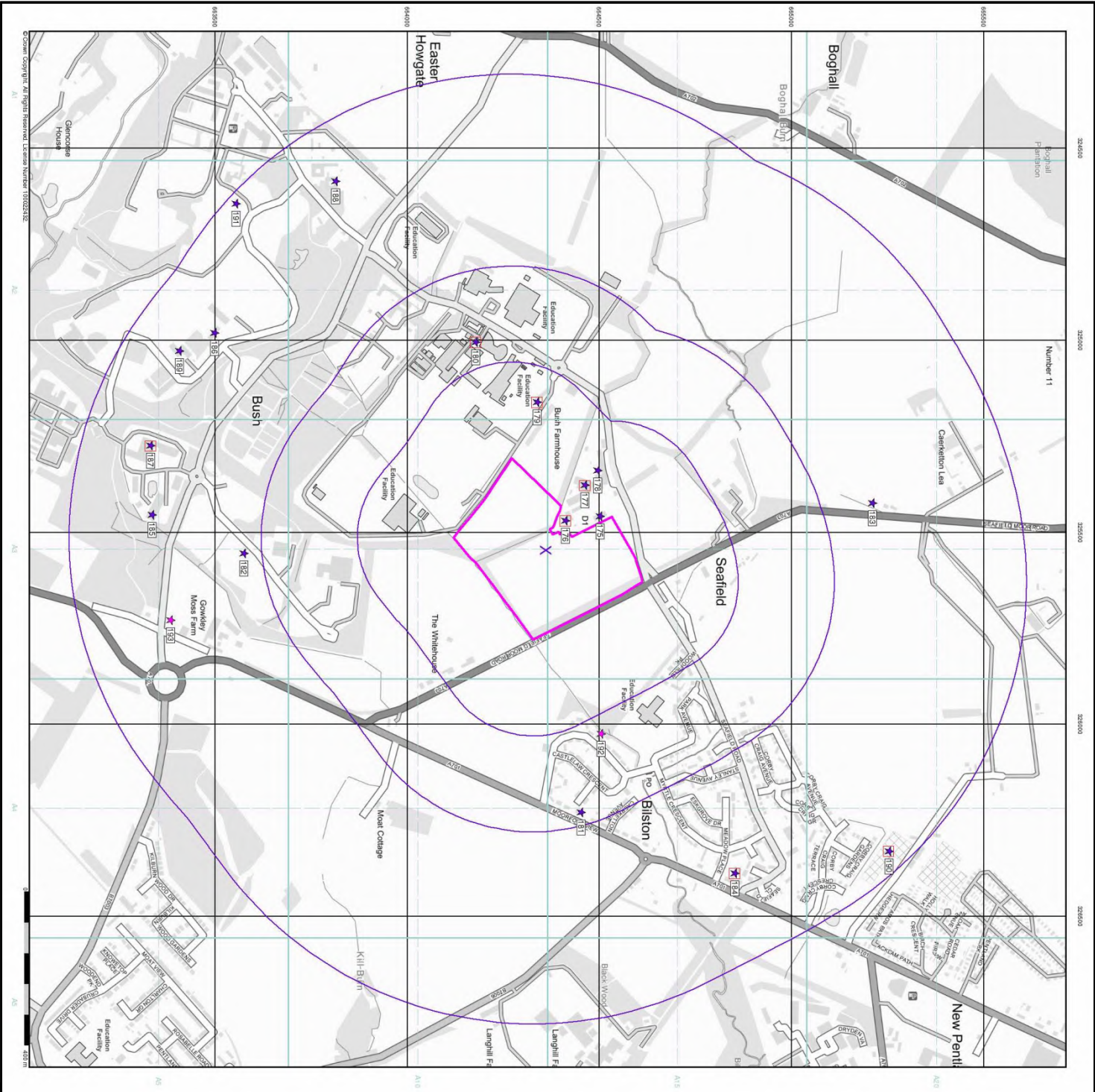
- ☒
- Contaminated Land Register Entry or Notice

Agency and Hydrologica

- Agency and Hydrologica

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- 1**



Geospatial Consultants

Industrial Land Use Map

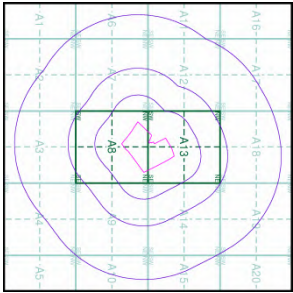
General

- Specified Site
- Specified Buffer(s)
- Map ID
- Bearing Reference Point

Industrial Land Use

- Site
- Contemporary Trade Directory Entry
- Fuel Station Entry
- Gas Pipeline
- Underground Electrical Cables

Industrial Land Use Map - Slice A



Order Details

Order Number: 277808321_1
Customer Ref: P21-019 CMCD
National Grid Reference: 325550, 664360
Site Area (Ha): 11.58
Search Buffer (m): 1000
Site Details
114, Pentcuk Road, ROSLIN, EH25 9NT

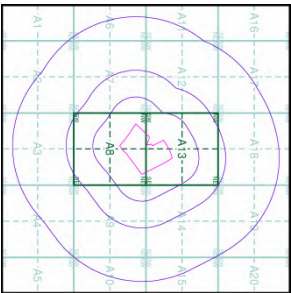


Tel: 0844 844 9952
Web: www.landmark.co.uk



- General**
- Specified Site
 - Specified Buffer(s)
 - Bearing Reference Point
- Agency and Hydrological (Flood)**
- 0 - 1m estimated 100yr flood depth
 - 1 - 2m estimated 100yr flood depth
 - Over 2m estimated 100yr flood depth
- The flooded areas have been generated using a generalised technique and should not, by themselves, be used to enter that specific areas are or are not at risk of inundation. Flood risk at any specific location may be influenced by local factors - not least flood defences - that have not been taken into account.

Flood Map - Slice A



Order Details

Order Number: 277808321_1.1
Customer Ref: P21-019 CMcD
National Grid Reference: 325550, 664360

Slice: A
Site Area (Ha): 11.58
Search Buffer (m): 1000

Site Details

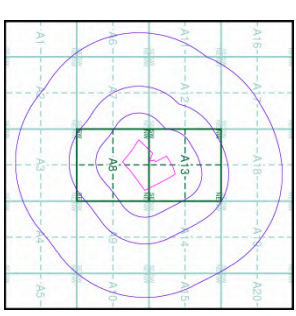
114, Penicuik Road, ROSLIN, EH25 9NT

- General**
- Specified Site
 - Specified Buffer(s)
 - Bearing Reference Point
 - Map ID
 - Several of 'Type' at Location
- Agency and Hydrological (Boreholes)**
- BGS Borehole Depth 0 - 10m
 - BGS Borehole Depth 10 - 30m
 - BGS Borehole Depth 30m +
 - Confidential
 - Other

For Borehole information please refer to the Borehole .csv file which accompanied this slice.

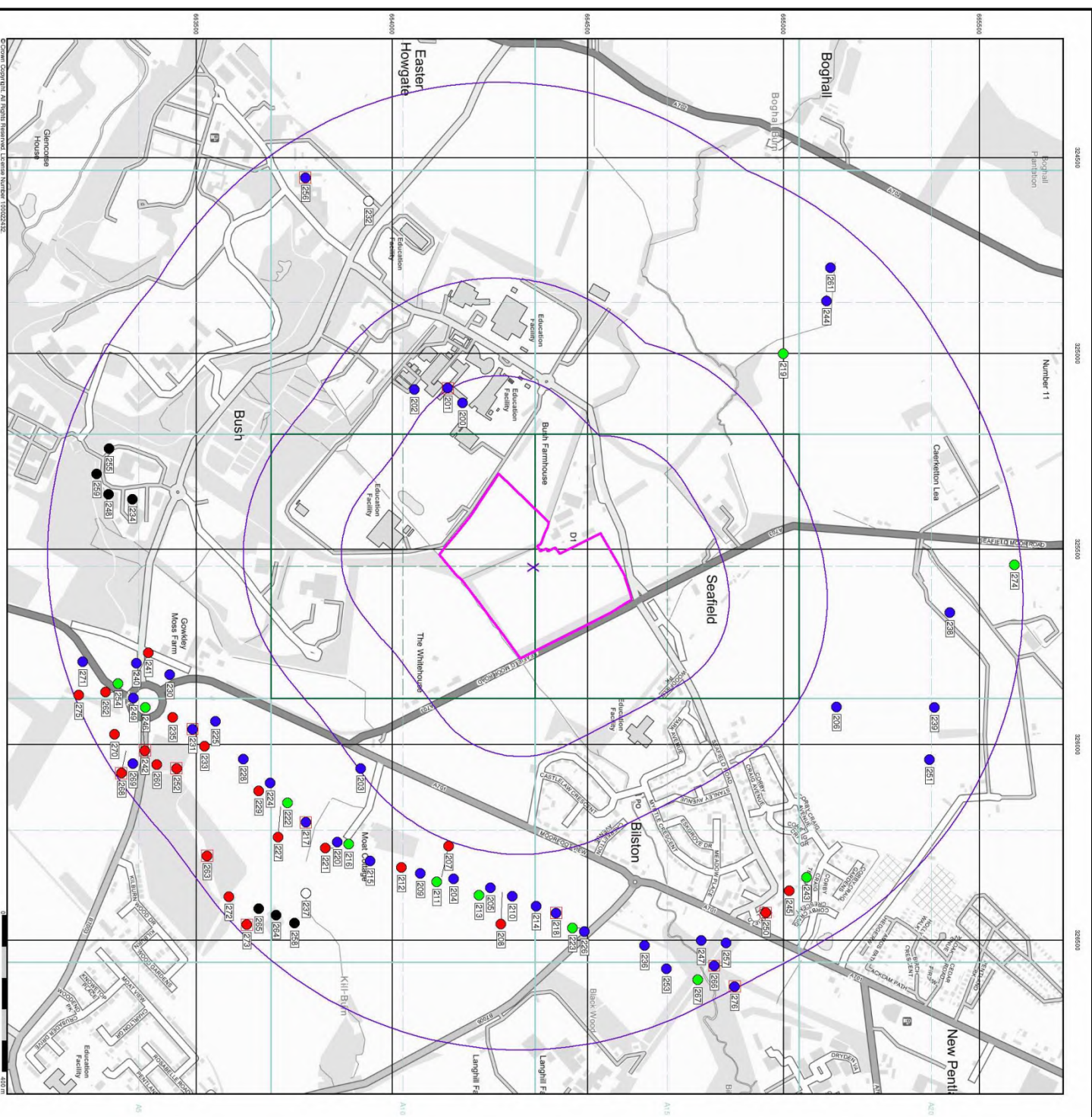
A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.environment.co.uk.

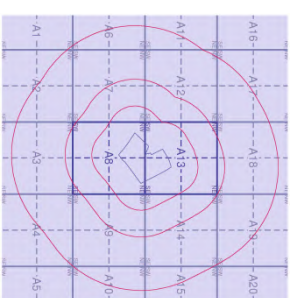
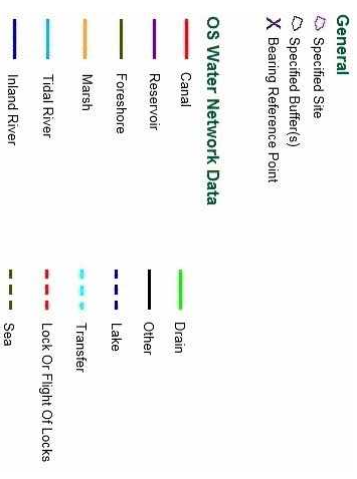
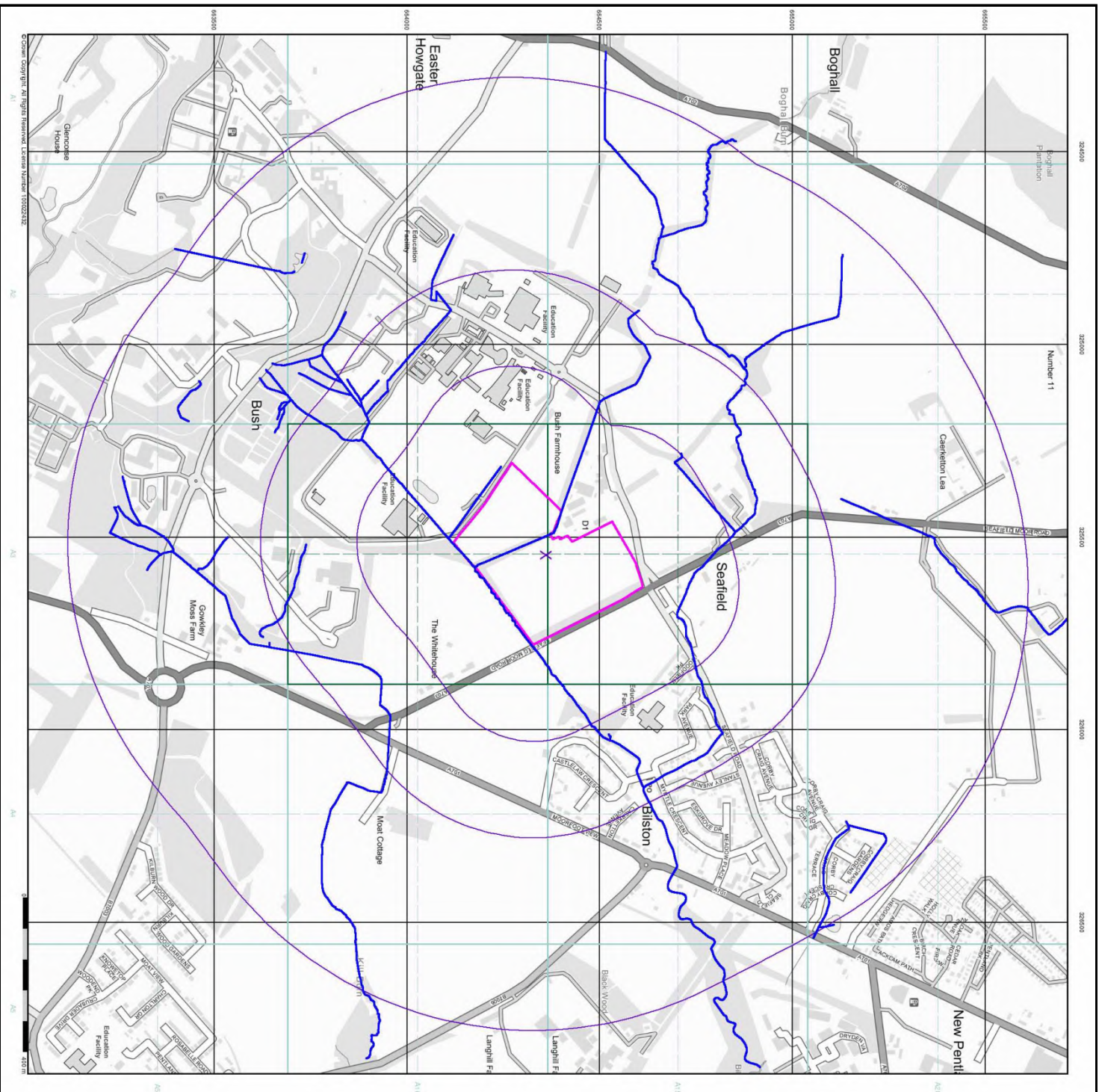
Borehole Map - Slice A



Order Details

Order Number: 277808321_1.1
 Customer Ref: P21-019 CMCD
 National Grid Reference: 325550, 664360
 Slice: A
 Site Area (Ha): 11.58
 Search Buffer (m): 1000
 Site Details
 114, Pencluk Road, ROSLIN, EH25 9NT





OS Water Network Map - Slice A

Order Details

Order Number:	277808321_1_1
Customer Ref:	P21-019 CMcD
National Grid Reference:	325550, 664360
Slice:	A
Site Area (Ha):	11.58
Search Buffer (m):	1000

Site Details

114, Penicuik Road, ROSLIN, EH25 9NT

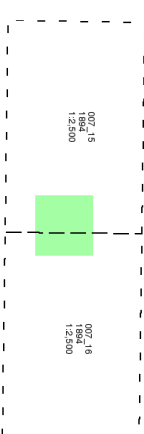


Edinburghshire Published 1894

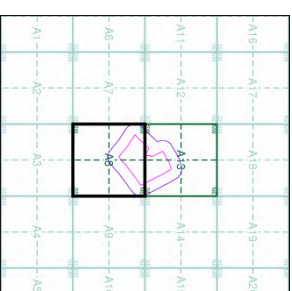
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the National Library of Scotland in the 19th century. In 1894 the 1:2,500 scale maps were published and covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A8



Order Details

Order Number: 277808321_1-1
Customer Ref: P21-019 CMCD
National Grid Reference: 325550, 664360
Slice: A
Site Area (Ha): 11.58
Search Buffer (m): 100
Site Details
114, Pentculik Road, ROSLIN, EH25 9NT



Tel: 0844 844 9952
Fax: 0844 844 9953
Web: www.landmark.co.uk



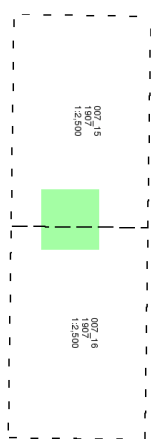
Edinburghshire

Published 1907

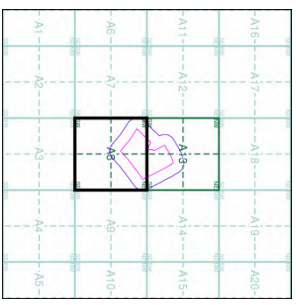
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the Ordnance Survey, Edinburgh, and Scotland in the 19th century. The 1:2,500 scale maps were surveyed and published between 1854 and 1907, covering the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A8



Order Details

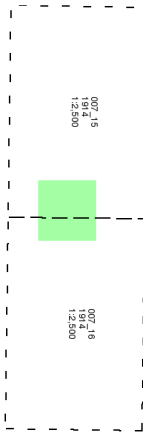
Order Number: 277808321_1-1
Customer Ref: P21-019 CMCD
National Grid Reference: 325550, 664360
Slice: A
Site Area (Ha): 11.58
Search Buffer (m): 100
Site Details
114, Pentcuk Road, ROSLIN, EH25 9NT

Edinburghshire
Published 1914

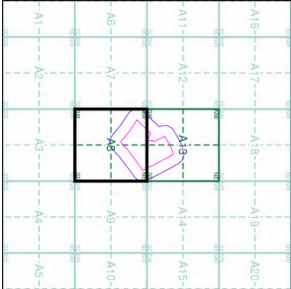
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the National Library of Scotland in the 1980s. In 1984 the 1:2,500 scale maps were digitised and published in 1985. The maps covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A8



Order Details

Order Number: 277808321_1_1
Customer Ref: P21-019 CMCD
National Grid Reference: 325550, 664360
Slice: A
Site Area (Ha): 11.58
Search Buffer (m): 100
Site Details
114, Pentcuk Road, ROSLIN, EH25 9NT

Ordnance Survey Plan

Published 1972

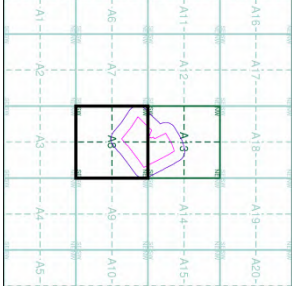
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the Ordnance Survey archives in the UK. The maps were surveyed in 1884 at a scale of 1:2,500 and were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

NT2564	1972
NT2563	1972
NT2563	12,500

Historical Map - Segment A8



Order Details

Order Number: 277808321_1-1
Customer Ref: P21-019 CMCD
National Grid Reference: 325550, 664360
Slice: A
Site Area (Ha): 11.58
Search Buffer (m): 100
Site Details
114, Pentcwik Road, ROSLIN, EH25 9NT

Additional SIMS

Published 1986

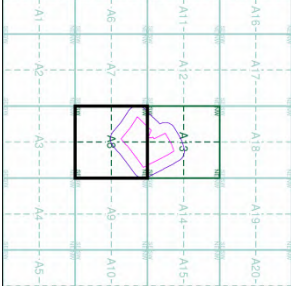
Source map scale - 1:2,500

The SIM cards (Ordinance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

MT2564	1986
1:2,500	
MT2563	1986
1:2,500	

Historical Map - Segment A8



Order Details

Order Number: 277808321_1-1
Customer Ref: P21-019 CMCD
National Grid Reference: 325550, 664360
Slice: A
Site Area (Ha): 11.58
Search Buffer (m): 100
Site Details
114, Penculic Road, ROSLIN, EH25 9NT

Large-Scale National Grid Data Published 1993

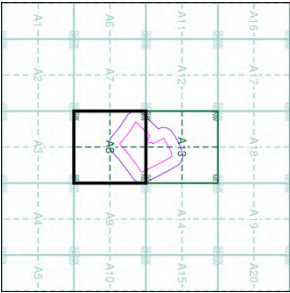
Source map scale - 1:2,500

Large Scale National Grid Data superseded SLM cards (Ordnance Survey's Survey of Great Britain) in 1993, and continued to be produced until 2009. These maps were produced at a scale of 1:2,500 and provided detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

NT2564	1993
NT2563	1993
NT2562	1993
NT2561	1993

Historical Map - Segment A8



Order Details

Order Number: 277808321_1_1
Customer Ref: P21-019 CMCD
National Grid Reference: 325550, 664360
Slice: A
Site Area (Ha): 11.58
Search Buffer (m): 100

Site Details

114, Pentcwik Road, ROSLIN, EH25 9NT

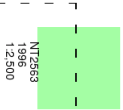
Large-Scale National Grid Data

Published 1996

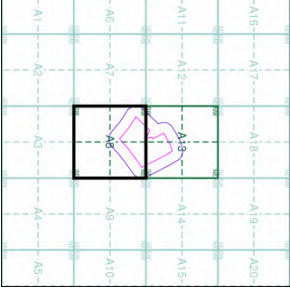
Source map scale - 1:2,500

Large Scale National Grid Data superseded SLM cards (Ordnance Survey's Survey of England on Microlith) in 1996, and continued to be produced until 2009. These maps were produced at a scale of 1:2,500 and provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A8

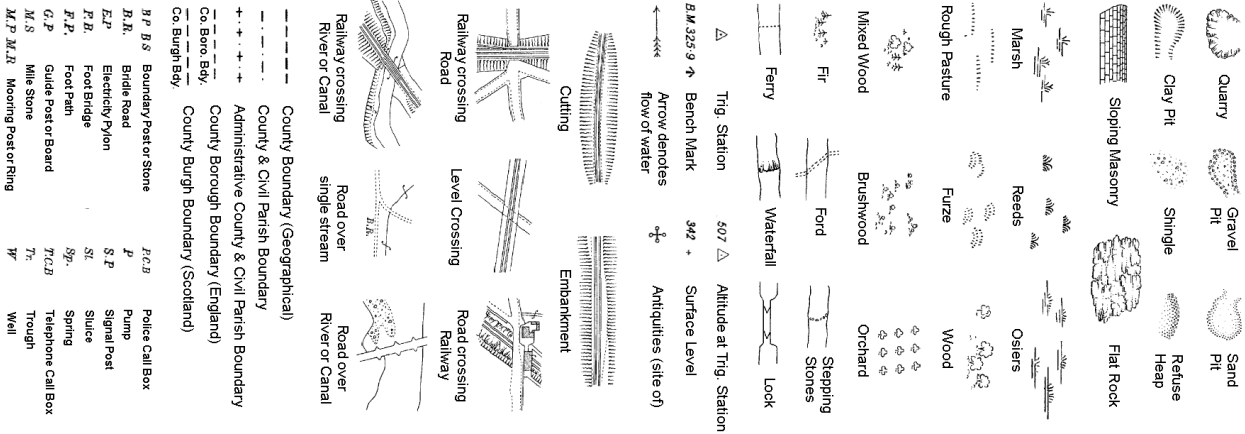


Order Details

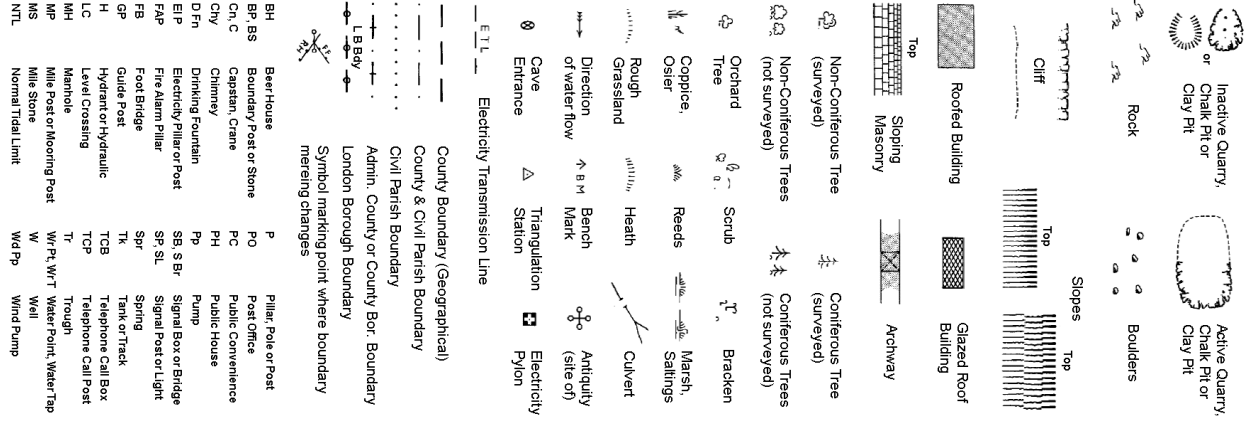
Order Number: 277808321_1_1
Customer Ref: P21-019 CMCD
National Grid Reference: 325550, 664360
Slice: A
Site Area (Ha): 11.58
Search Buffer (m): 100
Site Details
114, Pencutik Road, ROSLIN, EH25 9NT

Historical Mapping Legends

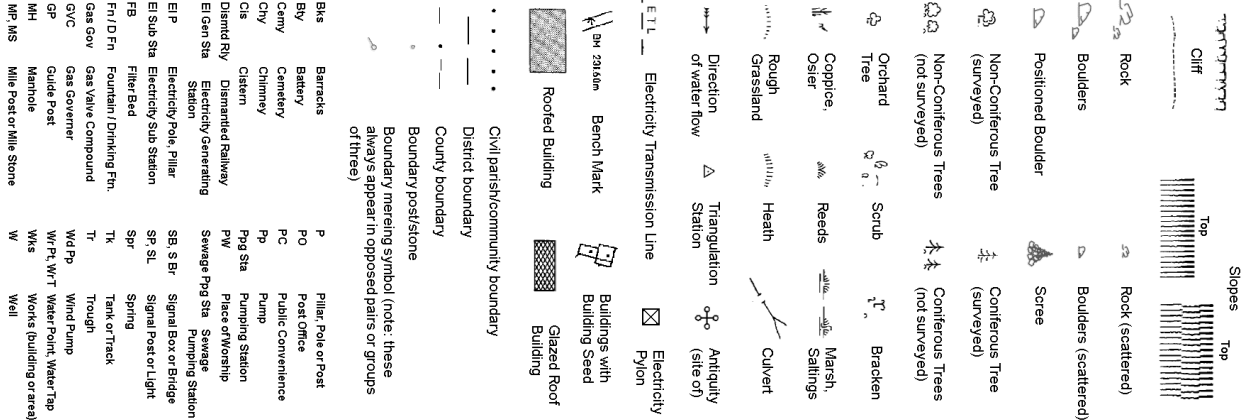
Ordnance Survey County Series and
Ordnance Survey Plan 1:2,500



Ordnance Survey Plan, Additional SIMs and
Supply of Unpublished Survey Information
1:2,500 and 1:1,250



Large-Scale National Grid Data 1:2,500 and
1:1,250

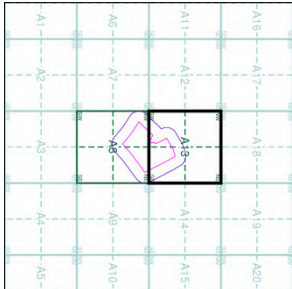


Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Edinburghshire	1:2,500	1884	2
Edinburghshire	1:2,500	1907	3
Edinburghshire	1:2,500	1913 - 1914	4
Ordnance Survey Plan	1:2,500	1972	5
Additional SIMs	1:2,500	1986 - 1990	6
Large-Scale National Grid Data	1:2,500	1993	7



Historical Map - Segment A13



Order Details

Order Number: 277808321_1_1
Customer Ref: P21-019 CMcD
National Grid Reference: 325550, 664360
Slice: A
Site Area (Ha): 11.58
Search Buffer (m): 100

Site Details

114, Pentcuk Road, ROSLIN, EH25 9NT

Edinburghshire Published 1894

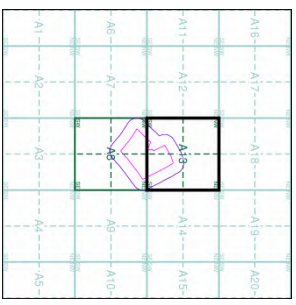
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the National Library of Scotland in the 1980s. In 1894 the 1:2,500 scale map of Edinburghshire was published. It covered the whole of what was then considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

007 11 1894 1:2,500	007 12 1894 1:2,500
007 15 1894 1:2,500	007 16 1894 1:2,500

Historical Map - Segment A13



Order Details

Order Number: 277808321_1
Customer Ref: P21-019 CMCD
National Grid Reference: 325550, 664360
Slice: A
Site Area (Ha): 11.58
Search Buffer (m): 100
Site Details
114, Pentcull Road, ROSLIN, EH25 9NT

Edinburghshire Published 1907

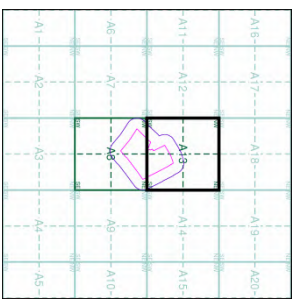
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the National Library of Scotland. The maps were surveyed in 1854 at a scale of 1:2,500 and were published in 1907. The maps covered the whole of what was considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

007 11 1907 1:2,500	007 12 1907 1:2,500
007 15 1907 1:2,500	007 16 1907 1:2,500

Historical Map - Segment A13



Order Details

Order Number: 277808321_1_1
Customer Ref: P21-019 CMCD
National Grid Reference: 325550, 664360
Slice: A
Site Area (Ha): 11.58
Search Buffer (m): 100
Site Details
114, Pentcuk Road, ROSLIN, EH25 9NT

Edinburghshire

Published 1913 - 1914

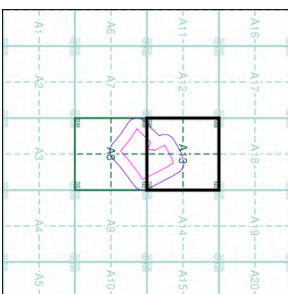
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the National Library of Scotland. The maps were surveyed in 1854 and 1855 and were the first to be published in Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

007_11	007_12
1913	1913
1:2,500	1:2,500
007_15	007_16
1914	1914
1:2,500	1:2,500

Historical Map - Segment A13



Order Details

Order Number: 277808321_1_1
Customer Ref: P21-019 CMCD
National Grid Reference: 325550, 664360
Slice: A
Site Area (Ha): 11.58
Search Buffer (m): 100
Site Details
114, Pentcuk Road, ROSLIN, EH25 9NT

A Landmark Information Group Service v50.0 30-Apr-2021 Page 5 of 7

Additional SIMS

Published 1986 - 1990

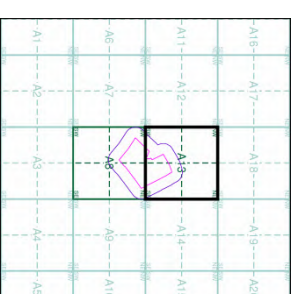
Source map scale - 1:2,500

The SIM cards (Ordinance Survey's Survey of Information on Microfilm) are further, minor editions of mapping which were produced and published 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:12,500 scales.

Map Name(s) and Date(s)

MT2565	1990
MT2564	1986
MT2564	12,500

Historical Map - Segment A13



Order Details

Order Number: 277808321, 1, 1
Customer Ref: P21-019 CMCD
National Grid Reference: 325550, 664360
Slice: A
Site Area (Ha): 11.58
Search Buffer (m): 100

Site Details

114, Pentuck Road, ROSLIN, EH25 9NT



Geographic Information Systems

Large-Scale National Grid Data

Published 1993

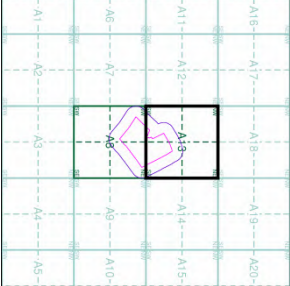
Source map scale - 1:2,500

Large Scale National Grid Data superseded SLM cards (Ordnance Survey's Survey of Great Britain) in 1993, and continued to be produced until 2000. The data is derived from the 1:25,000 scale maps, which provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

NT2565	1993
NT2564	1993

Historical Map - Segment A13



Order Details

Order Number: 277808321, 1, 1
Customer Ref: P21-019 CMCD
National Grid Reference: 325550, 664360
Slice: A
Site Area (Ha): 11.58
Search Buffer (m): 100
Site Details
114, Pencuik Road, ROSLIN, EH25 9NT



Tel: 0844 844 9952
Fax: 0844 844 9953
Web: www.landmark.co.uk

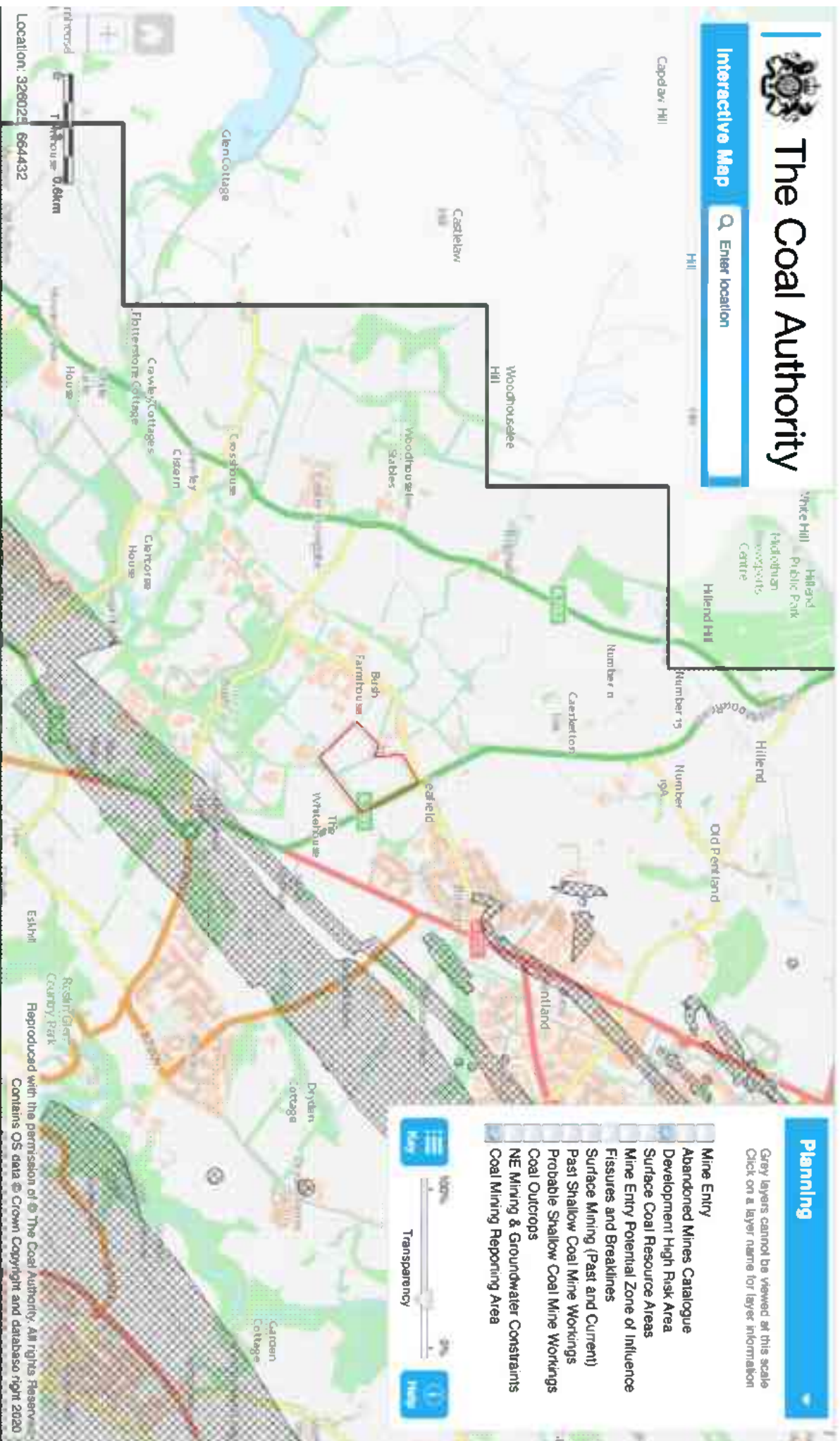
Appendix D – Coal Authority Information



The Coal Authority

Interactive Map

Enter location



Planning

Grey layers cannot be viewed at this scale
Click on a layer name for layer information

- ☐ Mine Entry
- ☐ Abandoned Mines Catalogue
- ☐ Development High Risk Area
- ☐ Surface Coal Resource Areas
- ☐ Mine Entry Potential Zone of Influence
- ☐ Fissures and Breaklines
- ☐ Surface Mining (Past and Current)
- ☐ Past Shallow Coal Mine Workings
- ☐ Probable Shallow Coal Mine Workings
- ☐ Coal Outcrops
- ☐ NE Mining & Groundwater Constraints
- ☐ Coal Mining Reporting Area



Location: 328025 664432

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Non-coal mining plans



Maps

- ☒ Mine plan extents
- ☒ Counties (including ceremonial)
- ☐ Counties (metropolitan areas)

MAP KEY

Search

Search for Mine plan extents below:

Mine name:

Geographical area:

Mineral:

Plan type:



ID	Mine name	Geographical areas	Minerals	Plan type	Series Number	Record availability	
15086		MIDLOTHIAN	SAND AND GRAVEL	MISCELLANEOUS/OTHER	SP477	OWNER: GEOLOGICAL SURVEY OF GREAT BRITAIN (SCOTLAND) AVAILABILITY: UNKNOWN CONTACT BGS ENQUIRIES	SHOW ON MAP
15267		MIDLOTHIAN	OIL SHALE	MINE PLAN	SP997	AVAILABILITY: UNKNOWN CONTACT BGS	SHOW ON MAP

Next results tab

Previous results tab



The Coal
Authority

Consultants Coal Mining Report

114, Penicuik Road
Roslin
Midlothian
EH25 9NT

Date of enquiry:	11 May 2021
Date enquiry received:	11 May 2021
Issue date:	11 May 2021

Our reference:	51002543952001
Your reference:	278326596_1



Consultants

Coal Mining Report

This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

NLIS Hub

Enquiry address

114, Penicuik Road
Roslin
Midlothian
EH25 9NT

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

 @coalauthority

 /company/the-coal-authority

 /thecoalauthority

 /thecoalauthority



Approximate position of property



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Section 1 – Mining activity and geology

Past underground mining

No past mining recorded.

Probable unrecorded shallow workings

None.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

None recorded within 100 metres of the enquiry boundary.

Abandoned mine plan catalogue numbers

None available.

Outcrops

No outcrops recorded.

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations

None recorded within 50 metres of the enquiry boundary.

Remediated sites

None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

Section 3 – Licensing and future mining activity

Future underground mining

None recorded.

Coal mining licensing

None recorded within 200 metres of the enquiry boundary.

Court orders

None recorded.

Section 46 notices

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices

The property is not in an area where a notice to withdraw support has been given.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Section 4 – Further information

Based on the responses in this report, no further information has been highlighted.

Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk**.

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

Opencast mines

Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips

Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations

Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites

Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence

Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas

Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission.

Mine water treatment schemes

Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining

Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing

Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders

Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices

Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices

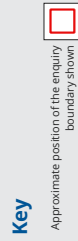
Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land

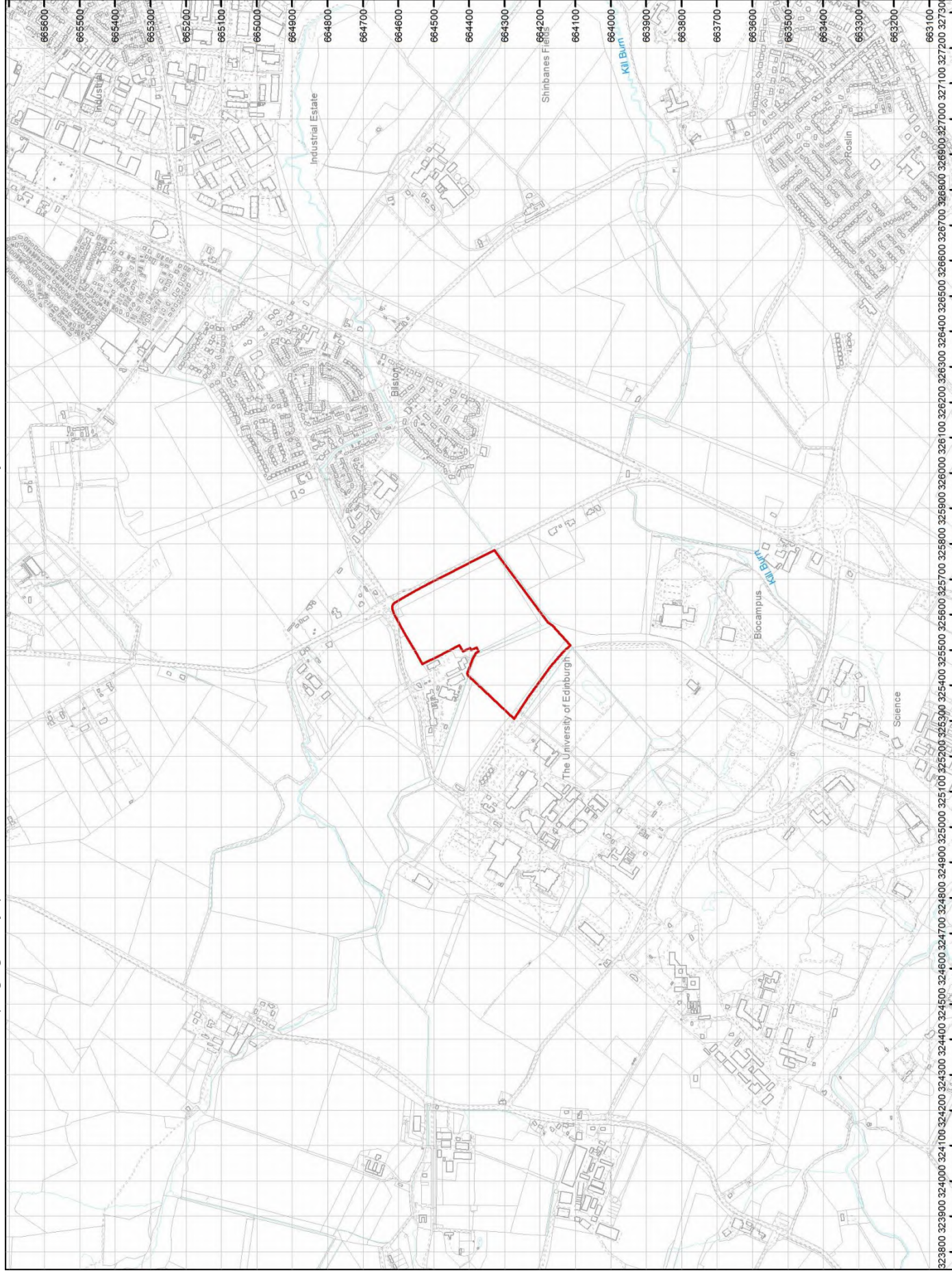
Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.



The map highlights any specific surface or subsurface features within or near to the boundary of the site.



Approximate position of the enquiry boundary shown



How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
www.groundstability.com

Appendix E – Copy of Unexploded Bomb Risk Map

UNEXPLODED BOMB RISK MAP



SITE LOCATION

Map Centre: 325463,664452



LEGEND

- High:** Areas indicated as having a bombing density of 50 bombs per 1000acre or higher.
- Moderate:** Areas indicated as having a bombing density of 15 to 49 bombs per 1000acre.
- Low:** Areas indicated as having 15 bombs per 1000acre or less.

- military**
- industry**
- UXO find**
- transport**
- dock**
- Luftwaffe targets**
- utilities**
- Bombing decoy**
- other**

How to use your Unexploded Bomb (UXB) risk map?

The map indicates the potential for Unexploded Bombs (UXB) to be present as a result of World War Two (WWII) bombing.

You can incorporate the map into your preliminary risk assessment* for potential Unexploded Ordnance (UXO) for a site. Using this map, you can make an informed decision as to whether more in-depth detailed risk assessment* is necessary.

What do I do if my site is in a moderate or high risk area?

Generally, we recommend that a detailed UXO desk study and risk assessment is undertaken for sites in a moderate or high UXB risk area.

Similarly, if your site is near to a designated Luftwaffe target or bombing decoy then additional detailed research is recommended.

More often than not, this further detailed research will conclude that the potential for a significant UXO hazard to be present on your site is actually low.

Never plan site work or undertake a risk assessment using these maps alone. More detail is required, particularly where there may be a source of UXO from other military operations which are not reflected on these maps.

If my site is in a low risk area, do I need to do anything?

If both the map and other research confirms that there is a low potential for UXO to be present on your site then, subject to your own comfort and risk tolerance, works can proceed with no special precautions.

A low risk really means that there is no greater probability of encountering UXO than anywhere else in the UK.

If you are unsure whether other sources of UXO may be present, you can ask for one of our **pre-desk study assessments (PDSA)**

If I have any questions, who do I contact?

tel: **+44 (0) 1993 886682**

email: **uxo@zetica.com**

web: **www.zeticauxo.com**

The information in this UXB risk map is derived from a number of sources and should be used in conjunction with the accompanying notes on our website: (<https://zeticauxo.com/downloads-and-resources/risk-maps/>)

Zetica cannot guarantee the accuracy or completeness of the information or data used and cannot accept any liability for any use of the maps. These maps can be used as part of a technical report or similar publication, subject to acknowledgment. The copyright remains with Zetica Ltd.

It is important to note that this map is not a UXO risk assessment and should not be reported as such when reproduced.

*Preliminary and detailed UXO risk assessments are advocated as good practice by industry guidance such as CIRIA C681 'Unexploded Ordnance (UXO), a guide for the construction industry'.

Appendix F – Utility Information

Maps by email Plant Information Reply



IMPORTANT WARNING

Information regarding the location of BT apparatus is given for your assistance and is intended for general guidance only. No guarantee is given of its accuracy. It should not be relied upon in the event of excavations or other works being made near to BT apparatus which may exist at various depths and may deviate from the marked route.



openreach

CLICK BEFORE YOU DIG

FOR PROFESSIONAL FREE ON SITE ASSISTANCE PRIOR TO COMMENCEMENT OF EXCAVATION WORKS INCLUDING LOCATE AND MARKING SERVICE

email cbyd@openreach.co.uk

ADVANCE NOTICE REQUIRED

(Office hours: Monday - Friday 08:00 to 17:00)

www.openreach.co.uk/cbyd

Accidents happen

If you do damage any Openreach equipment please let us know by calling 0800 023 2023 (opt 1 + opt 1) and we can get it fixed ASAP

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KEY TO BT SYMBOLS

	Planned	Live	Change Of State	+	Watlings	
PCP			Split Coupling	X	Build	
Pole			Duct Tee	▲	Planned	
Box			Building		Inferred	
Manhole			Kiosk		Duct I	
Cabinet			Other proposed plant is shown using dashed lines BT Symbols not listed above may be disregarded. Existing BT Plant may not be recorded. (Information valid at time of preparation. Maps are only valid for 90 days after the date of publication)			
	Pending Add	In Place	Pending Remove	Not In Use		
Power Cable						
Power Duct				N/A		

BT Ref : ZDF10107K

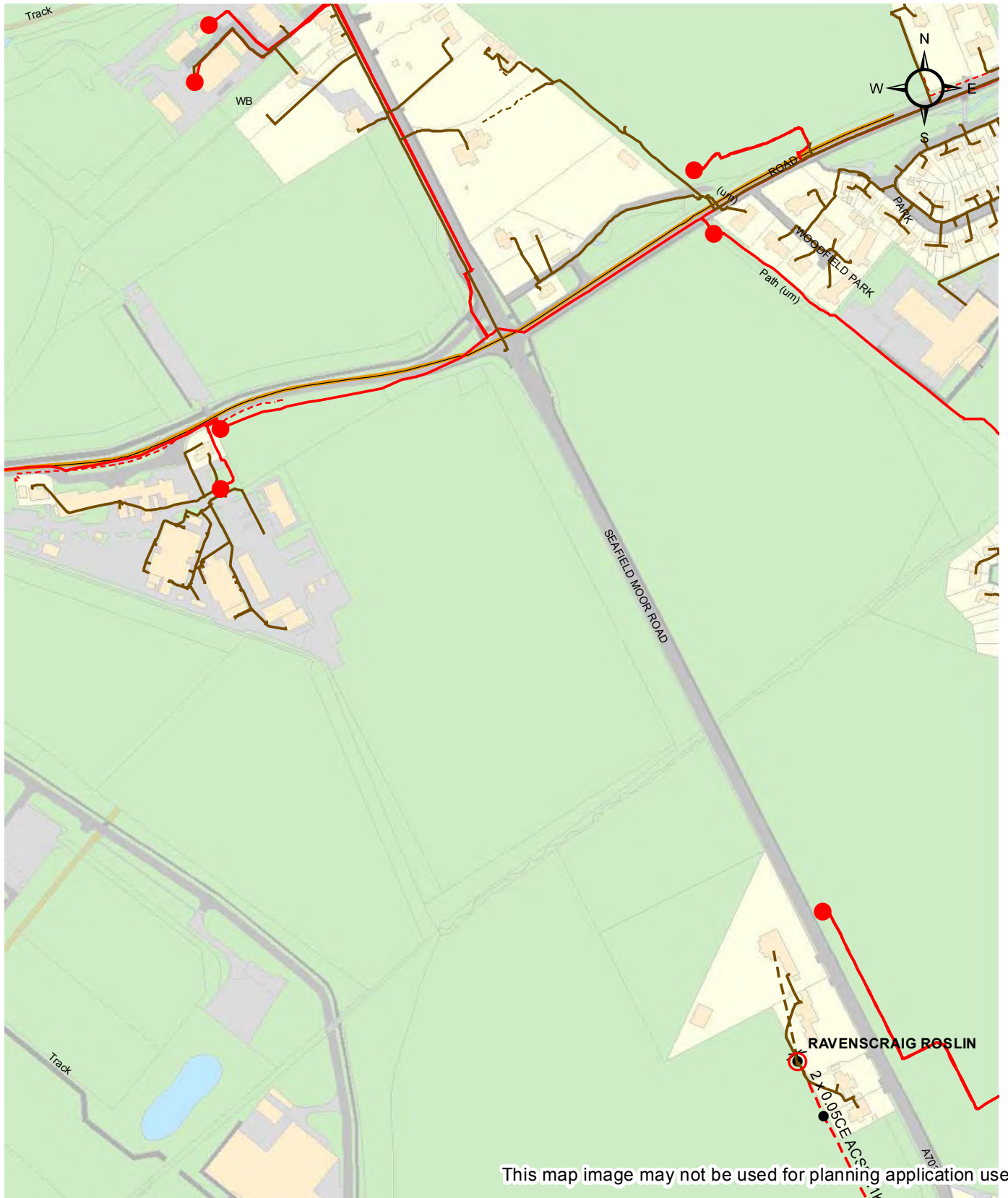
Map Reference : (centre) NT2554064372

Easting/Northing : (centre) 325540,664372

Issued : 03/05/2021 22:11:03

WARNING: IF PLANNED WORKS FALL INSIDE HATCHED AREA IT IS ESSENTIAL BEFORE PROCEEDING THAT YOU CONTACT THE NATIONAL NOTICE HANDLING CENTRE. PLEASE SEND E-MAIL TO: nnhc@openreach.co.uk

GOWLEY MOSS SITE2



This map image may not be used for planning application use



SP ENERGY NETWORKS

On behalf of SP Distribution plc & SP Transmission plc

Information about apparatus given on this drawing is indicative only as the original depths and lines of cables and pipes may have been changed by persons unknown. Normally electricity cables are laid in trenches between 450mm and 1m deep, but cellars or structures such as bridges may prevent cables and pipes being laid at these standard depths. Also, the depth may be above or below the standard due to regrading of the surface or other work after the cables are laid. Where known, non-standard depths are indicated. Any interference with, or damage to, ScottishPower apparatus may result in serious accident. Health and Safety Executive booklet HSG47 provides information on the avoidance of danger from underground services. Authorities and contractors will be held liable both for the full cost of repairs to ScottishPower apparatus and all claims made against ScottishPower by Third parties as a result of interference or damage. In the event of an emergency or should you require further assistance contact 0800-092-9290 (ScottishPower area) or 0800-001-5400 (SP Manweb area).

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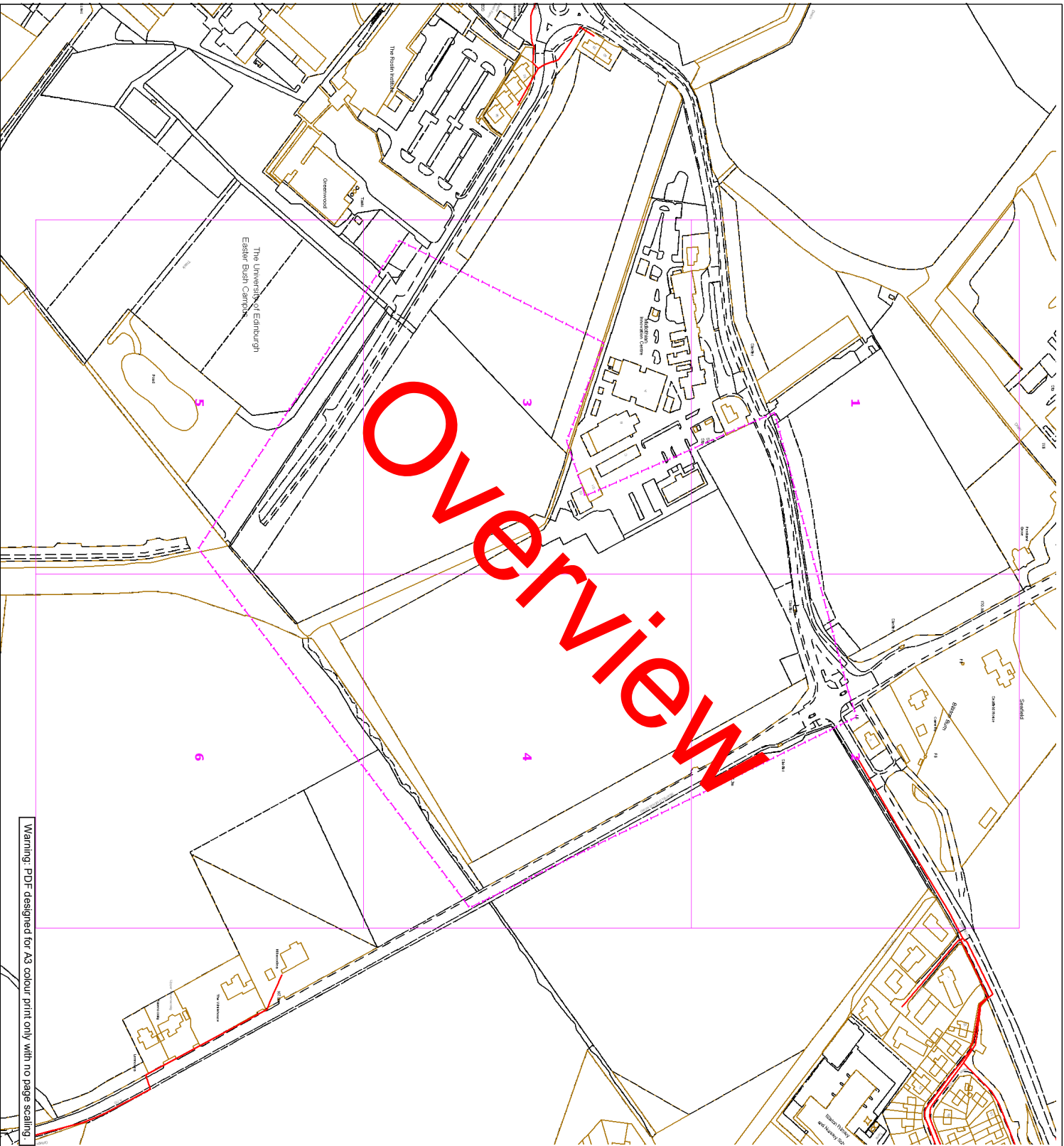
Scale: 1 : 4,040

Date: 03/05/2021

Produced by:
SKF

Produced for:
SKF

X Coord: 325,628
Y Coord: 664,330



Contact Us
Mapping Enquiries: All areas
General Enquiries: All areas

Date Requested: 03/05/2021
Job Reference: 22008785
Site Location: 325528 664366
Requested by: MR SCOTT FARQUHAR
Your Scheme/Reference: GOWKEY MOSS SITE2

This plan shows the location of those pipes owned by Scotia Gas Networks (SGN) by virtue of being a licensed Gas Transporter (GT). Gas pipes owned by other GTs or third parties may also be present in this area but are not shown on this plan. Information with regard to such pipes should be obtained from the relevant owners. No warranties are given with regard to the accuracy of the information shown on this plan. Service pipes, valves, siphons, sub-connections etc. are not shown but their presence should be anticipated. You should be aware that a small percentage of our pipes/assets may be undergoing review and will temporarily be highlighted in yellow. If your proposed works are close to one of these pipes, you should contact the SGN Safety Admin Team on 0800 912 1722 for advice. No liability of any kind whatsoever is accepted by SGN or its agents, servants or sub-contractors for any error or omission contained herein. Safe digging practices, in accordance with HS (G47), must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that plant location information is provided to all persons (whether direct labour or sub-contractors) working for you on or near gas apparatus. Information included on this plan should not be referred to beyond a period of 28 days from the date of issue.

Report damage immediately – KEEP EVERYONE AWAY FROM THE AREA
0800 111 999

Low Pressure Mains
Medium Pressure Mains
Intermediate Pressure Mains
High Pressure Mains

GTs
SSSIs
LAS

Some Examples of Plant Items
Valve
Siphon
Cover
Diameter Change
Material Change

Digsite: Line: Area:



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Contact Us
Mapping Enquiries: All areas
General Enquiries: All areas

Date Requested: 03/05/2021
Job Reference: 22008785
Site Location: 325528 664366
Requested by:
MR SCOTT FAROUJAH
Your Scheme/Reference:
GOWKEY MOSS SITE2
Exact Scales:
1:1000 Area or Circle dig site
1:1000 Line dig site

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0800 111 999

Low Pressure Mains
Medium Pressure Mains
Intermediate Pressure Mains
High Pressure Mains

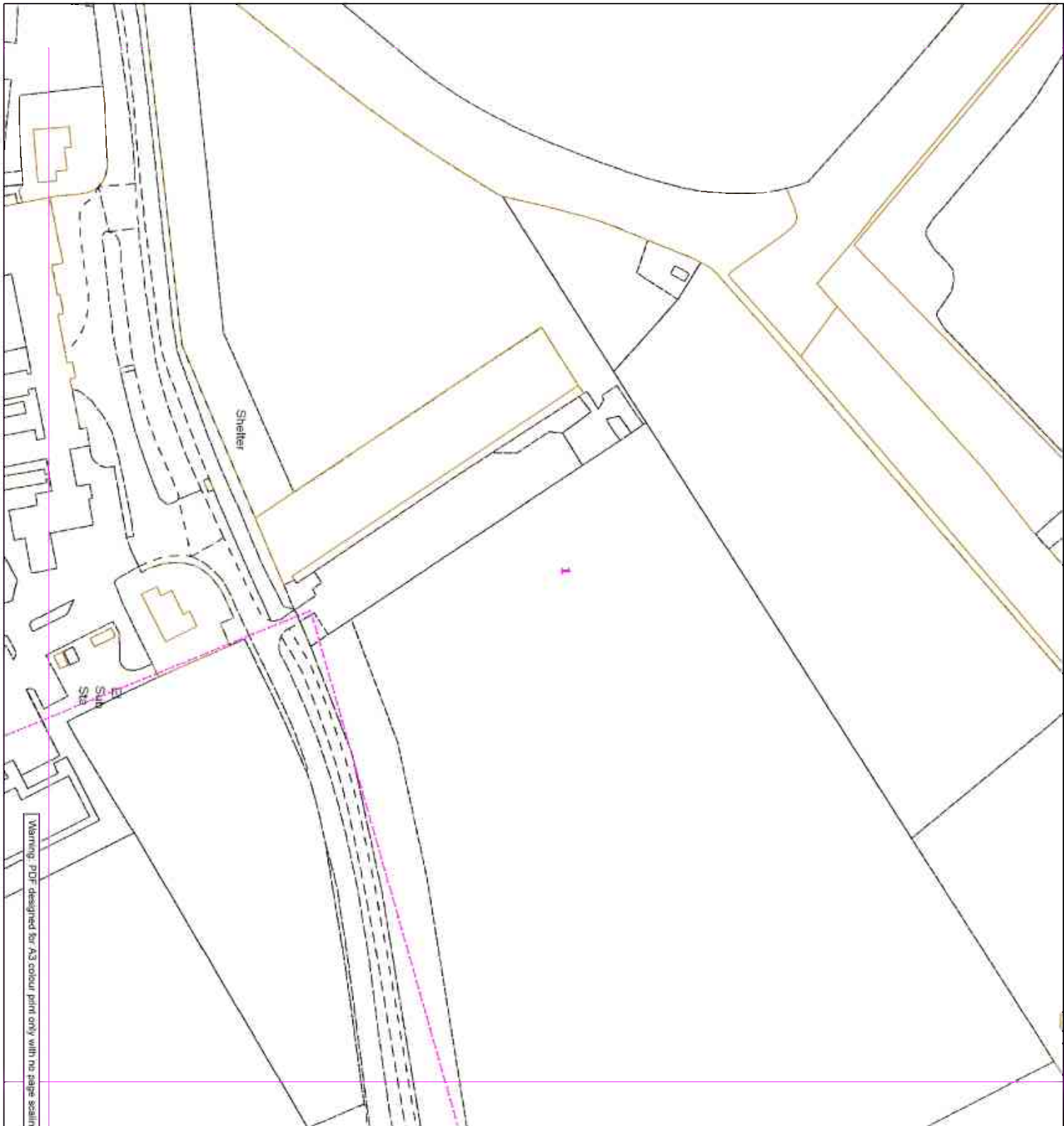
GTs
SSSIs
LAS

Some Examples Of Plant Items
Valve X Siphon O Cover V Diameter Change T Material Change I

Digsite: Line: Area:



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Contact Us
Mapping Enquiries: All areas
General Enquiries: All areas

Date Requested: 03/05/2021
Job Reference: 22008785
Site Location: 325528 664366
Requested by:
MR SCOTT FAROUJAH
Your Scheme/Reference:
GOWKEY MOSS SITE2
Exact Scales:
1:1000 Area or Circle dig site
1:1000 Line dig site

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Report damage immediately – KEEP EVERYONE AWAY FROM THE AREA
0800 111 999

Low Pressure Mains

Medium Pressure Mains

Intermediate Pressure Mains

High Pressure Mains

GTs

LAs

SSSIs

Some Examples Of Plant Items

Valve

Siphon

Cover

Depth of

Diameter

Change

Material

Change

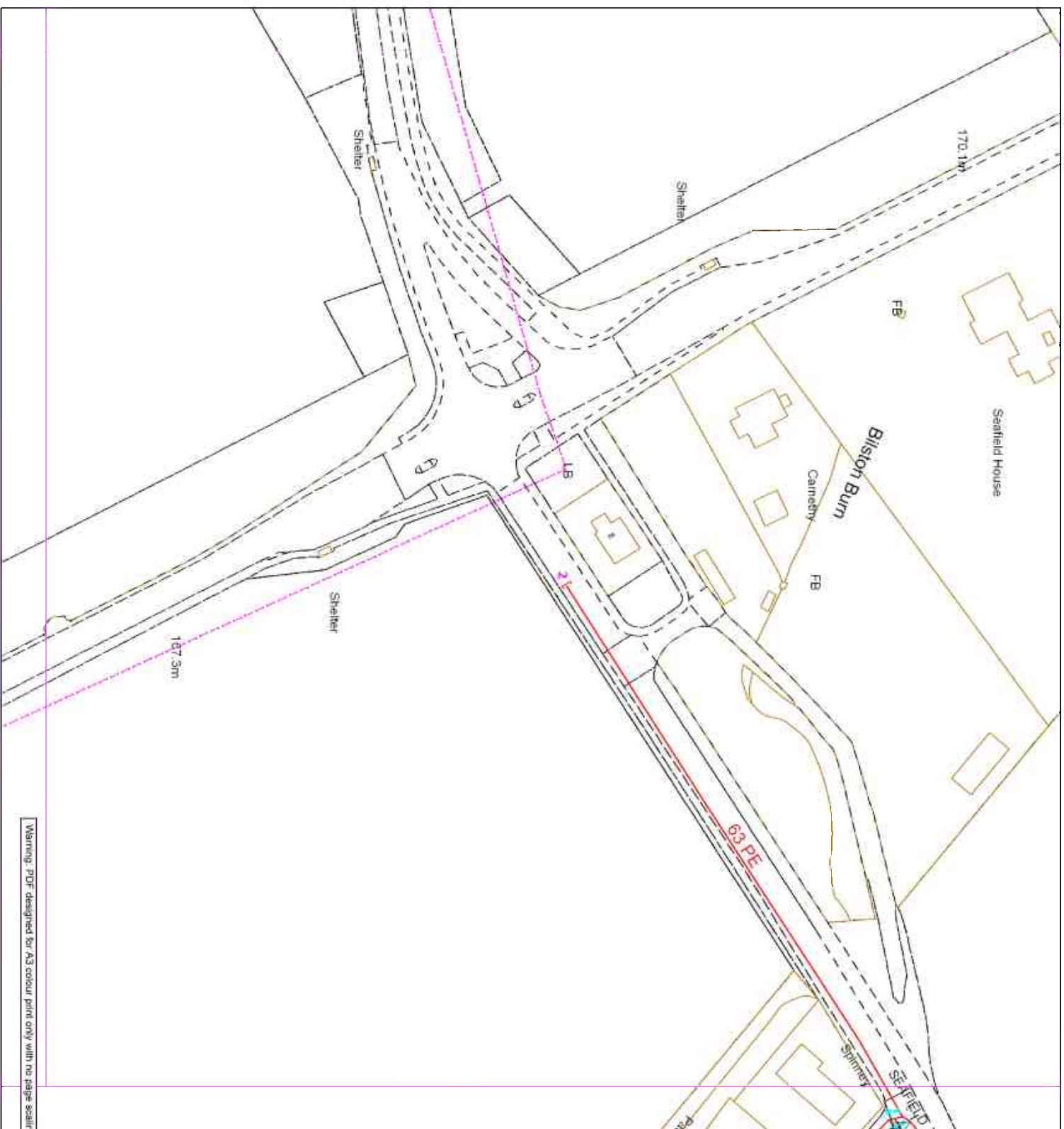
Digsite:

Line:

Area:



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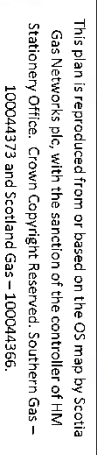
Job Reference: 22008785
Site Location: 325528 664366

GOWKEY MOSS SITE2

Exact Scales:
1:1000 Area or Circle dig site
1:1000 Line dig site

Report damage immediately – KEEP EVERYONE AWAY FROM THE AREA
0800 111 999

Digsite: Line: Area:





Contact Us
Mapping Enquiries: All areas
General Enquiries: All areas

Date Requested: 03/05/2021
Job Reference: 22008785
Site Location: 325528 664366
Requested by:
MR SCOTT FAROUJAH
Your Scheme/Reference:
GOWKEY MOSS SITE2
Exact Scales:
1:1000 Area or Circle dig site
1:1000 Line dig site

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0800 111 999

Low Pressure Mains

Medium Pressure Mains

Intermediate Pressure Mains

High Pressure Mains

GTs

LA5

SSSIs

SSSIs

Some Examples Of Plant Items

Valve

Siphon

Cover

Ditch of

Diameter Change

Material Change

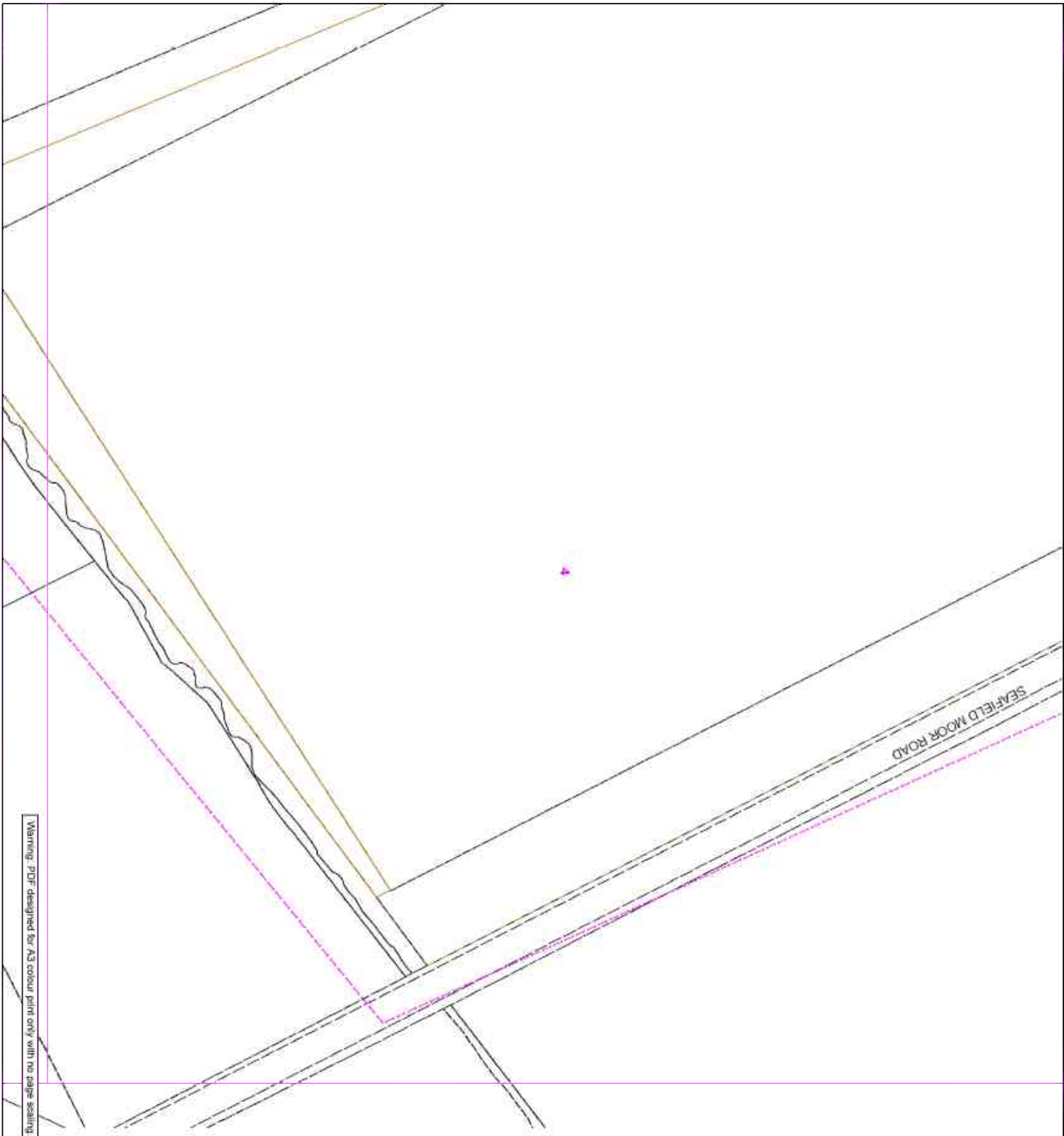
Digsite: Line:

Area:



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Contact Us
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General Enquiries: All areas

Date Requested: 03/05/2021
Job Reference: 22008785
Site Location: 325528 664366
Requested by:
Mr SCOTT FARQUHAR
Your Scheme/Reference:
GOWKEY MOSS SITE2
Exact Scales:
1:1000 Area of Circle dig site
1:1000 Line dig site

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0800 111 999

Low Pressure Mains:
Medium Pressure Mains
Intermediate Pressure Mains
High Pressure Mains

GTs LAs SSSIs
GTs LAs SSSIs

Some Examples Of Plant Items
Value Systems Digging Depth of Danger Material
Change Change Change

Digsite: Line: Area:



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The University of Edinburgh
Easter Bush Campus

Track

Pond

5

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Contact Us
Mapping Enquiries: All areas
General Enquiries: All areas

Date Requested: 03/05/2021
Job Reference: 22008785
Site Location: 325528 664366
Requested by:
MR SCOTT FAROUJAH
Your Scheme/Reference:
GOWKEY MOSS SITE2
Exact Scales:
1:1000 Area or Circle of dig site
1:1000 Line dig site

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0800 111 999

Low Pressure Mains
Medium Pressure Mains
Intermediate Pressure Mains
High Pressure Mains

GTs
LAS
SSSIs


Some Examples Of Plant Items
Valve Siphon Depth of Cover Diameter Change Material Change

Digsite: Line: Area:



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Appendix G – Historic Borehole Logs

Progress	Sample Depth	Samples and Tests		Casing Depth	Level (mOD)	Depth	Description of Strata	Legend	Water Depth	Backfill																																																														
		Type	Result							Symbol	Depth																																																													
21/3 2017	0.05					0.05	# Turf.				0.20																																																													
	0.30					0.30	Brown organic slightly gravelly very sandy CLAY with rootlets. Gravel is cubic subangular fine of sandstone. (TOPSOIL)				0.50																																																													
	0.50	J, T					Medium dense yellowish brown to orangey brown clayey very gravelly medium SAND. Gravel is flat to elongated subangular to subrounded fine to coarse of sandstone and igneous rock.																																																																	
	1.00	B, J, T																																																																						
	1.20	SPT=25 3.5/5.6/7.7 T		1.20																																																																				
	1.60																																																																							
	2.00	U B (43)		2.00			Firm greyish brown gravelly sandy CLAY. Gravel is elongated subangular to subrounded fine to coarse of sandstone and igneous rock.																																																																	
	3.00	SPT=15 2.1/2.2/2.4		3.00							3.40																																																													
	3.70					3.70	END OF BOREHOLE				3.70																																																													
<table border="1"> <thead> <tr> <th colspan="3">Flush</th> <th colspan="3">Chiselling</th> <th colspan="2">Water Added</th> <th colspan="4">Ground-water</th> <th rowspan="2">Diam</th> <th colspan="2">To Depth</th> <th rowspan="2">Location:</th> </tr> <tr> <th>Returns</th> <th>Type</th> <th>To Depth</th> <th>From</th> <th>To</th> <th>Time(hr)</th> <th>From</th> <th>To</th> <th>Struck</th> <th>Rose To</th> <th>Time(mins)</th> <th>Cut Off</th> <th>Boring</th> <th>Casing</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Level: -</td> </tr> <tr> <td colspan="12"></td> <td></td> <td></td> <td>Orientation: Vertical</td> </tr> </tbody> </table>												Flush			Chiselling			Water Added		Ground-water				Diam	To Depth		Location:	Returns	Type	To Depth	From	To	Time(hr)	From	To	Struck	Rose To	Time(mins)	Cut Off	Boring	Casing																Level: -															Orientation: Vertical
Flush			Chiselling			Water Added		Ground-water				Diam	To Depth		Location:																																																									
Returns	Type	To Depth	From	To	Time(hr)	From	To	Struck	Rose To	Time(mins)	Cut Off		Boring	Casing																																																										
															Level: -																																																									
														Orientation: Vertical																																																										
Remarks: # Description based on drillers records. Soil from 2.45 to 3.0 m depth kept in the same liner as U100 at 2.0 m depth. Liner sample from 3.0 to 3.7 m. No recovery for SPT at 3.0 m depth.						Equipment: Dart.		Method: Inspection Pit to 1.20m Window Sampler to 3.70m				Borehole No: BH02																																																												
												Contract No: 2379																																																												
Driller KG		Originator MM		BOREHOLE RECORD Scale 1:50								 Part Fig. No. Sheet 1 of 1																																																												
Chk & App SG		Status Final		SEAFIELD MOOR ROAD, BILSTON																																																																				



BOREHOLE LOG

Bilston, Midlothian

Borehole No

02

Sheet 1 of 2

Status

Final

18/01/2011

Client: The University of Edinburgh.

Consultant: Ironside Farrar Ltd.

Job No: 4293

Date Started: 20/10/2010

Date Complete: 20/10/2010

Hole Type: CP

Equipment: Dando 3600

Initial Boring Diameter: 150mm

Initial Core Diameter

Rotary Casing Type -

Core Barrel:

Core Bit:

Coordinates: E 325793.390 m National Grid

N 664365.300 m National Grid

Ground Level: 164.85 m OD

Plunge: 90 °

Scale: 1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run	U	In Situ Testing		TCR (SCR) RQD	FI	Installation
						Test	Result			
MADE GROUND: Brown very clayey fine to coarse sand with occasional pottery fragments.		0.30	164.55	B 0.05 DJV 0.20 D 0.20 B 0.30-0.80 D 0.70 B 0.80-1.20						
Greyish brown sandy sub angular fine to coarse GRAVEL of various lithologies and sandstone. Occasional sub rounded cobbles of basalt.				D 1.20-1.65 B 1.20-1.70		S	6			
				D 2.30-2.75 B 2.30-2.75		S	7			
Firm brownish grey slightly gravelly sandy CLAY with occasional sub rounded cobbles of sandstone. Gravel is sub angular fine to coarse of various lithologies.		2.75	162.10	B 2.75-3.20 D 3.00 U 3.20-3.65 D 3.60	29					
				D 4.30-4.75 B 4.30-4.80		S	20			
				U 5.40-5.85 D 5.85	43					
				D 6.50-6.95 B 6.50-7.00		S	33			
				D 7.50						

Continued next sheet

U Undisturbed U100 / U86 Sample	TCR Total Core Recovery	S Standard Penetration Test	CP Cable Percussion
P Piston Sample	SCR Solid Core Recovery	C Cone Penetration Test	RO Rotary Open Hole
TW Thin Wall Sample	RQD Rock Quality Designation	32 N for full 300mm penetration	RC Rotary Cored
D Small Disturbed Sample	FI Fracture Index	/175 For given penetration (mm)	SO Sonic Open holed
B Bulk Disturbed Sample	NI Non Intact	/25# Seating blows only (mm)	CONP Continuous Percussion
LB Large Bulk Disturbed Sample	U* Blows to drive U100 / U86	PP Pocket Penetrometer Test	WS Window Sampler
W Water Sample	UT Thin wall undisturbed sample	K Permeability Test (m/s)	Installation
G Gas Sample	NA Not Applicable	L Packer Test (Lugeons)	Slotted Pipe
C Core	NR No Recovery	IV Insitu Vane Test. Peak	Piezometer Tip
J Amber Jar Sample	NP No Penetration	IVR Insitu Vane Test. Residual	Grout
V Vial Sample		HV Hand Vane Test. Peak	Concrete
		HVR Hand Vane Test. Residual	



BOREHOLE LOG

Bilston, Midlothian

Borehole No

02

Sheet 2 of 2

Status

Final

18/01/2011

Client: The University of Edinburgh.

Consultant: Ironside Farrar Ltd.

Job No: 4293

Date Started: 20/10/2010

Date Complete: 20/10/2010

Hole Type: CP

Equipment: Dando 3000

Initial Boring Diameter:

150mm

Initial Core Diameter

Rotary Casing Type

-

Core Barrel:

Core Bit:

Coordinates:

E 325793.390 m National Grid

N 664365.300 m National Grid

Ground Level:

164.85 m OD

Plunge:

90 °

Scale:

1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run	U	In Situ Testing		TCR (SCR) RQD	FI	Installation
						Test	Result			
Firm brownish grey slightly gravelly sandy CLAY with occasional sub rounded cobbles of sandstone. Gravel is sub angular fine to coarse of various lithologies.				U 8.30-8.75	100					
				D 8.80						
				D 9.30						
				D 9.90-10.35 B 9.90-10.40		S	45			
				D 11.00						
				U 11.50-11.95	100					
End of Borehole at 12.00 m		12.00	152.85	D 12.00						

U Undisturbed U100 / U86 Sample
P Piston Sample
TW Thin Wall Sample
D Small Disturbed Sample
B Bulk Disturbed Sample
LB Large Bulk Disturbed Sample
W Water Sample
G Gas Sample
C Core
J Amber Jar Sample
V Vial Sample

Core Run
TCR Total Core Recovery
SCR Solid Core Recovery
RQD Rock Quality Designation
FI Fracture Index
NI Non Intact
U* Blows to drive U100 / U86
UT Thin wall undisturbed sample
NA Not Applicable
NR No Recovery
NP No Penetration

S Standard Penetration Test
C Cone Penetration Test
32 N for full 300mm penetration
/175 For given penetration (mm)
/25# Sealing blows only (mm)
PP Pocket Penetrometer Test
K Permeability Test (m/s)
L Packer Test (Lugeons)
IV Insitu Vane Test. Peak
IVR Insitu Vane Test. Residual
HV Hand Vane Test. Peak
HVR Hand Vane Test. Residual

CP Cable Percussion
RO Rotary Open Hole
RC Rotary Cored
SO Sonic Open holed
CONP Continuous Percussion
WS Window Sampler

Installation
 Slotted Pipe
 Piezometer Tip
 Grout
 Concrete
 Sand Filter
 Bentonite Seal
 Gravel Filler



BOREHOLE LOG

Bilston, Midlothian

Borehole No

02

Information

Status

Final

18/01/2011

Client: The University of Edinburgh.

Consultant: Ironside Farrar Ltd.

Job No: 4293

Date Started: 20/10/2010
Date Complete: 20/10/2010
Hole Type: CP
Equipment: Dando 3000

Initial Boring Diameter: 150mm
Initial Core Diameter
Rotary Casing Type: -
Core Barrel:
Core Bit:

Coordinates: E 325793.390 m National Grid
N 664365.300 m National Grid
Ground Level: 164.85 m OD
Plunge: 90 °
Scale: 1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
20/10/2010	17:00	12.00	7.60	-	

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed
20/10/2010	00:00	1.20	-	5	-	-	-

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.20	N=6 (1,0,1,1,2,2)
2.30	N=7 (2,3,2,2,2,1)
4.30	N=20 (2,3,4,5,5,6)
6.50	N=33 (5,6,7,8,9,9)
9.90	N=45 (7,8,8,10,13,14)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Hand dug inspection pit 0.60m x 0.60m x 1.20m depth. 50mm Standpipe installed at 6.00m on completion.

PERSONNEL

Driller: TQD

Logged by: DWF

Checked by: DWF



BOREHOLE LOG

Bilston, Midlothian

Borehole No

03

Sheet 1 of 2

Status

Final

18/01/2011

Client: The University of Edinburgh.

Consultant: Ironside Farrar Ltd.

Job No: 4293

Date Started: 20/10/2010

Date Complete: 21/10/2010

Hole Type: CP

Equipment: Dando 3000

Initial Boring Diameter:

150mm

Initial Core Diameter

Rotary Casing Type

Core Barrel:

Core Bit:

Coordinates:

E 325851.040 m National Grid

N 664283.960 m National Grid

Ground Level:

164.68 m OD

Plunge:

90°

Scale:

1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run	U	In Situ Testing		TCR (SCR) RQD	FI	Installation
						Test	Result			
MADE GROUND: Brown organic sandy clay with occasional pottery and glass fragments.		0.40	164.28	B 0.10-0.40 DJV 0.20 D 0.20 B 0.40-0.60 D 0.50 B 0.60-1.10 D 1.00 U 1.20-1.65	41					
Soft to firm becoming firm mottled greyish brown slightly gravelly sandy CLAY. Gravel is sub angular to rounded fine to coarse of various lithologies.				D 1.70 D 2.20-2.65 B 2.20-2.80		S	13			
Stiff grey slightly gravelly slightly sandy CLAY with occasional cobbles of sandstone. Gravel is sub angular to sub angular fine to coarse of various lithologies.		3.10	161.58	D 3.10 U 3.30-3.75	53					
				D 3.80						
				D 4.40-4.85 B 4.40-5.00		S	22			
				U 5.40-5.85	80					
				D 5.80						
				D 6.50-6.87 B 6.50-7.00		S	33			
				D 7.50						

Continued next sheet

U Undisturbed U100 / U86 Sample	TCR Core Run	S Standard Penetration Test	CP Cable Percussion
P Piston Sample	SCR Total Core Recovery	C Core Penetration Test	RO Rotary Open Hole
TW Thin Wall Sample	RQD Solid Core Recovery	32 N for full 300mm penetration	RC Rotary Cored
D Small Disturbed Sample	FI Rock Quality Designation	175 For given penetration (mm)	SO Sonic Open Holed
B Bulk Disturbed Sample	NI Fracture Index	125# Seating blows only (mm)	CONP Continuous Percussion
LB Large Bulk Disturbed Sample	NI Non Intact	PP Pocket Penetrometer Test	WS Window Sampler
W Water Sample	U* Blows to drive U100 / U86	K Permeability Test (m/s)	Installation
G Gas Sample	UT Thin wall undisturbed sample	L Packer Test (Lugeons)	Slotted Pipe
C Core	NA Not Applicable	IV Insitu Vane Test. Peak	Piezometer Tip
J Amber Jar Sample	NR No Recovery	IVR Insitu Vane Test. Residual	Grout
V Vial Sample	NP No Penetration	HV Hand Vane Test. Peak	Concrete
		HVR Hand Vane Test. Residual	Sand Filter
			Bentonite Seal
			Gravel Filter



BOREHOLE LOG

Bilston, Midlothian

Borehole No

03

Sheet 2 of 2

Status

Final

18/01/2011

Client: The University of Edinburgh.

Consultant: Ironside Farrar Ltd.

Job No: 4293

Date Started: 20/10/2010

Date Complete: 21/10/2010

Hole Type: CP

Equipment: Dando 3000

Initial Boring Diameter:

150mm

Initial Core Diameter

Rotary Casing Type

-

Core Barrel

Core Bit:

Coordinates:

E 325851.040 m National Grid

N 664283.960 m National Grid

Ground Level:

164.68 m OD

Plunge:

90 °

Scale:

1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run	U	In Situ Testing		TCR (SCR) RQD	FI	Install -ation
						Test	Result			
Stiff grey slightly gravelly slightly sandy CLAY with occasional cobbles of sandstone. Gravel is sub rounded to sub angular fine to coarse of various lithologies.				D 8.10-8.55						
				D 8.60						
				D 9.20						
				D 9.70-10.12 B 9.70-10.20		S	50/265			
				D 10.80						
				U 11.50-11.95	100					
End of Borehole at 12.00 m		12.00	152.68							

U Undisturbed U100 / U86 Sample
P Piston Sample
TW Thin Wall Sample
D Small Disturbed Sample
B Bulk Disturbed Sample
LB Large Bulk Disturbed Sample
W Water Sample
G Gas Sample
C Core
J Amber Jar Sample
V Vial Sample

TCR Total Core Recovery
SCR Solid Core Recovery
RQD Rock Quality Designation
FI Fracture Index
NI Non Intact
U* Blows to drive U100 / U86
UT Thin wall undisturbed sample
NA Not Applicable
NR No Recovery
NP No Penetration

S Standard Penetration Test
C Cone Penetration Test
32 N for full 300mm penetration
/175 For given penetration (mm)
/25# Seating blows only (mm)
PP Pocket Penetrometer Test
K Permeability Test (m/s)
L Packer Test (Lugeons)
IV Insitu Vane Test. Peak
IVR Insitu Vane Test. Residual
HV Hand Vane Test. Peak
HVR Hand Vane Test. Residual

CP Cable Percussion
RO Rotary Open Hole
RC Rotary Cored
SO Sonic Open holed
CONP Continuous Percussion
WS Window Sampler

Installation

Slotted Pipe

Piezometer Tip

Grout

Concrete

Sand Filter

Bentonite Seal

Gravel Filter



BOREHOLE LOG

Bilston, Midlothian

Borehole No

03

Information

Status

Final

18/01/2011

Client: The University of Edinburgh.

Consultant: Ironside Farrar Ltd.

Job No: 4293

Date Started: 20/10/2010
Date Complete: 21/10/2010
Hole Type: CP
Equipment: Dando 3000

Initial Boring Diameter: 150mm
Initial Core Diameter
Rotary Casing Type: -
Core Barrel:
Core Bit:

Coordinates: E 325851.040 m National Grid
N 664283.960 m National Grid
Ground Level: 164.68 m OD
Plunge: 90 °
Scale: 1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
20/10/2010	17:00	5.90	4.70	-	Dry
21/10/2010	07:30	5.90	4.70	-	
21/10/2010	17:00	12.00	6.10	-	Dry

DRILLING DETAILS

CP Chiselling			Rotary			
From	To	Hours	From	To	Hole Dia	Core Dia
11.10	11.30	0.50				

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed
20/10/2010	00:00	3.30	2.80	20	3.00	-	-

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm increments
2.20	N=13 (2,2,2,2,4,5)
4.40	N=22 (3,4,4,6,6,6)
6.50	N=33 (7,9,10,23,0,0)
9.70	50/265mm (9,9,10,15,15,10)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Hand dug inspection pit 0.60m x 0.60m x 1.20m depth. 50mm standpipe installed at 6.00m on completion.

PERSONNEL

Driller: TQD

Logged by: DWF

Checked by: DWF

Appendix 6 Methodology for Exposure Assessment and Ground Gas Risk Assessment

METHODOLOGY FOR EXPOSURE ASSESSMENT

The following is a general statement of JPB's methodology for investigating and assessing potentially contaminated sites for the purposes of identifying constraints posed by contamination issues. There is a large body of authoritative technical guidance in this field and it would not be either appropriate or worthwhile for this methodology to repeat verbatim that guidance, and the methodology does not seek to do so. Each site will be different, with different constraints and challenges and site specific investigation and assessment details for individual sites are given within the text of each report. The following text provides an informative summary of the methodology JPB generally apply to such sites.

Regulatory Framework

The assessment of potentially contaminated sites and the associated risk to the proposed development is dependent on a number of factors namely; the intended site end use, distribution and level of contamination, characteristics of the soil (i.e. pH, permeability) the groundwater regime and the sensitivity of the surrounding area. An analysis of the interaction between these various factors allows a decision to be made with regard to the extent of any remedial measures required for the development.

The contaminated land provision of the Environment Protection Act 1990, inserted by Section 57 of the Environment Act 1995, came into force in July 2000. In May 2006 the Scottish Executive issued a revised Statutory Guidance Edition 2 (SE/2000/43). Within this "Contaminated Land" is defined as

"any landin such a condition by reason of substances in, on or under the land, that

- a) significant harm is being caused or there is a significant possibility of such harm being caused; or*
- b) pollution of the water environment is being, or is likely to be caused;"*

In addition *"the questions*

- a) what harm or pollutant of the water environment is likely to be regarded as significant*
- b) whether the possibility of the significant harm or significant pollution of all the water environment being considered significant"*

In addition, PAN 33 is affected by this and embodies a "suitable for use approach" for land for development, which requires remediation only where there are unacceptable risks to health and the environment depends on the current and proposed end use.

In addition, the guidance requires a significant contaminant linkage to be present which includes;

- A source (pollutant)
- A pathway
- A receptor

JPB have therefore developed a risk assessment approach based on this philosophy, the methodology used is represented diagrammatically in the attached flow chart.

Stage 1 - Preliminary risk assessment-

Desk Study

The methodology utilised for desk studies follows the specifications outlined in CLR2 "Guidance on Preliminary Site Inspection of Contaminated Land", CLR6 "Prioritisation and Categorisation Procedure for Sites which May be Contaminated", CLR11 Model Procedures for the Management of Land Contamination, DEFRA/EA 2004, Contaminated Land Risk Assessment, CIRIA C552 and BS 10175 "Investigation of Potentially Contaminated Sites – Code of Practice", BSI.

During the study, documentary research will include an examination of the Ordnance Survey maps for details regarding previous site and adjacent land uses. Similarly, the available geological maps will be examined to determine the geological/hydrogeological conditions beneath and adjacent to the site. In addition, regional memoirs will be consulted together with mine abandonment plan data and any available borehole records, in order to assess the mining conditions. The assessment also takes cognisance of the information contained in the guidance documents "Risk Based Approach to Development Management – Resources for Developers" published by the Coal Authority and CIRIA SP32 "Construction over Abandoned Mineworkings".

A walkover survey will be carried out to determine the existing site conditions and operations. In addition, a photographic record of the site is taken during the walkover survey.

Information will also be obtained from the SEPA, BGS and Coal Authority websites and other authoritative online resources and from a review of in-house information. A report of environmental database information may also be obtained.

Conceptual Site Model

A Conceptual Site Model (CSM), which describes how potential chemical sources at the site could contribute to increased levels of risk to potentially sensitive receptors, is developed at an early stage and constantly reassessed in light of investigative findings. CSMs are generated in accordance with Guide to Good Practice for the Development of Conceptual Models and the Selection and Application of Mathematical Models of Contaminant Transport Processes in the Subsurface - National Groundwater & Contaminated Land Centre report NC/99/38/2 – Environment Agency 2001.

The first step in developing such a model is to identify whether there are potential hazards which may pose a risk on the site through desk top research and professional judgement. In addition, information regarding the site-specific environmental setting including geology, hydrogeology, hydrology etc, is gathered in order to assess the potential exposure pathways which are likely to exist and the location of humans and environmental resources which could be impacted by the site.

Following this desk-based study and the development of an initial CSM (ICSM), a site investigation is designed in order to determine whether any potentially significant contaminant linkages actually exist on the site. The information gathered during the investigation is then used to revise the ICSM and as the basis of the risk assessment process. While any investigation strategy will be specific to each site the following general comments can be made.

Design of Site Investigations

JPB design and implement site investigations cognisant of the guidance given in BS10175. Care is taken to target investigations at potentially contaminated locations identified in the ICSM from researches and from site visits or other available information. In addition, during the performance of investigations locations are refocused in the light of known site conditions. Further investigations are also undertaken at randomly selected locations resulting in a mixture of random and targeted investigation locations.

The requirement for adequate site coverage is a key consideration at the design stage and the number and type of investigation locations is determined by the available information, the brief and the requirements of the guidance given in CLR4 and R & D Publication Report P5-066/TR Secondary Model Procedure for the development of Appropriate Soil Sampling Strategies for Land Contamination. BS10175 indicates that in order to provide adequate site coverage a sampling grid of between 10m and 25m should normally be applied for a main investigation, for example where a residential development is considered. Where the ICSM indicates there to be no potential source of contamination on the site, or other land uses are envisaged, JPB consider that a wider grid, for example 50m spacing, may be adopted.

Site Zoning

Some sites may need to be divided into geographical sectors where, for example, historical land uses differ or the type of development varies across the site in accordance with R & D Technical Report P5-066/TR. Good practice guidance describes averaging areas as “areas of soil to which a receptor is exposed or which otherwise contributes to the creation of hazardous conditions”. Where made ground material is contaminated at variable concentrations, but within a single geological unit, JPB consider that this unit can be adopted as an averaging area for the purposes of making an assessment of human health risks. However, where measured contamination concentrations include statistical outliers of high concentration, where different historical land uses have resulted in different patterns of contamination or where there is a clear distribution of higher contaminant concentrations in one sector of the site, averaging areas are chosen to reflect this contaminant distribution. Single high contaminant concentrations may indicate the presence of “hotspots” which may merit closer scrutiny or additional investigation.

Site Coverage

Investigation locations such as trial pits and boreholes are positioned to provide adequate site coverage, where access is available and avoiding existing services. Boreholes are situated at a mixture of targeted and random locations at the site where access is possible.

During the investigation the sampling strategy in CLR 4 “Sampling strategies for contaminated land” together with the guidance given in R & D Publication Report P5-066/TR is followed. The rationale behind the sampling strategy given in the R & D publication is:

Depth of sample	Rationale
0-0.5	<p>To assess</p> <ul style="list-style-type: none"> Human/animal intake arising from ingestion and dermal contact. Potential for wind entrainment leading to inhalation (of contaminated soils and dusts) or deposition onto neighbouring land. Surface water run-off (e.g. due to flash flooding). Uptake by shallow rooting plants (e.g. crops, ornamental and wild species). Surface leaching to groundwater.
0.5m in made or natural ground	<p>To assess</p> <ul style="list-style-type: none"> Intake via ingestion/inhalation/dermal contact from “abnormal” (or unpredicted) excavation (e.g. children digging dens) or for other purposes such as swimming pools, ponds house extensions). Uptake by deep rooting shrubs and trees. Intake by, or arising from, the activities of burrowing animals. Intake arising from construction / maintenance of buildings and services for example. Foundations (usually within 2m of formation level). Water supply pipes, telecommunications, gas & power (0.5-1m of final formation level). Sewers (from 0.5 > 1m of final formation level). <p>To locate perched water or groundwater. To confirm depth of made ground. To locate possible lateral pathways for gas or vapour migration in made ground. To establish extent of any leaching of soluble constituents from superficial soils. To detect “deep” contaminants (e.g. gas generating materials, leachable materials, dense solvents located on top of an impermeable stratum). To obtain information of “background” soil properties. To locate “natural” lateral migration pathways.</p>

Samples are generally taken at shallow depth, then at where relevant changes are noted in materials with depth. Where any made ground is thick and relatively uniform samples are taken at least every 0.5m to 1.0m. Where organic contamination is observed within made ground, a sample of natural soil is generally taken from beneath each made ground horizon where the base is proven. Samples are recovered from each trial pit. Samples are recovered at these regular intervals with additional samples of any atypical horizons also taken. It should be noted that there will always be the possibility of additional unrecorded conditions outwith the sampling points. Samples obtained are stored within appropriate containers and dispatched for analysis within 24 hours of sampling.

Attempts are made to recover water samples from all of the boreholes at which standpipes are installed. Each borehole is extensively purged to a volume in excess of three times the well volume, where feasible, using a submersible mini-whale pump or bailer. Purging before sampling allows a more representative water sample of groundwater to be obtained and ensures that any water initially present in the boreholes is removed as this may have been chemically altered due to reaction with air or with installation materials. Water samples are transferred to appropriate containers before being transported to the testing laboratory in cooled conditions.

Testing parameters scheduled on soil and water samples are based on historical and current operations information and their importance in relation to health risks, phytotoxicity, impact on the water environment, protection of building materials, services and structures from chemical attack and potential impact on the quality of potable water supplies. Where possible chemical testing is targeted at locations at the site where particular contaminants are anticipated, with additional testing scheduled to give horizontal and vertical site coverage. Selection of test parameters is performed on a site specific basis as described in the text of each investigation report.

Stage 2 Generic Quantitative Risk Assessment

The next stage of the site-specific assessment is to perform a Stage 2 risk assessment using the information gathered during the site investigation to determine the actual nature and extent of contamination, evaluating the data using conservative generic criteria to determine whether any recorded levels of contaminants could be potentially of concern.

Stage 2 Criteria

The Stage 2 generic quantitative assessment of risks to human health, property, ecology, surface water and ground water considers the potential for exposure based on comparison of the results to conservative generic criteria.

Human Health Risks

DEFRA and the Environment Agency including; Soil Guideline Values (SGVs) derived using the CLEA model and the methodology described in EA Science Report SC050021/SR3, EA CLEA science reports and the associated TOX and SGV series of reports. In addition, JPB have adopted S4UL values published by LQM/CIEH and GAC values published by EIC/AGS/CL:AIRE as GACs and, where other suitable values are not available, GACs derived by JPB generated using the CLEA model and in accordance with the above guidance.

The Contaminated Land Exposure Assessment (CLEA) model was developed for the Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency. The model estimates child and adult exposures to soil contaminants for those potentially living, working and/or playing on contaminated sites over long time periods and has been used to produce the Soil Guideline Values for the UK, first published in 2002. The guidance was updated following the “Way Forward” process, and the revised technical guidance and SGVs above published in 2009.

The CLEA model used to derive generic criteria has undergone a number of updates, the model used for the derivation of current published criteria; SGVs, S4ULs, EIC/AGS/CL:AIRE was Version 1.06. S4ULs were, however, derived using some exposure parameters amended in the light of the C4SL project (see below).

The CLEA model calculates GACs which represent doses “without appreciable health risk” or “minimal human health risk” depending on whether a contaminant is a threshold or non-threshold substance. An update (version 1.071) was released in 2015, and includes the library data sets from the DEFRA research project SP1010 (Development of Category 4 Screening Levels (C4SLs) for assessment of land affected by contamination), allowing the derivation of generic criteria characterised as representing “low” levels of risk.

In addition, CLEA 1.071 continues to allow the derivation of GACs which represent doses “without appreciable health risk” or “minimal human health risk”. This procedure has been adopted to calculate JPB derived GACs using CLEA 1.071. JPB derived criteria are based on conservative assumptions including; the development of small terraced houses on the site, a soil organic matter content of 1% and pH value of 7.

C4SLs represent a higher, but still low, level of risk than SGVs, S4ULs, EIC/AGS/CL:AIRE or JPB GACs. Although they represent different levels of risk, JPB consider that both C4SLs and other JPB GACs are appropriately protective generic criteria for assessing contaminated land for the following reasons. S4ULs, EIC/AGS/CL:AIRE and JPB GACs have been derived in accordance with technical guidance and a risk assessment model which are scientifically based and have been published by authoritative bodies. C4SLs have been confirmed to represent levels of risk which are lower than is required to meet the definition of “contaminated land” (“Simplification of the contaminated land regime”, Impact Assessment: Defra 1133). Their use is also endorsed by DEFRA in their Policy Companion Document to the SP1010 project which states that C4SLs “are intended to be more pragmatic (whilst still strongly precautionary) compared to existing generic screening levels”.

Where available C4SL values have been adopted as JPB GACs. However, to date only a limited number of HCVs for C4SL have been published and consequently a limited number of contaminants have published C4SLs. As selecting an appropriate C4SL HCV requires specialist toxicological competences, JPB have not derived HCV for additional contaminants. Where a published C4SL is not available for a particular contaminant, JPB have adopted a GAC derived using the CLEA model and based on “without appreciable health risk” or “minimal human health risk” risk levels. Where an S4UL or EIC/AGS/CL:AIRE value is available it has been adopted as a GAC, where no C4SL, S4UL or EIC/AGS/CL:AIRE GAC is available, JPB GAC derived in accordance with the above guidance have been adopted.

Annex E of SP1010 indicates that in order to apply the benzo(a)pyrene surrogate approach and C4SL used in the above guidance, the assumptions made in its derivation must be verified, in particular the PAH profile in the site soils must be similar to the test material used in the toxicological study on which the C4SL HCV is based. To assess the PAH profile in the test soil samples, JPB calculate the ratio of seven other genotoxic PAHs (benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene and indeno(1,2,3-c,d)pyrene), relative to benzo(a)pyrene, to ensure the site soil PAH profile is similar to the test material used in the study. The ratios relative to benzo(a)pyrene must fit within the upper and lower limits detailed in Table 2.5 and Figure 2.1 of Annex E.

These ratios are calculated for soils at each site and the result appended to the report. It should be noted that PAH ratios are calculated for samples with appreciable PAH contents, as the above ratio test does not work correctly where some genotoxic PAH concentrations are near or below laboratory reporting limits as ratios become skewed by zero or “less than reporting limit” values.

Phytotoxic Risks

To assess the site’s potential for phytotoxicity JPB refer to the MAFF/DoE document “Review of the Rules for Sewage Sludge Application to Agricultural Land – Soil Fertility Aspects of Potentially Toxic Elements” in the absence of other definitive phytotoxic screening levels. This document is authoritative and scientifically based, it sets out total concentrations of various metallic elements which shouldn’t be exceeded in order to maintain soil fertility and avoid toxicity. Therefore, it is considered that these limits can be applied to contaminated land and other situations, e.g. they have been adopted by DEFRA in its “Soil Code” and by the Forestry Commission. It should be noted that plant growth can also be significantly affected by many other factors including: pH, nutrient availability, soil texture and structure, temperature, moisture content and aeration. In addition, reference has been made to “Soil Code” (MAFF 1998), and CLR2, “Guidance on Preliminary Site Inspection of Contaminated Land”.

Structures and Services

Where structures or services are considered to be viable receptors, risks are assessed using contemporary best practice guidance given in documents published by the Building Research Establishment (BRE), CIRIA, Water Research Council (WRc), UKWIR, the HSE and other relevant organisations.

Risks posed to buildings and services due to aggressive soil sulphate, chloride and pH conditions are assessed using the guidance given in BRE Special Digest 1 (2005), Concrete in aggressive ground.

Water Supply Pipes

Risks posed by soil and groundwater contaminant concentrations to water supply pipes are assessed in accordance with the UK Water Industry Research (UKWIR) document, "Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites", UKWIR report reference 10/WM/03/21, 2010. This guidance identifies the chemicals present in soils which can either permeate pipes or impact on their integrity by causing swelling, cracking and degradation or corrosion. The main focus is, therefore, on organic contaminants and on the soil's conductivity, pH and redox potential. Due cognisance is also taken of the requirements and guidance issued by utility companies.

UKWIR guidance states that where a site has been greenfield and no chemicals have been historically or currently stored or used on it (or part of the site meets these criteria), no restriction is made on the type of water pipes which can be used on the site (or part of the site as appropriate). Direct communication between JPB and Scottish Water (SW) indicates that SW will not require intrusive investigations on sites which have been greenfield throughout their history, providing supporting documentary evidence is supplied.

Where investigations are required, samples are obtained from locations on site as identified in the site ICSM. Where the route of water supply pipes is known, sample locations during investigations would include locations on or within 15m either side of the route, otherwise investigation coverage for the whole site is as described previously in this methodology, as recommended in section 2.5.5 of the UKWIR report and in SW guidance.

Selected soil samples are tested for the parameters recommended in the UKWIR guidance; VOCs (including TIC), SVOCs (including TIC), amines, petroleum hydrocarbons (including "mineral oils"), conductivity, pH value and redox potential. Results of analyses are collated and compound group concentrations summed as described in section 2.7.9 of the UKWIR guidance, these sums are adopted as Representative Contaminant Concentrations (RCCs). The maximum concentration recorded at the site (or if appropriate within a particular site zone) for each substance is used for summing and tabulation, this is a conservative assumption.

The RCCs are compared with the UKWIR threshold values for polyethylene (PE) and polyvinylchloride (PVC pipes) detailed in Table 3.1 of the UKWIR, which have been adopted as JPB GACs. Exceedence of a single GAC indicates PE or PVC pipework is not appropriate and other pipe materials should be selected. Consideration of the corrosive properties of soils is also required where PE, PVC or barrier pipes are not selected as appropriate. The comparison of RCCs with GACs and the other criteria in Table 3.1 of the UKWIR guidance results in a list of pipe materials which would be suitable in terms of chemical properties, a preferred selection can then be made on the basis of cost, appropriateness etc. or the choice of specific materials to be used made by the engineer/developer. Further recommendations on standards and specifications for water supply pipes and fittings for various pipe materials are given in Part 4 of the UKWIR guidance.

Combustibility

Where potentially combustible materials are encountered the following assessment methodology is adopted. Despite the potential for combustion in many sites characterised by carbonaceous materials, the number of recorded instances of actual combustion are very few and there has been no definitive study of the phenomena. Consequently, there are no commonly accepted criteria for comprehensively assessing and dealing with the risk of spontaneous combustion. The ICRCL Guidance Note 61/84 "notes on fire hazards of contaminated land" suggests that there is an unacceptable risk of combustion if the material has a Calorific Value in excess of 10 MJ/kg or perhaps only 7 MJ/kg.

However, a paper presented at the Fourth Mineral Waste Utilisation Symposium related to the Utilisation of Coal Refuse for Highway Base or Sub-base Material. In this paper it states that "low permeability values are desirable in order to reduce air circulation and the potential for spontaneous combustion". It then goes on to suggest that "proper compaction of coal refuse reduces air voids to less than 10% and the potential for spontaneous combustion is substantially reduced".

There is an imprecise relationship between Loss on Ignition and Calorific Value but previous comparisons by JPB have indicated 10 MJ/kg to be roughly equivalent to 30% Loss on Ignition and 7 MJ/kg to be roughly equivalent to 23% Loss on Ignition.

JPB adopts the following guidelines:

- i) combustion may be induced and supported only if the Loss on Ignition value exceeds about 20% and the Calorific Value exceeds 7 MJ/kg.
- ii) carbonaceous material needs to be of some bulk ie thicker than 1 metre and greater than 10 m³ in volume.
- iii) spontaneous combustion should not occur in thoroughly compacted material to which air is excluded.

Water Environment

Current SEPA guidance described in document WAT-PS-10-01: Assigning Groundwater Assessment Criteria for Pollutant Inputs (Live Document) notes that for land contamination four receptors were to be assessed, if identified as being present, namely; surface water; groundwater abstraction, groundwater resource, and groundwater dependant terrestrial ecosystem (GWDTE or wetland). Routine leachability testing is carried out for water soluble contaminants in order to determine if there is a threat from soil borne contaminants to ground and surface waters.

For the protection of surface waters and groundwater resources the concentration of each contaminant in soil leachates, groundwaters and surface waters are compared against relevant assessment limits. The assessment limits may be a UK Drinking Water Standard (UKDWS), Resource Protection Value (RPV) or EQS depending on the nature of the receptor which is being considered to potentially be at risk. In addition, reference is made to SEPA guidance document WAT-SG-53: Supporting Guidance, Environmental Standards for Discharges to Surface Waters, The Scotland River Basin District (Standards) Directions 2014, UKTAG's m-BAT tool and SEPA's River Basin Management Plans.

Where no assessment limit has been provided by SEPA, other limits may be adopted such as WHO Drinking Water Guidelines, US EPA National Primary Drinking Water Regulations or the laboratory's minimum reporting limit (MRL).

Stage 2 Risk Evaluation

Stage 2 risk-based guidance levels such as GACs are conservative generic values against which measured contaminant concentrations can be compared. Where measured concentrations are found to be below these screening criteria then the contamination identified is not considered to pose a significant risk. The guidance used to evaluate investigation data is chosen to be relevant for the particular risk and receptor being assessed as well as being applicable to the legislative issues of concern. Where measured concentrations of contaminants exceed generic criteria, the risks posed by the contaminants of concern are considered more fully in a Stage 3 risk assessment. Where no generic criteria are available for a substance, an automatic Stage 3 assessment is carried out if the contaminant is present above laboratory reporting limits.

Stage 2 criteria adopted by JPB for risk assessments are included in reports. If any of the appropriate criteria contained in these documents are exceeded, the conclusion is that significant risk could exist and that a further assessment (Stage 3) is warranted in order to calculate the potential levels of risk. This process, therefore, focuses on the contaminants of concern and can, if necessary, inform any further investigations which may be required for more detailed examination.

Derivation of JPB Human Health Criteria

Assessment of risks to human health

Each contaminant exceeding Stage 2 criteria is examined for its potential to cause harm. Consideration is then given to the significant contaminant linkages which are plausible for the identified hazards, i.e. whether a contaminant can conceivably come into contact with a specified receptor group. It is possible that a contaminant may be deemed a hazard due to its presence above screening criteria but ultimately not constitute a risk as no viable pathway exists between the source and the receptor. The relative sensitivity of all potential receptors identified is quantitatively assessed using the data obtained during the desk study and site investigation phases.

The risk to human health is determined using an exposure assessment, an estimate of potential doses of the chemicals in exposed individuals via the pathways identified in the ICSM. This focuses on a hypothetical individual within each exposed population and involves the use of models which incorporate assumptions regarding human behaviour and physiological attributes. The assumptions are made in a “worst case” or “reasonable worst case” manner to provide estimates of dose which are unlikely to be exceeded by receptors at or in the vicinity of the site. The main focus of the exposure assessment is the estimation of long-term (chronic) dose levels from repeated exposure to chemicals in the soil and groundwater. In some cases, for example cyanides, acute exposure is also considered. Exposure to each chemical is estimated for each viable pathway and for any potential sensitive receptors.

The purpose of the human health assessment is to identify the levels of exposure to contaminants which, if not exceeded, do not cause unacceptable adverse health effects. The subject of human health assessments is covered in depth in the DEFRA/EA Science reports to which the reader is referred for further background information, however, a short review is given below.

Health Criteria Values

Human health assessment criteria are derived by comparing the estimated exposure of critical receptors to the contaminants with Health Criteria Values (HCVs). HCV represent a tolerable or minimal risk to health from chronic exposure to these contaminants or, in the case of C4SLs, a “low” risk level. Acute health risks must be assessed separately. Health Criteria Values are derived through the collation and review of toxicological data and its subsequent use in the derivation of soil contaminant intakes that are considered to be protective of human health. These intakes are guidelines to a risk assessor on the level of long-term human exposure to individual chemicals in soil that are tolerable or pose a minimal risk, or in the case of C4SLs pose a low but acceptable risk. HCVs are established from a review of the evidence from occupational and environmental epidemiological studies, animal studies and from scientific understanding of the mechanisms of absorption, transport, metabolism and toxicity of chemicals within the human body.

The derivation of HCVs for tolerable or minimal risks is described in detail within EA Science report-SC050021/SR2. The derivation of HCVs representing low risks used to derive C4SLs is described in DEFRA report SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination.

Contaminants generally exhibit two possible types of toxicity, threshold toxicity and non-threshold toxicity. For contaminants which exhibit threshold toxicity there is some, non-zero, measurable amount of exposure (dose) that is required before a biological threshold is breached and an adverse health effect is produced. However, in some cases the toxicological mechanism responsible for producing the adverse effect is such that there is no basis to assume a threshold exists. This is most notably the case for genotoxic carcinogens. The biological mechanisms by which these types of chemicals cause damage to DNA and genetic material means that any exposure to these chemicals, no matter how small, will carry some level of risk. The theoretical basis for this is that one ‘hit’ on DNA can produce a mutation that may eventually lead to a tumour. It is, therefore, not possible to identify the threshold with any confidence. Hence, the prudent assumption is made that such compounds do not have a threshold. It should be noted that not all carcinogens are genotoxic, some may exhibit a threshold, and whether a contaminant is a threshold or non-threshold substance should be determined by a review of the available toxicological evidence.

HCVs for Tolerable or Minimal Risk

HCVs for tolerable risk levels for threshold substances are referred to in the UK as Tolerable Daily Intakes (TDIs), some other authorities or organisations derive similar criteria such as Reference Doses (RfDs) or Provisional Tolerable Weekly Intakes (PTWIs). These values are in principle similar and can be thought of as “safe” levels of exposure at which adverse effects are not likely to occur, although some conversion or further consideration may be required before adoption of values from other jurisdictions in the UK context. These health criteria are typically derived by applying “safety” or “uncertainty” factors to intake levels observed to have little or no effects in humans or animals.

Exposure to receptors will occur not just from soil-borne contamination but also from intakes of food, water and air. Where a contaminant is a threshold substance these background intakes of a contaminant must, therefore, be calculated and subtracted from the TDI, to calculate the intake of the contaminant which could be tolerated from exposure to soil contamination alone (this quantity is the TDSI – Tolerable Daily Soil Intake), in addition to normal background exposure. This background intake is the Mean Daily Intake (MDI). Where information is not available on intake levels of contaminants or where the MDI exceeds the TDI, the Science report-SC050021/SR3 states that the TDSI should be set in the model to be 50% of the TDI.

DEFRA/EA have adopted the Index Dose (ID) as the HCV for minimal risk levels for non-threshold substances, which can be considered to present a minimal human health risk from exposure to soil contaminants. For non-threshold contaminants background intake is not considered as there is no “safe level”. In addition, application of the ALARP (As Low As Reasonably Practicable) principle for these substances means that intake should be reduced to as low a level as practicable, that this principle is being adopted by the competent authorities for intakes from food, water and air and that actions are being taken to reduce these other intakes.

There are a number of sources of toxicity criteria and background exposure levels which include Department of the Environment, Food and Rural Affairs (DEFRA); World Health Organisation (WHO); the US Environmental Protection Agency (US EPA) IRIS (Integrated Risk Information System) and other published scientific literature. Where available the definitive UK toxicological and background exposure levels published in the DEFRA/EA/SEPA CLEA TOX reports, under the advice of the Department of Health and The Food Standards Agency, are used as the primary source. However, as authoritative UK based information is available for only a limited number of substances, health criteria and other model input data has been sourced from non-UK published information. The methodology outlined in Science report-SC050021/SR2 has been used to derive HCVs where an authoritative UK HCV has not been published.

HCVs for Low Risk

HCVs for low levels of risk are known as LLTC, LLTC used in deriving C4SLs adopted by JPB have been derived as described in DEFRA report SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination. The assumptions and decisions used to derive LLTC are discussed in the above document. The overall LLTC derivation methodology described contains several elements which are similar to or, conversely, differ from, those used to derive “minimal risk” HCVs. Key aspects of the similarities and differences between the approaches are summarised in Table 2.4 of the above document.

General Approach to Risk Estimation

Stage 2 generic criteria have been selected from published values or derived by JPB as described above. JPB derived GACs using the CLEA 1.071 model where sufficiently reliable UK authoritative or peer-reviewed input data (including HCVs) is available. In the first instance the model input values published by DEFRA/EA, derived by Land Quality Management (LQM) in association with the Chartered Institute of Environmental Health (CIEH) and data published in Environment Industry Commission (EIC)/CL:AIRE Report: Soil Generic Assessment Criteria for Human Health Risk Assessment have been used for JPB derived GAC if available. Both the CLEA model and C4SL methodology derive GACs for use when considering the risk to human health from chronic exposure to toxic metals, metalloids and organic substances in soil. The assessment criteria represent contaminant concentrations in soils, which if exceeded on site may be indicative of unacceptable risks to human health. It is envisaged that these methodologies can also be used as a tool during either the detailed quantitative risk assessment or the risk management process.

These methodologies adopt the risk-based source-pathway-receptor contaminant linkage framework and a deterministic methodology. The exposure pathways considered are direct ingestion of soil and dust, direct dermal contact with contaminated soil, consumption of home grown or allotment vegetables, ingestion of soil attached to such vegetables, inhalation of soil vapours outdoors and inhalation of soil vapours indoors. The CLEA model used in both methodologies is intended to reflect and be compliant with the guidance in DEFRA/EA Science Reports.

Where input data from the above sources is not available, data published by other organisations has been used. It should be noted that the toxicological data available for particular substances in many cases is very limited and incomplete. In order to adopt a relatively consistent approach, where authoritative or peer reviewed UK data is not available, data has been obtained primarily from USEPA and Dutch RIVM report sources as these sources offer a wide range of expert reviewed parameter values such as health criteria values, physical and chemical property data for commonly encountered soil contaminants.

Risks posed by Polychlorinated biphenyls (PCBs) in soil

For risk assessment purposes PCB congeners are divided into two groups; (1) dioxin-like PCBs and (2) non-dioxin like PCBs. Dioxin-like PCBs have similar structures and toxic mechanisms to dioxins and furans and so are assessed together with dioxin and furans. Non-dioxin like PCBs have a different toxic end point to dioxin-like PCBs and must, therefore, be assessed separately.

If the criteria set out in the SGV report are fulfilled, the PCB test results can be directly compared with the SGV given in the report. However, SGVs relate to background PCB levels where a site source is absent, and this limits the applicability of the SGV.

Where the assumptions required for the use of the SGV are not met, dioxin-like PCBs are assessed using the SGV worksheets for the standard land uses. Where site specific dioxin and furan data is not available, the median urban or rural dioxin and furan values given in the SGV report are used to account for “background” concentrations of these substances. A hazard index (HI) is calculated using the worksheet and if the HI is >1, then dioxin-like PCBs may pose a risk to human health receptors in the scenario being considered.

A specific methodology to assess risks posed by non-dioxin like PCBs has not yet been published by EA/DEFRA, however, JPB have adopted the current UK methodology used to assess other organic compounds. This involves selecting a list of target compounds, a TDI and other input data and using the CLEA model to derive GACs. PCBs are typically present as mixtures. The most persistent and toxic non-dioxin-like PCBs are present at their highest concentrations in PCB mixture aroclor 1254. The 7 ICES list indicator PCBs make up about 50% of aroclor 1254. JPB, therefore, compare the sum of these indicator PCBs with the assessment criteria. The criteria are derived using a TDI for aroclor 1254 and other input data using the CLEA model. The TDI is adjusted to account for the percentage of the 7 ICES compounds present in aroclor 1254. If the sum of the soil concentrations of the 7 ICES exceeds the GAC, then non-dioxin-like PCBs may pose a risk to human health receptors in the scenario being considered.

Therefore, if either the dioxin-like PCB or non-dioxin-like PCB assessment indicates the presence of a risk, remediation may be required or a further assessment may be proposed.

Risks posed by Cyanides in soil

Cyanide compounds exhibit both acute and chronic toxicity, although it should be recognised that complex cyanides are much less toxic than free cyanides. There is currently no UK SGV available to assess chronic cyanide toxicity, although a review of the toxicology of cyanide has been published (DEFRA CLR TOX 5 report).

Criteria derived to be protective of chronic cyanide exposure exceed those derived to be protective of acute exposure to both types of cyanide. Therefore, the criteria derived for acute exposure to free and complex cyanides have been conservatively adopted to be protective of receptors.

The Environment Agency has not published guidance on the assessment of risks due to acute exposure to cyanide compounds. However, HPA publications indicate that hydrogen cyanide and its solutions may be fatal following acute exposure via all intake routes (ingestion, inhalation and dermal). The Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) published a nominal acute reference dose (ARfD) based on the lowest reported acute lethal dose. JPB have derived assessment criteria for free and complex cyanides in soils based on the above ARfD, exceedance of which is considered to pose a risk to sensitive site receptors.

Stage 3 Detailed Quantitative Risk Assessment

Representative Contaminant Concentrations and Site Specific Assessment Criteria

To merit a Stage 3 assessment concentrations of contaminants will have exceeded Stage 2 criteria, or there are no available Stage 2 criteria. At this stage the chemical dose to potentially exposed human receptors are calculated, incorporating site specific data together with conservative health assumptions where necessary to derive Site Specific Assessment Criteria (SSACs). Data evaluation and statistical procedures are used to derive representative contaminant concentrations (RCC) for contaminants of concern in the relevant averaging areas of sites. RCCs are compared with SSACs at the risk evaluation stage in order to determine their significance. This process effectively reduces the conservatism of the Stage 2 assessment and provides a site specific assessment at Stage 3.

At Stage 2 all soil contaminant concentrations are compared with GACs. At Stage 3 RCCs are calculated and used for comparison with assessment criteria. Depending on the nature of the data the RCC may consist of either the maximum concentration recorded or a 95% Upper Confidence Limit (UCL95). Where small data sets are available, or where point source contamination such as hydrocarbon spillages are present, statistical analysis is not appropriate and the maximum contaminant concentration recorded is adopted as the RCC. Where larger data sets are available statistical analysis may be performed to derive an RCC where appropriate. Where RCCs exceed assessment criteria this indicates that the contaminant poses a human health risk and that remedial actions may be required to prevent actual harm. As an initial assessment, JPB generally alter only specific pH and %SOM values and the development type to generate SSACs. Should a more detailed DQRA assessment be merited, a more extensive re-examination of data inputs may be undertaken.

Statistical analysis is carried out in accordance with the methodology outlined in guidance given in CL:AIRE/CIEH Publication, "Guidance on Comparing Soil Contamination Data with a Critical Concentration". A number of statistical tools may be used for deriving UCL95 values, JPB principally use ProUCL, a software package developed by the US EPA for this purpose. In general, RCC values are selected as follows;

- Determine if there is sufficient data for statistical analysis, if not the maximum concentration is selected as the RCC;
- If data is sufficient the data set for each contaminant is tested for distribution type (normal distribution, lognormal etc.);
- The data set for each contaminant is tested for the presence of outliers, and these are considered for removal or inclusion in further calculations;
- An appropriate UCL95 is calculated, based on the distribution type and revised data set, and this is used as the RCC.

Consideration of whether outliers represent potential contaminant hotspots is also undertaken.

Lead risks are assessed using a C4SL value derived using a model which uses the geometric mean of blood lead levels as one of its input parameters. For this reason, the log transformation of soil lead concentrations across a site is required prior to deriving the RCC.

Stage 3 JPB Risk Estimation Practice

JPB's Stage 3 assessment practice is to calculate SSACs, incorporating site specific data together with conservative health assumptions where necessary. This effectively reduces the conservatism of the Stage 2 assessment and provides a site specific assessment. Depending on the contaminant linkages identified in the conceptual site model and on the nature of contamination identified during site investigations, particular risk assessment tools are selected which are considered to be appropriate to assess risks to human health under the existing site conditions.

The CLEA model used has been designed to comply with current UK DEFRA guidance on the assessment of contaminants on land and where possible this is JPB's risk assessment tool of choice. Health criteria, toxicological, physical and chemical data are input for each contaminant for the land use envisaged. The model derives a Site-Specific Assessment Criteria (SSAC) for the contaminant which, if exceeded, would represent a human health risk to the sensitive receptor. The basis of the CLEA models are more fully discussed in the CLEA software manual and DEFRA report SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination respectively.

The CLEA model used to derive SGVs, C4SLs, GACs and SSACs includes inhalation of outdoor and indoor dust pathways where appropriate. Inhalation pathways are most important in driving risk assessments where inhalation HCVs are low or where inhalation exposure is high. Where a Stage 3 assessment is required, the inhalation SSACs may be presented in JPB's reports to allow further consideration of these pathways and any remedial actions which may be required.

On completion of contemporary developments, the amount of bare soil exposed is generally limited to localised landscaping. This is considered to be minimal as a proportion of the site area and given that clean topsoil will generally be placed to provide a suitable rooting horizon during development, this pathway will be usually be broken by this cover for most inorganic contaminants and, therefore, JPB do not assess this further. An additional degree of conservatism is build into the assessment here as the overall SSACs still have these pathways included. However, where volatile organic contaminants are present, such as BTEX or naphthalene, these substances may potentially migrate through clean cover and, if present at sufficiently high concentrations, may require the introduction of protective measures such as the installation of membranes in solums of buildings etc. to prevent unacceptable exposure to receptors via vapour migration and inhalation. The generation of dust during site works may also expose site operatives or the occupiers of adjacent properties to health risks and should be managed by the provision of appropriate PPE and adoption of appropriate site practices as described in CIRIA document 132 "A guide for safe working on contaminated sites".

Stage 3 Assessment of Risk to Other Receptors

The ecological risk assessment is carried out with respect to both on-site and off-site ecologically sensitive receptors. A review of information can indicate whether any nearby ecologically sensitive areas are likely to be impacted by on-site derived contamination; a comparison of contaminant levels found in the on-site ecologically sensitive areas can also be made with the UK Environmental Quality Standards for the protection of wildlife.

Contaminants which are at concentrations in excess of the Stage 2 screening criteria are determined to present a potential risk to the water environment and these contaminants therefore require assessment at a Stage 3 level. The purpose is to ascertain if the concentrations create a risk. It is important to consider factors such as the background groundwater quality, the sporadic nature of the perched groundwater and the separation of the site from the regional groundwater by an aquiclude.

The most significant receptors in the water environment assessment are generally considered to be the local shallow and deep groundwater and local surface waters. At some sites there is the potential for contaminants detected on-site to detrimentally affect off-site water receptors. Deeper (bedrock) groundwater resources may be important in some areas, or where groundwater may be abstracted for use. The significance of the risk to these receptors is assessed by considering, either conceptually or using groundwater models, the potential effects contaminants may have to groundwater and surface water receptors.

Stage 3 Evaluation of Risks to Groundwater and Surface Waters

An assessment of the potential for both contaminated soil and groundwater to affect the quality of water resources is undertaken in accordance with current SEPA guidance described in document WAT-PS-10-01: Assigning Groundwater Assessment Criteria for Pollutant Inputs (Live Document). This notes that for land contamination four receptor groups are to be assessed, if identified as being present, namely; surface water, groundwater abstraction, groundwater resource and groundwater dependant terrestrial ecosystem (GWDTE or wetland). Each receptor is considered in turn at the ICSM stage, and investigations scoped to examine these linkages where necessary.

At Stage 2 the potential linkages identified in the ICSM are re-examined in the light of investigation findings, and only the viable linkages are considered further. Where relevant, recorded soil leachate, groundwater and surface water contaminant results are compared with GACs selected as described in the above guidance, dependant on the receptor being considered (e.g. UKDWS would be used where a water abstraction was the receptor). Where exceedences of GACs occur a Stage 3 assessment is undertaken.

In the Stage 3 Risk Assessment - Water Environment a re-examination of the ICSM is undertaken with respect to water environment receptors on the basis of site investigation data. Where a potential linkage remains, a back calculation is undertaken for the recorded soil leachate and/or groundwater concentration exceedences in accordance with the guidance in document WAT-PS-10-01 using the EA's Remedial Targets Methodology (RTM) and the associated Remedial Targets Worksheet hydrogeological modelling tool. After applying a dilution factor and where appropriate, degradation, the theoretical concentration of each contaminant at an assessment point is compared against the relevant assessment limit at that assessment point.

The assessment limit may be a UK Drinking Water Standard (UKDWS), Resource Protection Value (RPV) or EQS depending on the nature of the receptor which is being considered to be potentially at risk. The assessment point is the point at which assessment limit must be met. For the purposes of risk assessment, the assessment point is selected to be the nearest surface water course for surface water receptors, the site boundary (or 50m downgradient of the site boundary or 250m in a sewered urban environment) for the future groundwater resource receptors or in the raw water prior to any treatment this might receive for current abstractions. It should be noted that in contrast the SEPA guidance defines a compliance point as a "real" sampling point to demonstrate that inputs are acceptable. A compliance point may be the same location as the assessment point or between the source and receptor.

In addition, where required the Remedial Targets Worksheet can be used to calculate soil remedial targets which can be used to determine whether soil contaminant levels on site require remedial actions to prevent impact to water environment receptors.

For the above calculations it is assumed that leachate is theoretically produced by water infiltration from rainfall into site groundwater which can then migrate off site. In this case the leachate migrates through permeable strata until it enters a theoretical deeper groundwater. The remedial target which is calculated represents the maximum concentration of that particular contaminant which can be allowed at the assessment point or at its location on the site in the case of soil remedial targets. If concentrations are recorded above remedial targets, then theoretically by the time impacted groundwater has migrated to the assessment point it will be above the relevant assessment limit for that contaminant and remedial measures would be necessary.

Other analytical, numerical and probabilistic groundwater models are available to aid in the quantitative assessment of contaminated waters, the suitability of each which can be determined upon completion of site assessment and project requirements.

RISK-BASED CONCLUSIONS

The comparison of the estimated risks with the appropriate criteria indicates whether;

- 1) the site presents an insignificant risk based on the analysis; or,
- 2) there is a potential risk to health or the environment.

Where a risk has been identified remedial strategies can then be developed in order to break any source-pathway-receptor linkage. Strategies may include; source removal, breaking the pathway from the source to the receptor or choosing developments in which sensitive receptors are not included in areas where the risk exists.

As described above a number of remedial strategies can be adopted for a site and JPB select the most appropriate strategy for remediation on a site specific basis. One commonly adopted practice is to break the contaminant linkages by the introduction of clean capping materials. JPB have adopted, where appropriate, the BRE/DTI/NHBC/AGS document as a decision making tool to aid the design of remedial actions. This provides a research and data-based approach to designing cover systems rather than the use of professional judgement alone. It is, however, emphasised this document is used by JPB in the context of professional judgement and experience and a knowledge of site conditions.

As at the time of investigations the concentrations of contaminants present in material to be imported for capping may not be known, a conservative approach in which the imported material is assumed to have a contaminant concentration of 75% of the target guideline value is adopted. The spreadsheet which accompanies the document contains a viability check graph which indicates whether the capping layer calculated is acceptable or whether further consideration is required as to the effectiveness of the cover system proposed. JPB's procedure is to ensure that the effectiveness of the cover system is adequate for the site conditions encountered. Where these are exceeded more stringent remedial actions are recommended. JPB consider that this methodology provides a consistent, scientifically based rationale for designing cover systems in the vast majority of sites we encounter. Where more extreme conditions are encountered, or where there are specific site requirements, these issues will be considered on a site specific basis in order to be protective of receptors at the proposed development.

Specific measures are proposed where asbestos fibres or materials are recorded to be present and are to be retained, encapsulated on site. The recommended design of the environmental capping reflects the magnitude of the risks posed by the different types, concentrations and conditions of asbestos materials recorded to be present.



Remediation Strategy

Before any works can be carried out on site a Remediation Strategy is prepared in accordance with the “Model Procedures for the Management of Land Contamination” (CLR11) and the EA document “Verification of Remediation of Land Contamination”. JPB integrate the requirements for the various stages of remediation works in Remediation Strategy, Implementation and Verification Plan documents.

Ground Gas Assessment Methodology

Introduction

The assessment of ground gas as a potential constraint to development has been the subject of a great deal of research and published guidance. Broadly speaking ground gas can be a concern for several reasons; flammable gases may cause an explosion, build up of gases within poorly ventilated areas may lead to asphyxia or toxic gases may cause harm to those exposed to them. In general, we consider principally methane and carbon dioxide levels, however the presence of other gases such as carbon monoxide, hydrogen sulphide, petroleum vapours etc may also be considered where appropriate. Some physical properties of ground gases are tabulated below.

Gas	Explosive Range	Density of 20°C	Toxicity % by volume in air*
Methane	5-15% by vol	0.72 kg/m ³	30 (low)
Carbon dioxide	N/A	1.98kg/m ³	0.5 (high)
Carbon monoxide	12.5-74.2% by vol	1.25kg/m ³	0.02 (high)
Hydrogen sulphide	4.2-46% by vol	1.54kg/m ³	0.001 (high)

* short term occupational exposure limits. The long term occupational exposure limit for carbon monoxide is 30ppm and for hydrogen sulphide is 5ppm.

These ground gases may originate from many sources including; mine workings, organic sediments, landfilling, biodegradable materials in made ground on brownfield sites, petroleum hydrocarbons or other site specific sources. The gas concentrations measured are the result of volatile emissions and the microbial degradation of organic materials. The processes by which materials degrade to form ground gases are discussed more fully in EA's Guidance on the Management of Landfill Gas, LFTGN 03, 2004.

Data Requirements and ICSM

JPB's overall methodology for ground gas assessments is summarised in the attached flow chart. In order to assess the degree of risk to receptors we must first develop an initial conceptual site model (ICSM) of the site which can identify the various sources and receptors and any potential pathways by which they may be linked. This process can be undertaken as part of the development of an ICSM for the site for contaminants other than gases. If a potential contaminant linkage is identified for ground gas, site investigations to confirm the nature and extent of ground gases will be required. Guidance on how these site investigations should be undertaken is given in B5930 - Code of Practice for Site Investigations, BS10175 - Investigation of Potentially Contaminated Sites, CIRIA Reports 103 (Vol II) and 150 (Methane Investigation Strategies), CIRIA C665 and BS8485 and other published guidance including the VOC handbook and CIRIA C735.

Investigation methodologies which have been used to measure gas concentrations include spike probe surveys, sinking of boreholes with monitoring standpipes installed and flux boxes. Spike probe surveys are considered to be unreliable for the following reasons: limited depth, spikes into an aerobic layer in an open hole underestimate methane levels and spike probes may not intercept the gas source.

JPB, therefore, generally commission the sinking of boreholes with standpipes to characterise the gas regimes at sites. Where access is restricted, a window sampler is used to install standpipes. The number and position of bores and well response zones are carefully chosen in order to maximise the information to be obtained to fully characterise the site. Table 4.2 in CIRIA C665, reproduced below, gives some guidance on the spacing of wells, which should be interpreted in conjunction with the associated text of that paper and in the light of actual site conditions.

Gas Hazard	Typical Examples	Sensitivity of end use	Initial nominal spacing of gas monitoring wells ^{1,2}
High	Domestic landfill sites	High ³	Very close (<25m)
		Moderate	Close (25-50m)
		Low	Close (25-50m)
Moderate	Older domestic landfills disused shallow mine workings ⁴	High	Close/very close (<25m -50m)
		Moderate	Close (25-50m)
		Low	Close/wide (25-75m)
Low	Made ground with limited degradable material, organic clays of limited thickness	High	Close (25-50m)
		Moderate	Wide (50-75m)
		Low	Wide/very wide (50->75m)

- ¹ The initial spacing may need to be reduced if anomalous results indicate this is necessary to give a robust indication of the gas regime below a site. To prove the absence of gas, closer spacings may be required.
- ² The spacing assumes relatively uniform ground conditions and the gas source present below a site. The spacing will need to be reduced if ground conditions are varied or if the investigation is trying to assess migration patterns from off site.
- ³ Placing high-sensitivity end use on a high gas hazard site is not normally acceptable unless the source is removed or treated to reduce gassing potential.
- ⁴ Petrol stations and other sources of vapours are most likely to be classified as gas hazard "Moderate" however site specific assessment would be required.

Three bores with standpipes and four sets of readings should be considered an absolute minimum for even the smallest of sites.

Flux boxes can be used to measure surface gas emission rates but do not take into account a deeper source of gas generation. Flux boxes can be used to confirm that a capping layer above a source and the surface has been effective. It should be noted that methane levels at the surface may underestimate ground gas levels as aerobic conditions at the near surface will deplete methane concentrations.

Guidance on the measurement of gas levels at bores is given in the above documents, however, in general a peak gas reading is taken followed by readings at 30 second intervals until a steady state is reached. This allows the assessor to determine how quickly the ground gas is replenished. Flow rate is generally measured first followed by methane/carbon dioxide levels. In addition, atmospheric pressure, weather, date and any other relevant information is recorded.

Flow rates can be positive or negative, they are generally negative where ambient atmospheric pressure is high or where falling groundwater levels reduce pressures in bores. Flow rates between -0.4 and 0.4 L/h indicate that there is probably no overall flow. The length of the monitoring period and frequency of monitoring will vary from site to site depending on the sensitivity of development, geology of the site, the level of risk and other factors. Typical minimum periods and monitoring frequencies are given in Table 5.5 of CIRIA C665. Generally, JPB undertake six visits over 12 weeks for sites proposed for residential development.

Continuous gas monitoring at boreholes over a period of several weeks can also sometimes be utilised to clarify the type of gas generation sources present and levels of risk posed by ground gases at some sites.

The degree of monitoring required must enable the assessor to measure or predict the reasonable worst case gas regime.

Risk Assessment

Having obtained factual data from the investigation the ground gas regime can be assessed in a tiered approach. In the past guidance such as Waste Management Paper 27 recommended a highly conservative precautionary principle, i.e. no development within 250m of a landfill site. This approach was seen as anti-development and does not take into account the site conditions, whether a risk exists at the site for the development proposed, the level of risk and whether it can be mitigated by design. More recent approaches characterise the site and the risk and base recommendations on this assessment. Various reports and standards have recently been published to update the guidance on ground gas assessment and this JPB methodology uses the philosophy outlined in these. These include CIRIA C665 "Assessing risks posed by hazardous ground gases to buildings", NHBC Report No. 10627-R01(04) "Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present" and British Standard BS8485 "Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings".

Tier 1 assessment

Following the completion of investigations, the assessor reviews the ICSM in the light of site investigation data and identifies any intact contaminant linkages. If intact contaminant linkages exist a Tier 1 risk assessment is performed using generic screening criteria to determine whether a risk exists. JPB use the following screening levels: **Methane <1% by volume in bores and Carbon dioxide <5% by volume in boreholes.**

These values are derived from Waste Management Paper 27, 1% methane by volume represents 20% of methane's lower explosive limit of 5% by volume, 5% carbon dioxide relates to the known health effects of exposure to this gas. Both screening concentrations are detailed in the Building Regulations Approved Document C (2004) and BRE Report "Construction of New Buildings as Gas Contaminated Land" (BR 212).

A limit to gas flow rates for the above trigger values is inferred by the table given below where the limiting borehole gas volume flows for CH₄ and CO₂ are <0.07L/hr for characteristic situation 1. These are equivalent to **a limiting borehole flow rate of 7L/h for CH₄ at 1% by volume and 1.4L/h for CO₂ at 5% by volume.** The above Tier 1 trigger values are only valid, therefore, if these volume flows are not exceeded. Where these volume flows are exceeded a Tier 2 assessment should be undertaken.

Guidelines on screening levels for hydrogen sulphide and other trace gases are given in the VOC Handbook, CIRIA RP711. Other information on VOCs is available in EA Technical Guidance on Management of Landfill Gas (2004) and in the vapour models used in the CLEA model for contamination land assessments.

If these screening concentrations are not exceeded then no significant risk exists and no further action is required. Where screening concentrations are exceeded a Tier 2 assessment is performed.

Tier 2 assessment

Where Tier 1 generic screening concentrations are exceeded a Tier 2 assessment is performed using the Wilson and Card (1999) approach as outlined in CIRIA C665. Each site is classified into a "characteristic situation" based on the maximum methane and carbon dioxide concentrations measured. These measurements combined with the maximum borehole flow rate are used to calculate the gas screening value.

Gas screening value (L/hr) = gas concentration (% by volume) x borehole flow rate (L/hr).

(N.B. gas screening value is also known as "site characteristic hazardous gas flow rate (Q_{hgs}) in BS8485)

For example, for a borehole flow rate of 1.5 L/h and a methane concentration of 20% the gas screening value = 1.5 x 20/100 = 0.3 L/h.

Gas screening value rates for methane and carbon dioxide can be compared with Table 8.5 of CIRIA C665 "Assessing risks posed by hazardous ground gases to buildings" or Tables 14.1 of NHBC Report No. 10627-R01(04) "Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present", reproduced below, to determine a characteristic situation for the site.

Table 8.5 *Modified Wilson & Card Classification (CIRIA Report C665)*
NB *Use for most scenarios other than low rise housing with a ventilated underfloor void (min 150mm)*

Characteristic Situation (CIRIA R149)	Comparable classification in DETR et al (1999)	Risk classification	Gas Screening Value (GSV) CH ₄ or CO ₂ (L/hr) ¹	Additional Limiting Factors	Typical Source of generation.
1	A	Very low risk	<0.07	Typically methane <1% by volume and/or carbon dioxide < 5%. Otherwise consider increase to Situation 2.	Natural soils with low organic content. "Typical" made ground
2	B	Low risk	<0.7	Borehole air flow rate not to exceed 70L/hr. Otherwise increase to characteristic situation 3	Natural soil, high peat/organic content. "Typical" made ground
3	C	Moderate risk	<3.5		Old landfill, inert waste, mineworking flooded
4	D	Moderate to high risk	<15	Quantitative risk assessment required to evaluate scope of protection measures	Mineworking – susceptible to flooding, completed landfill, inert waste (WMP 26B criteria)
5	E	High risk	<70		Mineworkings unflooded inactive
6	F	Very high risk	>70		Recent landfill site

Table 14.1 Gas Risk Assessment (Traffic Lights) NHBC Report No. 10627-R01(04)
NB To be used for low rise housing with a ventilated underfloor void (min 150mm)

Traffic Light	Methane ¹		Carbon Dioxide ¹	
	Typical max conc. ⁵ (% by vol)	Gas screening value ^{2,4,6} (L/hr)	Typical max conc. ⁵ (% by vol)	Gas screening value ^{2,3,4,5} (L/hr)
Green	1	0.13	5	0.78
Amber 1	5	0.63	10	1.60
Amber 2	20	1.60	30	3.10
Red				

Protective measures can then be selected for the site buildings based on the Characteristic Situation and the type of development proposed (building types A-D, Table 3 BS8485) using the guidance and scoring system given in BS8485 and its annexes. Protective measures for new buildings can then be designed which are appropriate to the types and magnitude of the risks posed.

Radon

Radon is a naturally occurring radioactive gas that is formed from the decay of uranium and radium present in some types of rocks. It can migrate through cracks and fissures into the soil and by this route into buildings.

Radon can accumulate inside structures over the long term posing a risk to health. Long term exposure increases the risk of developing lung cancer, in a building with high levels of radon, long-term exposure can increase the risk to the point where preventative action is necessary.

For this reason section 3.2 of the Technical Handbook Guidance, which sets functional standards for Scottish buildings under the Building (Scotland) Act 2003, was revised in 2011 to ensure that “every building must be designed and constructed in such a way that there will not be a threat to the health of people in or around the building due to the emission and containment of radon gas”. This document provides guidance on how the risks posed by radon should be assessed. JPB’s methodology for assessing risks posed by radon follows that guidance and this methodology is outlined below.

The location of the site is pinpointed on maps published in Appendix A of BRE BR 211. These maps were the result the result of a joint project between The Health Protection Agency (HPA) and the British Geological Society who prepared detailed maps of radon potential in Scotland by testing radon levels in houses. Depending on the level of risk within the geographical grid square within which the development lies, maps indicate whether; no protection measures are required, basic radon protection measures are required or full radon protection measures are required.

Where the site is indicated to be within an area within which radon protection is required, a further assessment of the risks posed by radon is undertaken. The BR211 Appendix A maps provide information on a large scale, and whole grid squares are categorised based on the worst conditions within the grid square, rather than for a specific site or smaller geographical area. Where the BR211 Appendix A map indicates there is a possibility that radon may pose a risk (or it is unclear), more detailed HPA/BGS mapping data is obtained and the site is assessed accordingly.

If the more detailed report indicates that the site is located on ground where radon protection measures are required, protective measures are recommended. Radon protective measures are recommended in accordance with the guidance contained in BRE Report BR211 "Radon: Protective measures for new buildings". BRE have also confirmed to JPB that, where gas protection measures are being installed to provide protection against ground gases such as methane and carbon dioxide for CS-2 conditions or above, these measures will also provide adequate protection from risks posed by radon.

It should be noted that this approach has been adopted as monitoring radon concentrations in the ground prior to construction is not considered to be a valid methodology for assessing risks posed by radon in buildings. This is because it is difficult to equate the concentrations of radon measured in boreholes with levels inside houses, as many factors can influence the actual indoor air radon concentration experienced, including; radon generation rates, geology, construction details, ventilation rates, seasonal factors, occupant behaviour etc. Similarly, for newly constructed buildings it is impractical to determine indoor air radon concentrations over the recommended three month monitoring period and the results measured in unoccupied properties would not, in any case, be a valid assessment of conditions in occupied houses.

JPB Risk Assessment Methodology Flow Chart

