



AUCHTERTOOL, MOSSMORRAN, FIFE



STAGE 1 GEOENVIRONMENTAL INVESTIGATION REPORT INCORPORATING COAL MINING RISK ASSESSMENT (CMRA)

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AUCHTERTOOL, MOSSMORRAN, FIFE

STAGE 1 GEOENVIRONMENTAL INVESTIGATION REPORT

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C O N T E N T S

<u>Text</u>	<u>Page No</u>
EXECUTIVE SUMMARY	i
1.0 INTRODUCTION AND BRIEF	1
2.0 METHODOLOGY	2
2.1 Regulatory Framework	2
2.2 Stage 1 - Preliminary Investigation	2
3.0 SITE DETAILS	4
3.1 Site Walkover	4
3.2 Invasive Plant Survey	4
4.0 HISTORY OF LAND USE	6
5.0 GEOLOGICAL ASSESSMENT	11
5.1 General Geology	11
5.2 Hydrology and Hydrogeology	11
5.3 Geo-Hazards	12
5.4 Foundation Options	12
6.0 QUARRYING, MINING AND MINE ENTRIES	14
6.1 Quarrying	14
6.2 Mining Conditions	14
6.3 Preliminary Mining Risk Assessment	14
6.4 Mine Entries	14
6.5 Summary of Mining Risks	14
7.0 REGULATORY SEARCH	15
7.1 Regulatory Database	15
7.2 Petroleum Officers Response	16
7.3 Petroleum Officers Response	17
7.4 Unexploded Ordnance (UXO)	17
8.0 CHEMICAL CONTAMINATION AND GAS EMISSIONS	18
8.1 Chemical Contamination	18
8.2 Ground Gases	18
8.3 Summary	19
9.0 CONCEPTUAL SITE MODEL	20
9.1 Introduction	20
9.2 Potential Contaminant Linkages	20
10.0 STAGE 1 PRELIMINARY QUALITATIVE RISK ASSESSMENT	23
10.1 Methodology	23
10.2 Risks to Site Development	25
11.0 PART 2A CONSIDERATIONS	29
11.1 Introduction	29
11.2 Site Prioritisation Methodology	29
11.3 SERA Assessment	30
12.0 CONCLUSIONS AND RECOMMENDATIONS	31
12.1 General	31
12.2 Chemical Contamination	31

12.3	Gas Emissions	32
12.4	Foundation Options	33
12.5	Mining.....	33
12.6	Asbestos	34
12.7	Invasive Plant Survey	34
APPENDICES		1
Appendix 1	Drawings	
Appendix 2	Photographic Records	
Appendix 3	Invasive Plant Survey	
Appendix 4	Historical Map Extracts	
Appendix 5	Archaeology Information	
Appendix 6	BGS Supplied Borehole Logs	
Appendix 7	Mining Remediation Authority Coal Mining Report	
Appendix 8	SEPA Water Quality Information	
Appendix 9	Envirocheck Report and Site Sensitivity Maps	
Appendix 10	Environmental Information Request (Fife Council)	
Appendix 11	UXO Map Study	
Appendix 12	SERA Input and Output Values	

Drawings Appendix 1

Client Supplied	Drawing No. J407/031/21042025 (Draft) – Illustrative Initial Layout
ZG116-01/R/F/01	Site Location Plan
ZG116-01/R/F/02	Photographic Plate Orientation Plan
ZG116-01/R/F/03	Extract from the British Geological Survey Map NT29SW – Solid and Drift
ZG116-01/R/F/04	Initial Conceptual Site Model Section

EXECUTIVE SUMMARY

Johnson Poole & Bloomer Limited (JPB) were commissioned by ILI Cato Limited to undertake a Stage 1 Geoenvironmental Investigation of a site at Auchtertool, Mossmorran, Fife (JPB Drawing ZG116-01/R/F/01). This section provides a brief summary of the desk study findings in relation to the geotechnical, mining, chemical contamination and gas emissions issues at the site. It is understood that ILI Cato Limited are considering the viability of the site for a Data Centre, with areas of mixed native woodland, wildflower meadow and pond/biodiversity wetland.

Invasive Plants

An invasive plant survey was carried out and the recommendations are as follows.

S6A	SURVEY FINDINGS
	There was no evidence of controlled species, such as Japanese Knotweed, Giant Hogweed & Himalayan Balsam during this survey. Horsetail was identified within this survey area. There are a total of 9 infestations across the site. Access to some areas of the site were limited due to dense vegetation such as gorse, and steep embankments. The soil disturbance within the ploughed fields may also have limited our findings.
S6B	SURVEY RECOMMENDATIONS
	Recommendations for Site Investigation Contractor Regarding Horsetail, we would advise that the risk of spread from these activities is low. Recommendations for Developer Although Horsetail is not controlled by legislation it is a highly invasive perennial weed which spreads quickly and vigorously, reproducing through spores and root fragments. As it often causes damage to roads and footways, we would recommend that some form of management/treatment is carried out to minimise the risk of future damage to roads, infrastructure and delay to road adoptions. Should there be any concern or queries when carrying out the work, KleerKut can be contacted for guidance.

Historical Background

On Site	Off Site
Greenfield, railway, landfill, well, farm buildings, ruins, electricity pylons	Greenfield, agriculture, quarrying, residential, railway, distillery

Archaeology

Ruins of a mediaeval castle, known as Camilla or Hallyards is present in the north of the site and the site is listed on the Canmore.org website. Should any development or earthworks be required in the vicinity of these ruins it is likely that supervision will be required by a suitably qualified archaeologist. In addition, discussions would likely to be required with the local authority and Historic Environment Scotland.

Geology

Based on our assessment of the available geological information some made ground is anticipated across parts of the site associated with the former railway, landfill, farm buildings, well, ruins and electricity pylons.

The underlying natural superficial deposits, where encountered, are predominantly shown to be glacial till. Alluvium is shown to be present within the western area of the site.

The majority of the site is indicated to be underlain by the Pathead Formation These typically comprise mudstone and siltstone with beds of dolomite and limestone. However, dolerite, basalt and quartz dolerite sills of the Midland Valley Sill Complex are indicated to be present within the northern, central, eastern and southern areas of the site.

The bedrock geology is shown to be disrupted by a sequence of north-west to south-east orientated geological faults which generally downthrow strata to the south-west. In addition, a north to south oriented fault is shown in the eastern area of the site, which connects two of the faults and downthrows strata to the west.

Foundation Options

The desk study has indicated the site to be overlain by made ground; along the area of the former railway and area of Landfill; farm buildings and well. Due to the inherent variability of this material it is considered that this horizon would not be very suitable as a founding horizon in its present condition. Consideration of vibro-improvement or piling may be required. It should be noted that the area of former cutting/landfill truncates through the proposed development area.

The location of the former well (infill status unknown) located at the southwest site boundary could act as a local physical constraint if future development was to encroach in its vicinity and hence remedial works to infill/stabilise the well may be required.

The desk study has indicated the natural superficial deposits at the site are predominantly glacial till. Where these deposits are present at shallow depth, it is possible that standard strip or pad foundations may be feasible, subject to actual proposed building loadings.

However, alluvial deposits are indicated to be present beneath the western area of the site. Based on the available information it is likely that standard strip or pad foundations may not be feasible within these areas of the site if buildings are to be constructed within this area. As standard foundations are considered not to be feasible based on the existing information, ground improvement techniques such as vibro or piling may be required. **Consideration will have to be made on settlement due to any loading of the alluvial deposits.**

The geological maps indicate there are areas of the site where bedrock is at or near surface, and this may be encountered during any excavations during the development such as the construction of sewers. This material would be suitable for a foundation horizon.

A detailed site investigation will be required to confirm the foundation solution.

Mining & Mine Entries

The table below summarises the potential risks associated with former mining legacy for the proposed development site, identified from list sources of information.

Mining Issue	Yes/No	Risk Assessment
Underground mining (recorded at shallow depths)	No	The documentary research has not found any records for shallow mining beneath the site, the risks relating to mining are considered to be low.
Underground mining (recorded at depth)	No	The Mining Remediation Authority Coal Mining Report indicates that according to the records in their possession, the property is not within the zone of likely physical influence on the surface from past underground workings.
Mine entries (shafts and adits)	No	During the study no evidence of any mineshafts or adits being present within the site was encountered.
Coal mining geology (fissures)	No	MRA report/web page indicates no evidence of any issues.
Record of past mine gas emissions	No	MRAA report/web page indicates no evidence of any issues.
Recorded coal mining surface hazard	No	MRAA report/web page indicates no evidence of any issues.
Surface mining (opencast workings)	No	MRA report/web page indicates no evidence of any issues.

As with any coalfield/former mining area, there is the potential for unrecorded mine entries to be present. As in the development of all sites in former mining areas, vigilance should be maintained by all site workers during any ground excavations to identify any features suspected to be possible mine entries.

Chemical Contamination and Gas Emissions

Stage 1 Preliminary Qualitative Risk Assessment

Greenfield area

Risk	Risk classification
Exposure of sensitive residential receptors to contaminants	Low
Migration of soil gas/vapours to onsite properties	Moderate/High
Phytotoxic Risks	Low

Groundwater contamination at the site due to the leaching of contaminants	Low
Surface water contamination at the site due to contaminants migrating to local waters	Low
Exposure of buildings and services to site contaminants	Low

Area of Former Railway, Landfill, Former Well, Farm Buildings, Ruins and Electricity Pylons

Risk	Risk classification
Exposure of sensitive residential receptors to contaminants	Moderate/Low
Migration of soil gas/vapours to onsite properties	High
Phytotoxic Risks	Moderate/Low
Groundwater contamination at the site due to the leaching of contaminants	Moderate/Low
Surface water contamination at the site due to contaminants migrating to local waters	Moderate
Exposure of buildings and services to site contaminants	Moderate

JPB Site Evaluation and Part 2A Risk Assessment

Greenfield area

Priority Category 4

A priority **Category 4** indicates is considered to be the lowest risk and would almost certainly be outwith the scope of the contaminated land legislation.

Area of Former Railway, Landfill, Former Well, Farm Buildings, Ruins and Electricity Pylons

Priority Category 3

A site that the assessment considers to be suitable for present use and environmental setting although there may be contamination present lies within this category. The assessment considers that the presence of contamination does not cause a concern, as there is a low risk to the possible receptors. The conclusion, if a site falls within this category, is that remedial work is unlikely to be required as long as the site is utilised for that end use. In this respect this category would not be assessed as contaminated land under the contaminated land legislation.

Proposed Stage 2 Investigations

On the basis of the assessment, it is considered prudent to undertake an in-depth ground investigation at the site.

Such an investigation would allow any issues of concern regarding protection of site workers, potential environmental liabilities associated with the site and any financial implications during redevelopment to be more fully assessed.

1.0 INTRODUCTION AND BRIEF

This report presents the findings of the Stage 1 Geoenvironmental Investigation carried out for a site at Auchtertool, Mossmorran, Fife (JPB Drawing ZG116-01/R/F/01). JPB were commissioned by ILI Cato Limited to prepare this assessment on their behalf. It is understood that ILI Cato Limited are considering the viability of the site for a Data Centre, with areas of mixed native woodland, wildflower meadow and pond/biodiversity wetland. A client supplied drawing showing the current development proposals is given in Appendix 1.

The purpose of this report is to identify the potential geotechnical, environmental and mining constraints to the site and the potential for land contamination from current or previous site uses, or from the surrounding land use. In addition, we have undertaken an evaluation of the potential for excessive soil gas emissions or mining instability. Issues which could lead to potential environmental or financial liabilities affecting the land value relating to the ground conditions or impact on redevelopment options has been identified. Recommendations for further investigations have been provided where appropriate.

In the preparation of this report we have studied relevant information held within our archives which included editions of past and present Ordnance Surveys, geological maps and memoirs, archive borehole information and other documentation. Our researches using the above data are now complete and this report presents our interpretation of the data examined.

In addition, a Desk Study and Risk Assessment and Contaminated Land Inspection Report was carried out by Fife Council. These documents were supplied to JPB and information from these reports have been used where appropriate. It is assumed that the findings of these documents are accurate and the reader is referred to the original supplied documents for further details. Details of the reports are given below.

- Contaminated Land Inspection Report, Dronachy Den Railway Land, Auchtertool – Fife Council Environmental Services (Report ref C458, dated February 2006).
- Desk Study and Risk Assessment Report, Kickcaldy & District Branch – Fife Council Enterprise, Planning and Protective Services (Report ref C1305, dated June 2013).

This report has been prepared and written on behalf of ILI Cato Limited in the context of the purpose stated above and should not be used in any differing context. No duty of care extends to any third party that may make use of the information unless written confirmation has been provided by Johnson Poole & Bloomer Ltd. In addition, new information, improved practices and legislation may necessitate an alteration to the report in whole or in part after its submission. Therefore, with any change in circumstances, or after the expiry of one year from the date of the report, it should be referred to us for reassessment and, if necessary, amendment. No action or proceedings can be commenced against Johnson Poole & Bloomer after the expiry of 12 years from the date of this report.

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2.0 METHODOLOGY

2.1 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 land in 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 requires a "suitable for use approach" 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 overall process of risk assessment for sites employed by JPB is summarised for a Stage 1 Geoenvironmental Investigation as follows.

2.2 Stage 1 - Preliminary Investigation

Technical Guidance

The methodology utilised for this desk study follows the specifications outlined in BS10175, Investigation of Potentially Contaminated Sites – Code of Practice, CLR2 "Guidance on Preliminary Site Inspection of Contaminated Land" and CLR6 "Prioritisation and Categorisation Procedure for Sites which May be Contaminated" and CIRIA C552, "Contaminated Land Risk Assessment". The report 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 in and CIRIA C758 "Abandoned Mine Workings Manual".

The research is now complete and this report presents the interpretation of the data examined.

Site Reconnaissance

A walkover survey was carried out on 3rd June 2025 to determine the existing site conditions and operations. A photographic record of the site taken during the walkover survey is presented in Appendix 2, whilst a drawing showing the direction taken of individual photographs is outlined on our Drawing ZG116-01/R/F/02.

A walkover was carried out by ecologist on 30th April 2025 in order to identify the presence of any invasive plants. A record of the study is given in Appendix 3.

Desk Study

During the study, documentary research included an examination of the Ordnance Survey maps for details regarding previous site and adjacent land uses. As part of our researches JPB obtained historical map extracts (Appendix 4) together with British Geological Survey (BGS) supplied borehole logs (Appendix 6) and a Coal Authority Coal Mining Report (Appendix 7).

Similarly the available geological maps were examined to determine the geological/hydrogeological conditions beneath and adjacent to the site. In addition, regional memoirs were consulted together with mine abandonment plan data and any available borehole records, in order to assess the mining conditions with a view to assessing the risk to the proposed development arising from the possible presence of mining.

Information was also obtained from the SEPA website and a review of in-house information. Results of the SEPA researches are presented in Appendix 8. An Envirocheck Report of environmental database information was also obtained and is presented in Appendix 9. Information from Fife Council was obtained and is included in Appendix 10.

A Zetica Map has been obtained with regard to the assessment of any risks which may or may not be posed by Unexploded Ordnance (UXO) at the site. A copy of this map can be found in Appendix 11.

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, has been developed at an early stage and constantly reassessed in light of investigative findings. This has been 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.

Stage 1 Preliminary Quantitative Risk Assessment

Contaminants are likely to be present at the site and ground gases may be being generated, therefore risks posed by the site to receptors have been evaluated in accordance with the methodology given in the guidance document CIRIA C552. This methodology for risk evaluation is a qualitative method of interpreting the available data from the information gathering phase of the assessment. It involves the classification of the:

- magnitude of the probability (likelihood) of the risk occurring.
- magnitude of the potential consequence (severity) of risk occurring.

Once the consequence and probability have been classified, a risk category, ranging from "very high risk" to "very low risk", can be assigned to each possible contaminant linkage.

Chemical contamination and ground gas risks are assessed in accordance the source-pathway-receptor concept and contemporary contaminated land guidance. Risks posed to the water environment are assessed in accordance with current Scottish Government and SEPA guidance.

Site Prioritisation – Part 2A Considerations

JPB'S Site Evaluation Risk Assessment (SERA model) was utilised in order to prioritise the site, based on the methodology set out in the Department of the Environment Contaminated Land Review Report No. 6 (DOE CLR No.6). The SERA model has been developed to evaluate sites by determining the level of priority the site should be given based on the source-pathway-receptor model. The model is based on DOE Report CLR6 and Part 2A of the EPA but develops the principles further than CLR6 by determining the level of priority of a site more objectively and in more detail. The results of the SERA assessment procedure are given in Appendix 12.

3.0 SITE DETAILS

3.1 Site Walkover

The site is located in the Auchtertool area of Fife, approximately centred on Ordnance Survey National Grid Reference NT 212 911. A selection of site photographs is presented in Appendix 2. The site covers an area of approximately 66 hectares.

At the time of the site walkover on 3rd June 2025 the site comprised arable farm land, farm buildings, a new battery storage facility and natural burn running west to east through the centre of the site. The site was bounded by the B925 road to the south, greenfield and dense forests to the north and west, with a SUDs pond and electrical substation to the northwest of the site associated with a chemical Works in the west. To the east the site was bounded by a single tracked road across the majority of the east and northeast boundary with a housing estate (at Camilla Road) in the southeast and Auchtertool village further to the southeast.

Overall, the topography of the site was very undulating with steep slopes and deep gulleys seen throughout the site and most notably associated with the Dronachy Burn; the dismantled railway through the centre of site and a steep slope running west of Camilla Farm and along the northern boundary.

Dronachy Burn flowed through the centre of the site and in the west the watercourse changed direction dramatically (bend) to trend north to run adjacent to the site boundary. The Burn flowed west to east, and a small waterfall was present near the eastern site boundary.

South of Dronachy Burn

Arable farmland was seen across the majority of the site, with areas to the west of dense vegetation as well as through the centre of the southern portion of the site. An area of steep elevation with dense heath growth was present, which leads east toward Camilla Farm on the eastern boundary. Camilla Farm was a small steading with a steel barn and a construction site cabin within the compound with a track leading from the barn to the east.

North of Dronachy Burn

The majority of the land north of the burn comprised mainly farmland with the exception of dense vegetation to the immediate northeast and a historical bridge and steep gully (former railway cutting) running from the bridge to the eastern site boundary. In the northwest, an area of dense forest is noted, the trees were uniform and all of the same type which suggests a plantation.

In the centre of the northern boundary an abandoned farm building (possibly old stables) was present. Adjacent to this is what appears to be a monument with evidence of a historical building with some stone walls and foundations still present. A track is seen to run from this building to the east towards the single-track road that runs along the eastern boundary.

Within the very northeast of the site a newly constructed compound was noted with a steel fence surrounding the area. This compound seems to relate to a battery storage facility with a compound and brick building seen on the hard standing.

A number of overhead electrical cables and pylons cross through the site.

3.2 Invasive Plant Survey

An invasive plant survey was carried out during the works prior to commencement of the investigation. The report is included in Appendix 3. The summary of the report is

- No Japanese Knotweed, Giant Hogweed or Himalayan Balsam plants were identified during the walkover.
- However, the ecologist noted the presence of some invasive or non-native species that may be of concern, including Horsetail during the visit. The report notes that nine areas of Horsetail were identified on site, with seven areas described as sporadic, and two areas of growth described as prolific.

S6A	SURVEY FINDINGS
	There was no evidence of controlled species, such as Japanese Knotweed, Giant Hogweed & Himalayan Balsam during this survey. Horsetail was identified within this survey area. There are a total of 9 infestations across the site. Access to some areas of the site were limited due to dense vegetation such as gorse, and steep embankments. The soil disturbance within the ploughed fields may also have limited our findings.
S6B	SURVEY RECOMMENDATIONS
	Recommendations for Site Investigation Contractor Regarding Horsetail, we would advise that the risk of spread from these activities is low. Recommendations for Developer Although Horsetail is not controlled by legislation it is a highly invasive perennial weed which spreads quickly and vigorously, reproducing through spores and root fragments. As it often causes damage to roads and footways, we would recommend that some form of management/treatment is carried out to minimise the risk of future damage to roads, infrastructure and delay to road adoptions. Should there be any concern or queries when carrying out the work, KleerKut can be contacted for guidance.

4.0 HISTORY OF LAND USE

An investigation of the past usage of the site can often provide an indication of the presence of potentially contaminated soils arising from processes associated with former land uses. These researches can help to identify any potential constraints to developments upon which physical investigations can then concentrate. Past copies of Ordnance Survey Maps and air photos were examined, with particular attention being given to the industrial heritage of the study area and the changing land use of the site. The summary of the historical land uses identified on and adjacent to the site are described below.

Due to the size of the site, the maps were broken down into 6 separate map packages at 1:2,500 scale, and 4 separate map packages at 1:10,000 scale. For ease of use, the 1:2,500 scale maps summarised in the table below have been divided into geographical areas covering the northwestern (NW); north-central (NC); northeastern (NE); southwestern (SW); south-central (SC); and southeastern (SE) portions of the site.

Similarly, the 1:10,000 scale maps have been divided into geographical areas covering the west (W) and east (E) of the site, with 2 further maps detailing the surrounding area to the northwest (NW) and northeast (NE).

For clarity, the scale of the maps inspected has been included in parentheses after the Ordnance Survey edition, whilst the reference of the map segment (appended) is also included in parentheses after the geographical area in the first instance.

Ordnance Survey Edition (Appendix 4)	On Site	Surrounding Area
1856 (1:10,000)	W (A) – The site is mostly greenfield with the ruins of a castle known as Camilla (formerly Hallyards) present in the north. The site is cut from northeast to southwest by the Dronachy Burn. E (B) – Mostly greenfield. A waterfall and dam are present on the Dronachy Burn in the east of the site.	W (A) – Mostly greenfield, with old limestone quarries located approximately 300m to the southwest. A Whinstone uarry is located approximately 40m to the north-east. E (B) – Mostly greenfield. Camilla Loch is located approximately 600m to the northeast. NW (C) – Mostly greenfield. An old limestone quarry is located approximately 500m to the northwest, with another limestone quarry located approximately 700m to the northwest. Loch Gelly is present 1km to the northwest. NE (D) - A sandstone quarry is present approximately 600m to the northeast, with Glenniston Limestone Quarry and limekilns present approximately 900m to the northeast.
1895 (1:2,500)	NW (A15) – Railway present on an embankment cutting through the north of the site from west to east with areas of woodland bounding the railway. Furze along northern boundary. A small stream is present immediately south of the railway which flows to the east before following towards the western boundary and flowing towards the south. NC (A16) – Railway enters a cutting and is crossed by an aqueduct. A north-south oriented lane leading to Camilla crosses the railway cutting. Some farm buildings approximately 45m south-west of the ruins. NE (B13) – Mostly greenfield. Railway in a cutting in the south, oriented west to east, then turning towards the south-east. Railway crosses the Dronachy Burn which has a waterfall to its west.	NW (A15) – Mostly greenfield. The railway which cuts the site enters a cutting just west of the site boundary. The site of a tumulus is recorded approximately 380m to the north. A pump is located north of the tumulus. A quarried area is shown within an agricultural field approximately 520m to the north. NC (A16) – The quarry to the north has been extended and is now listed as 'old'. NE (B13) – Greenfield with areas of furze and rough ground. Small elliptical feature in a cutting approximately 30m to the north likely represents a small quarry. The eastern site boundary is formed by a lane. A small stream flows from marshland to the east of the site towards the eastern site boundary. SW (A11) – Mostly greenfield. Walton East Strip borders the site to the southwest. A drain is shown extending to the southwest. A farm known as Walton is located approximately 630m to the southwest.

Ordnance Survey Edition (Appendix 4)	On Site	Surrounding Area
	SW (A11) – Greenfield. SC (A12) – Dronachy Burn cuts through the area, oriented northeast to southwest. Some areas of furze and rough pasture are present south of the burn. A well is present just within the western site boundary. SE (B9) – Mostly greenfield with a railway on an embankment in the north-east. Some areas of furze and rough ground present. Stream or Mill Lead entering the site in the east and appearing to flow beneath the railway embankment.	SC (A12) – Walton East Clump woodland is present to the west of the site. Mostly greenfield. Two ‘stone depôts’ situated approximately 90m and 160m to the south. SE (B9) – The village of Auchtertool is present to the east containing a distillery, malthouse and mill. The railway extends on an embankment to the east of the site before entering a cutting approximately 280m to the east. A mill dam is present immediately south and east of the site with a number of buildings known as ‘Camilla’ to its south-east.
1896 (1:10,000)	W – No significant changes. E – No significant changes.	W – Walton Quarry located approximately 400m to the southwest and an old quarry located approximately 800m to the southwest. E – No significant changes. NW – No significant changes. NE – No significant changes.
1914 (1:2,500)	NW – No significant changes. A small building is located adjacent to the railway line in the west of the site. NC – No significant changes. NE – The burn immediately west of the waterfall has been re-routed and now includes a small reservoir and sluices. SW – No significant changes. SC – No significant changes. SE – No significant changes.	NW – No significant changes. The quarry to the north is now listed as an old quarry. The pump to the north of the tumulus is indicated to be a windpump. NC – Quarry and old quarry indicated approximately 90m north of the site. NE – Elliptical feature 30m to the north is now indicated to be an old quarry. A sheepfold is situated on the northern side of the stream to the east of the site adjacent to the lane. SW – No significant changes. SC – The Stone Depôts are no longer indicated. SE – A tank is present adjacent to the mill dam at Camilla, approximately 85m to the north-east, with the mill dam appearing to be occupied by marshland and rough ground. Filter beds are present approximately 60m to the northeast. The former malthouse is now indicated to be a bonded warehouse.
1920 (1:10,000)	W – No significant changes. E – No significant changes.	W – No significant changes. E – No significant changes. NW – No significant changes. NE – No significant changes.
1943 (1:2,500)	NW – No significant changes. NC – No significant changes. NE – A weir is now present adjacent to the sluices on site, whilst a second waterfall is indicated on the Dronachy Burn to the east of the railway.	NW – A new farm building has been constructed adjacent to the tumulus. NC – The quarry and newer of the ‘old’ quarries are no longer shown, although break-in-slope indicates a feature still remains consistent with the newer ‘old quarry’.

Ordnance Survey Edition (Appendix 4)	On Site	Surrounding Area
	SW – No significant changes. SC – A small area in the south of the site appears to have been excavated. SE – No significant changes.	NE – The sheepfold is no longer shown. A small circular depression is shown adjacent to the quarry, which is still listed as 'old'. SW – No significant changes. SC – No significant changes. SE – A tank is present approximately 130m to the east.
1950 (1:10,000) (aerial image)	W – No significant changes. E – No significant changes.	W – No significant changes. E – No significant changes. NW – No significant changes. NE – No significant changes.
1959 (1:10,000)	W – No significant changes. E – No significant changes.	W – The old quarry approximately 300m to the west now appears to have reopened under the name Walton Quarry. E – No significant changes. NW – No significant changes. NE – The windpump is indicated to be 'old'.
1962 – 1964 (1:2,500)	NW – The small building adjacent to the railway in the west of the site has been removed. NC – Electricity pylons have been constructed across the site. NE – A drain is present immediately southwest of the Dronachy Burn, to the east of the railway. SW – No significant changes. SC – No significant changes. Electricity pylons have been constructed on this part of the site. SE – No significant changes. The railway has been dismantled in the east of this area.	NW – New farm buildings have been constructed immediately north of the tumulus, which is now listed as the site of a cairn. A sheep wash has been constructed along a track approximately 340m north of the site. More fields are occupied by rough pasture to the north of the site. NC – A works building has been constructed just to the north of the older 'old quarry'. NE – A pond is present in the base of the old quarry. SW – No significant changes. SC – No significant changes. SE – The filter beds to the east are no longer shown. The railway to the east has been dismantled. A garage is recorded approximately 160m to the east. New buildings have been constructed at Camilla.
1966 – 1967 (1:10,000)	W – The railway has been dismantled. E – The railway has been dismantled.	W – Walton Quarry is indicated to be disused. E – No significant changes. NW – The quarries approximately 600m to the north appear to have been partially infilled. NE – No significant changes.
1986 - 1991 (1:2,500)	NW – No significant changes. NC – Most of the embankment of the railway has been removed, with a remnant still existing in the east. NE – No significant changes.	NW – The land to the west is now occupied by Mossmorran Plant, with additional embankments, reconfiguration of drains and streams and areas of rough ground bordering the site to the north now recorded as marsh. A large pond or reservoir is located approximately 90m west of the site. The site of the tumulus/cairn to the north is no longer

Ordnance Survey Edition (Appendix 4)	On Site	Surrounding Area
	SW – No significant changes. SC – The excavation in the south of the site is no longer shown and may have been infilled. SE – No significant changes.	shown. The distillery and associated buildings to the southeast have been removed. NC – An electrical substation is indicated to the north of the works building. NE – No significant changes. SW – The buildings at Walton have been removed, with two smaller buildings replacing them approximately 690m to the southwest. The road leading to Walton has now been extended to the west. SC – No significant changes. SE – The tank at Camilla to the east and the garage approximately 160m to the east are no longer shown. Sections of the former railway embankment have been removed and replaced by housing from approximately 240m east of the site.
1989 (1:10,000)	W – No significant changes. E – No significant changes.	W – No significant changes. E – The site of the former distillery is now occupied by housing. NW – No significant changes. NE – No significant changes.
1990 – 1992 (1:10,000)	W – No significant changes. E – No significant changes.	W - Mossmorran Plant is now known as Fife NGL Plant. E – No significant changes. NW – No significant changes. NE – No significant changes.
1993 (1:2,500)	NW – No significant changes. NC – No significant changes. NE – No significant changes. SW – No significant changes. SC – No significant changes. SE – No significant changes.	NW – No significant changes. NC – No significant changes. NE – No significant changes. SW – No significant changes. SC – No significant changes. SE – No significant changes.
1999 – 2000 (1:10,000)	W – No significant changes. E – No significant changes.	W – No significant changes. E – No significant changes. NW – No significant changes. NE – No significant changes.
2001 (1:2,500) (aerial image)	NW – No significant changes. NC – No significant changes. NE – No significant changes. SW – No significant changes.	NW – No significant changes. NC – No significant changes. NE – No significant changes. SW – No significant changes.

Ordnance Survey Edition (Appendix 4)	On Site	Surrounding Area
	SC – No significant changes. SE – A large shed or warehouse type structure appears to be present in the east of the site with a row of storage cabins or containers extending to the south-east.	SC – No significant changes. SE – The row of cabins or containers extends off-site to the south-east, parallel to the eastern site boundary. Some of the buildings at Camilla appear to have been removed and replaced by residential properties.
2006 (1:10,000)	W – No significant changes. E – No significant changes.	W – Several fields to the southwest now occupied by woodland. E – No significant changes. NW – No significant changes. NE – No significant changes.
2024	W – No significant changes. E – The warehouse-type structure in the east of the site is now labelled as Camilla Farm, with increased amounts of woodland to its north and a track extending into the site from the east.	W – No significant changes. E – No significant changes. NW – No significant changes. NE – No significant changes.

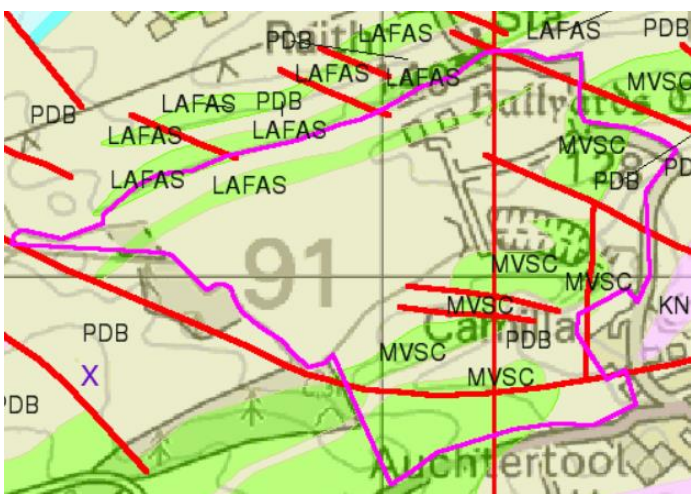
Archaeology

Ruins of a mediaeval castle, known as Camilla or Hallyards is present in the north of the site and the site is listed on the Canmore.org website (Appendix 5). Should any development or earthworks be required in the vicinity of these ruins it is likely that supervision will be required by a suitably qualified archaeologist. In addition, discussions would likely to be required with the local authority and Historic Environment Scotland.

5.0 GEOLOGICAL ASSESSMENT

5.1 General Geology

An initial appreciation of the general geological conditions underlying the site was made from the available Geological Survey sheets (JPB Drawing ZG116-01/R/F/ 03), BGS supplied borehole logs (Appendix 6), geological and mining memoirs, mine plan catalogues and the Coal Authority Mining report (Appendix 7). The following is a summary of the indicated conditions as interpreted from the above information by JPB.

Made Ground	Made ground is anticipated to be present along the former railway track and landfill which ran through the western, central and eastern areas of the site. In addition, localised made ground is anticipated to be present associated with the farm buildings, well, ruins, excavations, farm tracks and existing battery farm.
Natural Superficial Deposits	Alluvial deposits are indicated present within the western area of the site. These deposits are shown to be underlain by glacial till. Glacial till is indicated to be present across the majority of the site. This material is likely to comprise sandy clay with variable amounts of gravel, cobbles and boulders. Irregular bands or lenses of sand and gravel may occur in the till. BGS Borehole records held on the site indicate the glacial till deposits to be between 0.6m and 4.4m in thickness where encountered. Bedrock is indicated to be at the surface within parts of the northern, eastern and southern areas of the site.
Rock Strata	The majority of the site is indicated to be underlain by the Pathhead Formation. These typically comprise mudstone and siltstone with beds of dolomite and limestone. However, dolerite, basalt and quartz dolerite sills of the Midland Valley Sill Complex are also indicated to be present within the northern, central, eastern and southern areas of the site. The bedrock geology is shown to be disrupted by a sequence of north-west to south-east orientated faults which generally downthrow strata to the south-west. In addition, a north to south oriented fault is shown in the eastern area of the site, which connects two of the faults and downthrows strata to the west, as denoted by red (thicker lines) in the snip below. 

5.2 Hydrology and Hydrogeology

The available information, including SEPA's online water environment data (Appendix 8), indicates that the following hydrological and hydrogeological conditions are present at the site.

Surface Water Features	The nearest minor surface water feature is the Dronachy Burn present on site; flowing south-east close to the western site boundary before changing course and flowing northeast in the central site areas then southeast close to the eastern site boundary. In addition, Camilla Loch is located approximately 255m to the north-east. SEPA's Draft River Basin Management Plan online classifies the Dronachy Burn as being of "Moderate" ecological potential, with an overall ecological status of "Bad" and a chemical status of "Pass".
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	The nearest major surface water feature to the site is Loch Gelly located 1.1km north-west of the site. SEPA's Draft River Basin Management Plan online classifies the Loch Gelly as being of "Poor" ecological potential, with an overall ecological status of "Poor" and a chemical status of "Pass". No surface water abstractions were recorded within 1km of the site.
Superficial Deposits	Made ground deposits are present and may comprise granular materials. It is considered that these will have a medium to high permeability and are therefore susceptible to contamination. Glacial till is indicated to be present across the majority of the site which is likely to comprise stiff, silty, sandy clay with rock clasts and irregular bands or lenses of sand and gravel. This is considered to be of low permeability, to have a low susceptibility to contamination and may afford some protection to the underlying strata from the downward percolation of mobile contaminants. Alluvium is indicated to be present within the western area of the site, which may contain granular material. These deposits are likely to have a moderate permeability and therefore a moderate susceptibility to contamination.
Rock Strata	SEPA Water Environment Hub online maps indicate that the site is underlain by the Burntisland groundwater body (ID: 150555). This is reported to have an overall status of "Good" and to be of "Good" quality under the quantitative classification and to have a "Good" chemical status.
Groundwater Abstraction	The Envirocheck report (Appendix 9) indicated there are no groundwater abstraction records with 1km of the site.

5.3 Geo-Hazards

Johnson Poole & Bloomer commissioned an "Envirocheck" UK regulatory authority database search (Appendix 9) to obtain information on various operations within a 1 km radius of the centre of the site. A plan showing the location of these operations is presented in Appendix 9. The key findings of geological hazards database search are summarised below. JPB's default distance for commenting on features in the vicinity of the site is 50m.

Geo-hazard	Distance from site measured to the registered location (i.e. centre of the site)	Hazard Rating No Hazard/Very Low/Low/Medium/High
Potential for Collapsible Ground Stability Hazards	On site 9m NW	Very Low No Hazard
Potential for Compressible Ground Stability Hazards	On site 9m NW 16m NW	Moderate Moderate Very Low
Potential for Ground Dissolution Stability Hazards	On site	No Hazard
Potential for Landslide Ground Stability Hazards	On site 5m S 32m N 34m N 35m NW 36m NW 37m NE 38m S	Moderate No Hazard Moderate Low Moderate Moderate Very Low Low
Potential for Running Sand Ground Stability Hazards	On site 5m S 9m NW 37m N	Low No Hazard Low No Hazard
Potential for Shrinking or Swelling Clay Ground Stability Hazards	On site 5m S 37m N	Very Low No Hazard No Hazard

5.4 Foundation Options

The desk study has indicated the site to be overlain by made ground; along the area of the former railway and area of landfill, farm buildings and well. Due to the inherent variability of this material it is considered that this horizon would not be very suitable as a founding horizon in its present condition. Consideration of vibro-improvement or piling may be required. It should be noted that the area of former cutting/landfill truncates through the proposed development area.

The location of the former well (infill status unknown) located at the southwest site boundary could act as a local physical constraint if future development was to encroach in its vicinity and hence remedial works to infill/stabilise the well may be required.

The desk study has indicated the natural superficial deposits at the site are predominantly glacial till. Where these deposits are present at shallow depth, it is possible that standard strip or pad foundations may be feasible, subject to actual proposed building loadings.

However, alluvial deposits are indicated to be present beneath the western area of the site. Based on the available information it is likely that standard strip or pad foundations may not be feasible within these areas of the site if buildings are to be constructed within this area. As standard foundations are considered not to be feasible based on the existing information, ground improvement techniques such as vibro or piling maybe required. **Consideration will have to be made on settlement due to any loading of the alluvial deposits.**

The geological maps indicate there are areas of the site where bedrock is at or near surface, and this may be encountered during any excavations during the development such as the construction of sewers. This material would be suitable for a foundation horizon.

A detailed site investigation will be required to confirm the foundation solution.

6.0 QUARRYING, MINING AND MINE ENTRIES

6.1 Quarrying

There is no indication of quarrying on site or in the immediate vicinity.

6.2 Mining Conditions

Underground Mining

The objective of this part of the assessment was to undertake a desk study review of the indicated site geology and the underlying mining conditions with a view to assessing the risk to the proposed development arising from the possible presence of mining. It should be noted that the south-eastern area of the site does not lie within a Mining Remediation Authority Coal Mining Reporting Area, and therefore it is considered there is a very low risk from coal mining in this area. The following assessment is for the areas of the site which lie within a Coal Mining Reporting Area.

Examination of historical records shows no evidence of underground mining within the vicinity of the site and there is no current mining within influencing distance. The Mining Remediation Authority Report indicates the property is not within an area that could be affected by past recorded underground workings. The geological maps, and memoirs, the mine plans catalogues and Department of the Environment Report "Mining Instability in Great Britain", 1991 and BGS record on non-coal mining plans have no records of any mineworkings or mine entries beneath the site. Therefore, based on our researches the risks relating to **mining are considered to be very low.**

6.3 Preliminary Mining Risk Assessment

The documentary research has not found any records for mining beneath the site. In addition, the shallowest coals beneath the site will lie at depth. Given the depth to these seams, even if unrecorded mineworkings were present, **there is a very low probability of mining induced subsidence affecting the development and mining instability would not be considered to be a constraint.**

6.4 Mine Entries

During the study no evidence of any mineshafts or adits being present within the site was encountered. However, as in any areas of past mining activity, the presence of unrecorded mineshafts and adits cannot be discounted. Therefore, vigilance should be maintained by all site workers during any ground excavations to identify any features suspected to be possible mine entries.

6.5 Summary of Mining Risks

The table below summarises the potential risks associated with former mining legacy for the proposed development site, identified from list sources of information, in compliance with "Risk Based Approach to Development Management – Resources for Developers" published by the Coal Authority.

Mining Issue	Yes/No	Risk Assessment
Underground mining (recorded at shallow depths)	No	The documentary research has not found any records for shallow mining beneath the site, the risks relating to mining are considered to be low.
Underground mining (recorded at depth)	No	The Mining Remediation Authority Coal Mining Report indicates that according to the records in their possession, the property is not within the zone of likely physical influence on the surface from past underground workings.
Mine entries (shafts and adits)	No	During the study no evidence of any mineshafts or adits being present within the site was encountered.
Coal mining geology (fissures)	No	MRA report/web page indicates no evidence of any issues.
Record of past mine gas emissions	No	MRA report/web page indicates no evidence of any issues.
Recorded coal mining surface hazard	No	MRA report/web page indicates no evidence of any issues.
Surface mining (opencast workings)	No	MRA report/web page indicates no evidence of any issues.

As with any coalfield/former mining area, there is the potential for unrecorded mine entries to be present. As in the development of all sites in former mining areas, vigilance should be maintained by all site workers during any ground excavations to identify any features suspected to be possible mine entries.

7.0 REGULATORY SEARCH

7.1 Regulatory Database

Johnson Poole & Bloomer commissioned an “Envirocheck” UK regulatory authority database search (Appendix 9) to obtain information on various operations within a 1 km radius of the centre of the site. A plan showing the location of these operations is presented in Appendix 9. The key findings of regulatory database search are summarised below. JPB’s default distance for commenting on features in the vicinity of the site is 250m with the exception of COMAH and landfills for which it is 1km.

Licence/Data Type	Distance from site measured to the registered location (i.e. centre of the site)	Operation
Regulators		
Contaminated Land Register Entries and Notices	None within 250m	-
Discharge Consents to Controlled Waters	On site	Operator: Shell Uk Exploration Authority: Scottish Environment Protection Agency Location: Fife Ngl Plant Issued Date: 1/7/92 Discharge Type: Surface Water Operator: Shell Uk Exploration Authority: Scottish Environment Protection Agency Location: Mossmorran Fife Issued Date: 4/10/83 Discharge Type: Other Matter-Surface Water Operator: Shell Uk Exploration Authority: Scottish Environment Protection Agency Location: Mossmorran Fife Issued Date: 21/8/79 Discharge Type: Surface Water Operator: Tractor Shovels Ltd Authority: Scottish Environment Protection Agency Location: Old Railway Cutting Camilla Farm Issued Date: 21/11/79 Discharge Type: Trade Effluent
Enforcement and Prohibition Notices	None within 250m	-
Integrated Pollution Controls	None within 250m	-
Integrated Pollution Prevention and Control	None within 250m	-
Local Authority Integrated Pollution Prevention and Control	None within 250m	-
Local Authority Pollution Prevention and Controls	None within 250m	-
Local Authority Pollution Prevention and Control Enforcements	None within 250m	-
Pollution Incidents to Water Environment	None within 250m	-
Prosecutions Relating to Authorised Processes	None within 250m	-
Prosecutions Relating to Water Environment	None within 250m	-
Registered Radioactive Substances	None within 250m	-
Waste		
BGS Recorded Landfill Sites	None within 1km	-
Integrated Pollution Control Registered Waste Sites	None within 1km	-
Licensed Waste Management Facilities (Landfill Boundaries)	None within 250m	-
Licensed Waste Management Facilities (Locations)	None within 250m	-
Local Authority Recorded Landfill Sites	None within 1km	-
Potentially Infilled Land (Non-Water)	14m NE 81m NE 91m NE	Use: Unknown Filled Ground (Pit, quarry, etc.) Date of Mapping: 1992

Licence/Data Type	Distance from site measured to the registered location (i.e. centre of the site)	Operation
	125m NE	
Potentially Infilled Land (Water)	2m W	Use: Unknown Filled Ground (Pond, marsh, river, etc.) Date of Mapping: 1895
Registered Landfill Sites	None within 1km	-
Registered Waste Transfer site	None within 250m	-
Registered Waste Treatment or Disposal Sites	None within 250m	-
Hazardous Substances		
Control of Major Accident Hazards Sites (COMAH)	None within 1km	-
Explosive Sites	None within 250m	-
Notification of Installations Handling Hazardous Substances (NIHHS)	None within 250m	-
Planning Hazardous Substance Consents	None within 250m	-
Planning Hazardous Substance Enforcements	None within 250m	-
Industrial Land Use		
Contemporary Trade Directory Entries	90m SW	Name: Castle Restorations Location: Mossmorran, Auchtertool House Classification: Antiques – Repairing & Restoring Status: Inactive
	112m W	Name: Fife Blacksmiths Location: 1 Sanderson Terrace Classification: Blacksmiths & Forgemasters Status: Inactive
	134m W	Name: C F Cruickshank Blacksmiths Location: Sanderson Terrace Classification: Blacksmiths & Forgemasters Status: Inactive
Fuel Station Entries	None within 250m	-
Sensitive Land Use		
Ancient Woodland	None within 250m	-
Areas of Adopted Greenbelt	None within 250m	-
Environmentally Sensitive Areas	None within 250m	-
Forest Parks	None within 250m	-
Local Nature Reserves	None within 250m	-
Marine Nature Reserves	None within 250m	-
National Nature Reserves	None within 250m	-
National Parks	None within 250m	-
National Scenic Areas	None within 250m	-
Nitrate Sensitive Areas	None within 250m	-
Nitrate Vulnerable Zones	None within 250m	-
Ramsar Sites	None within 250m	-
Sites of Special Scientific Interest	200m N	Name: Camilla Loch Total Area (m2): 81749.53 Source: Nature Scotland Designation Details: Biological
Special Areas of Conservation	None within 250m	-
Special Protection Areas	None within 250m	-
World Heritage Sites	None within 250m	-
Summary	The database search has confirmed that there are limited industrial processes have been identified around the site and significant impact on the site is unlikely. However researches indicate that a landfill site (Dronachy Den) lies within the site boundary (see below).	

7.2 Environmental Health (Public Protection) Response

Fife Council was contacted to provide any available environmental related information for the site. A representative from Fife Council indicated that a section of the former railway cutting within the site was infilled and utilised as a landfill, which was referred to as “Dronachy Den”. Following the enquiry, Fife Council provided JPB with a Contaminated Land Inspection Report and Desk Study and Risk Assessment report. A summary of the relevant information from these reports are summarised below.

Contaminated Land Inspection Report, Dronachy Den Railway Land, Auchtertool (February 2006)

- The aim of the report was to provide an initial environmental risk assessment of the site and to determine the possibility of it being designated as Contaminated Land or a Special Site under Part IIA of the Environmental Protection Act 1990. The “site” refers to the Dronachy Den railway cutting.
- The site was a former railway cutting, which was infilled (landfill site). At the time of writing, the current land use was a wildlife/agricultural land.
- Council records referenced in the report indicate a site called “Camilla Farm” was infilled with soil, with deposition ceasing in 1981. It is understood that this landfill site was producing carbon dioxide but not methane when last monitored (date unknown). Fife Council conclude that this likely refers to the landfill on site (Dronachy Den).
- Potential associated contaminants identified for the historical land use (railway land and landfill) include metals, organics, acids, coal tar, creosote, TPH, PAH, chlorinated hydrocarbons, phenols, methane, carbon dioxide, solvents, sludge and asbestos.
- Sensitive ecological sites include the Auchtertool Linn Wildlife site (on site).
- At the time of writing (2006) the Dronachy Burn was classed as A1 – Excellent at Auchtertool and B – Fair downstream at Balbarton.
- The Auchtertool Mill (Mill Dam; Mill Lead; Sluice; Kiln) adjacent to the site is classed as an ancient monument with NMRS number NT29SW 53.
- Fife Council was unaware of any statutory nuisance complaints or pollutions incidents on the site at the time of writing. In addition, there were no known underground derelict tanks on site.
- Fife Council determined there to be a low risk to human health, the water environment and property, and a medium risk to ecology for the current site use. The overall risk rating for the site was determined as medium.
- The site was given a low priority ranking.

Desk Study and Risk Assessment Report, Kirkcaldy & District Branch (June 2013).

- Fife Council undertook a Desk Study and Risk Assessment for the former railway line between Cowdenbeath and Kirkcaldy, which includes the segment shown in the subject site.
- The report states that the Dronachy Den landfill site is understood to have been used for the deposition of excavated soils.
- A low risk was identified for human health, ground gases (including landfill gases), surface and groundwaters, and was therefore given a low overall risk ranking and low priority in terms of Fife Council's Contaminated Land Inspection Strategy.
- Fife Council considered that the site does not require further investigation under Fife Council's Contaminated Land Inspection Strategy at the time of writing (2013), however stated that if the site-use changes in the future, the risk assessment would need to be revised.

7.3 Petroleum Officers Response

While no fuel tanks were anticipated to be present at the site, the petroleum officer from the Fife Council was contacted as a precaution for information regarding to any historic below or above ground storage tanks on site or within a close vicinity, however no response has been received at the time of writing.

7.4 Unexploded Ordnance (UXO)

A Zetica Map has been obtained with regard to the assessment of any risks which may or may not be posed by Unexploded Ordnance (UXO) at the site. The map indicates the site to be in an area of low risk which are areas indicated as having 15 bombs per 1000 acre or less. A copy of this map can be found in Appendix 11.

8.0 CHEMICAL CONTAMINATION AND GAS EMISSIONS

8.1 Chemical Contamination

Greenfield Areas

Our researches have indicated that a large portion of the site has been occupied by agricultural land throughout its history. It is less likely, therefore, that significant chemical contamination will be present on site. However, testing for pesticide residues should be carried out and any made ground encountered should be tested for a suite of chemical contaminants commonly encountered on brownfield sites to confirm ground conditions.

Area of Former Railway, Landfill, Former Well, Farm Buildings, Ruins and Electricity Pylons

Our researches have indicated that a former railway embankment and cutting, landfill, ruins and existing farm buildings and electricity pylons within the site.

JPB examined DoE Industry Profiles for the various site usages where appropriate. The typical contaminants associated with the historical and current land uses of the site are as follows.

Previous site uses including former railway, landfill, farm buildings, ruins and electricity pylons	
<i>Metals and metalloids</i>	Toxic metals and metalloids including arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc.
<i>Inorganic</i>	Sulphides, sulphates, cyanides.
<i>Organics</i>	Petroleum hydrocarbons, PAHs, SVOCs, VOCs, phenols, PCBs, pesticides.
<i>Others</i>	Asbestos.

8.2 Ground Gases

The researches have indicated that part of the former railway cutting within the site was infilled and utilised as a landfill. Fife Council have referenced that the nature of the infill material is indicated to comprise excavated soils, however it could contain biodegradable material and could degrade to produce elevated levels of gas including methane, carbon dioxide, hydrogen sulphide and carbon monoxide. Fife Council have indicated that the site was producing carbon dioxide.

In addition, made ground associated with the former farm buildings is present in parts of the site, and a former well is present at the south-western site boundary.

Alluvium is recorded within the western area of the site which may contain organic silts which could provide a source of ground gas emissions. This may cause a constraint to any future developments and further intrusive investigations are required to confirm ground gas conditions.

Off Site Source

Old quarries which have likely been infilled are indicated 30m and 90m north of the site. The nature of the infill material is unknown and could potentially be a source of gas. Any ground gases generated from this source may have the potential to migrate towards the site.

Deep Seated Gas

The site in part lies within a Coal Authority Coal Mining Reporting Area (CMRA) and the CL:AIRE publication, "Good practice for risk assessment for coal mine gas emissions" recommends that where a site lies within a CMRA further assessment of risks from a deeper gas source is required.

Based on the above information, an assessment in accordance with CL:AIRE publication "Good practice for risk assessment for coal mine gas emissions" indicates that where it meets the following criteria it is considered to lie in a "Negligible Risk Zone" and no mitigation or further action is required.

- No mine entries within 50m of the site boundary.
- Workings are at depths of in excess of 150m.
- No faults or pathways connecting the surface to deeper unflooded workings
- The site is out with areas of shallow workings or probable workings on the Coal Authority viewer.

The BGS mapping information indicates that a sequence of geological faults are present at the site. However, it is considered that these faults do not connect the surface to deeper unflooded workings.

Given the above information, it is concluded that the site lies within a “Negligible Risk Zone” and no further assessment of risks from a deeper gas source is required.

Radon

Inspection of the BR 211 Appendix A radon map indicates that the site is within radon class 1.

Radon Class	Radon Affected Area	Estimated percentage band of dwellings exceeding the action Level	Radon Protective Measures (Scotland)
1	No	0-1	None
2	Yes	>1-<3	Basic
3	Yes	>3 to <5	Basic
4	Yes	>5 to <10	Basic
5	Yes	>10 to <30	Full
6	Yes	>30	Full

Based on this classification the site is not within an area requiring radon protection and, therefore, **no protective measures are required**.

8.3 Summary

Based on the proposed development of the site as a Data Centre, with areas of mixed native woodland, wildflower meadow and pond/biodiversity wetland, we envisage that there may be a constraint from chemical contamination and gas emissions and remedial measures may be required. The requirement for, and extent of, such works would be dependent upon the findings of Stage 2 intrusive investigations.

9.0 CONCEPTUAL SITE MODEL

9.1 Introduction

The Conceptual Site Model (CSM) describes how potential chemical sources at the site could contribute to increased levels of risk to potentially sensitive receptors. The CSM identifies the sources of contamination, the likely receptors and the potential pathways present which may link them. Where it appears that a pathway links a source to a receptor, this potential significant contaminant linkage should be the focus of site investigations.

The CSM is developed at an early stage and constantly reassessed in light of investigative findings. The first step in producing such a model is to identify whether there are potential hazards on site through desk top research together with the application of professional expertise and judgement. In addition, information regarding the site-specific environmental setting including geology, hydrogeology, hydrology etc., is gathered to identify the environmental resources which could be impacted by potential contaminants at the site. Within this context, a hazard is defined as a property that has the potential to cause harm to a receptor group.

A summary of this preliminary assessment is presented in the following ICSM tables which summarises the individual source, pathway and receptors considered to be present. This has also been presented in JPB Drawing ZG116-01/R/F/04.

9.2 Potential Contaminant Linkages

The first stage in developing an Initial Conceptual Site Model is to examine all of the contaminant linkages which may potentially be present at the site based on the information gathered in the desk study and during the site reconnaissance visit. A summary of these linkages is presented in the following table which summarises the linkages between individual sources, pathways and receptors considered to be potentially present.

SPR item	SPR item present based on desk study (Yes/No)	Comment
Sources		
S1 – Contamination from former land use	Yes	Site recorded to be formerly occupied by a former railway which was utilised as a landfill, former well, existing farm buildings, ruins and electricity pylons and potentially contaminated made ground is anticipated within the vicinity of these features.
S2 – Contamination from adjacent land use	No	Surrounding area recorded to be mainly greenfield, therefore, no major source of contaminants anticipated.
S3 – Ground gas	Yes	Dronarchy Den Landfill is indicated to be present within the site (infilled railway cutting). Localised made ground beneath the site could contain biodegradable material and could degrade to produce elevated levels of gas. Old quarries are located approximately 30m and 90m north of the site, which have been backfilled with unknown material.
S4 – Leachable contaminants	Yes	Some potential made ground contaminants may be leachable or mobile. Further investigations required.
S5 – Contamination groundwater in mineworkings	No	Mining not present under site or at depth beyond which minewater is a plausible source.
S6 – Contamination from substation	No	No substation present.
Pathways		
P1 – Contact with soil	Yes	Site is to be developed into a Data Centre with green spaces and, therefore, there is the potential for site users and maintenance workers to come into contact with the soils.
P2 – Ingestion of vegetables	No	The site is a commercial development and there are no garden areas where produce is grown.
P3 – Inhalation of dusts/vapours	Yes	Site end users, construction and maintenance workers may be exposed to dusts or vapours from any contaminants present.
P4 – Ingestion of groundwater	Yes	Potential for contact with groundwater for construction workers.
P5 – Building contact with soil	Yes	Site is to be developed and, therefore, buildings will be present on site.
P6 – Migration via services	Yes	Site is to be developed and, therefore, buildings and associated infrastructure will be present on site.
P7 – Perched groundwater	Yes	Researches indicate the potential presence of contaminated made ground overlying cohesive soils, therefore, perched groundwater may be present.

SPR item		SPR item present based on desk study (Yes/No)	Comment
P8 – Vertical migration		No	Site indicated to be predominantly underlain by glacial till, which is in turn underlain by mudstone or igneous bedrock, therefore vertical migration would likely be limited.
P9 – Migration of gas		Yes	Potentially elevated levels of gas could migrate through granular soils or made ground.
P10– Groundwater flow through mineworkings		No	No mineworkings present beneath the site.
Receptors			
Human Receptors			
R1	Adults	Yes	The site is to be developed into a Data Centre with ecological features and contact with the soil is anticipated to be limited to during construction or in landscaped areas.
R2 – Workers & trespassers		Yes	The site is to be developed and, therefore, workers and potentially trespassers on site.
R3 – Adjacent land users		Yes	Adjacent developments include residential developments.
Plant Receptors			
R4 – Plants		Yes	Areas of mixed native woodland and a wildflower meadow is proposed as part of the development.
Buildings/services receptors			
R5 – Buildings and infrastructure		Yes	The site is to be developed and, therefore, buildings will be present on site.
Water environment – surface waters			
R6 – Major Surface Water Features		No	There are no major surface water features within influencing distance of the site. In view of the distance to a major surface water, the localised nature of the made ground on site and the presence of intervening very low permeability glacial till soils which significantly retard contaminant migration, it is considered that there is no significant pathway present. In the absence of a significant pathway there is no significant contaminant linkage present and no further assessment is necessary.
R7 – Dronachy Burn		Yes	The Dronachy Burn is located within the site.
Water environment – groundwater abstraction			
R8 – Shallow perched groundwater		No	No groundwater abstractions recorded within 1km. In addition, any perched water in the made ground on site is unlikely to meet the criteria outlined in the WAT-PS-10-01 (Assigning Groundwater Assessment Criteria for Pollutant Inputs) and UKTAG (i.e. that in order to qualify as a body of groundwater an aquifer must be capable of supplying 10m³/day or 50 people on a continuous basis). Therefore, in the absence of a receptor or water body no further assessment is required.
R9 – Continuous groundwater in soil		No	No groundwater abstractions recorded within 1km. Natural superficial deposits are predominantly very low permeability glacial till which do not constitute a water body. Alluvium is indicated to be present within the western area of the site and may contain permeable granular deposits. However, in the absence of a receptor no further assessment is required.
R10 – Continuous groundwater in rock		No	No groundwater abstractions recorded within 1km. The underlying bedrock is noted to comprise the Pathead Formation which typically comprises low permeability mudstone and siltstone with beds of dolomite and limestone. In addition, igneous sills are indicated to be present. These aquifers are considered to be of low resource potential and low vulnerability. Therefore, no further assessment is necessary with regard to the deeper aquifer.
Water environment – groundwater resource			
R8 – Shallow perched groundwater		No	Any perched water in the made ground on site is unlikely to meet the criteria outlined in the WAT-PS-10-01 (Assigning Groundwater Assessment Criteria for Pollutant Inputs) and UKTAG (i.e. that in order to qualify as a body of groundwater an aquifer must be capable of supplying 10m³/day or 50 people on a continuous basis). The perched water in the made ground is not considered to be a groundwater body and as such is not a receptor.
R9 – Continuous groundwater in soil		Yes	The natural superficial deposits are indicated to predominantly be low permeability glacial till, which does not constitute a water body. However, alluvium is indicated to be present within the western area of the site, which may contain granular material and as such any water in these soils may meet the criteria outlined in the WAT-PS-10-01 (Assigning Groundwater Assessment Criteria for Pollutant Inputs) and UKTAG (i.e. that in order to qualify as a body of groundwater an aquifer must be capable of supplying 10m³/day or 50 people on a continuous basis). It is considered that there is a potential

SPR item	SPR item present based on desk study (Yes/No)	Comment
		receptor present and further assessment is necessary with regard to the continuous groundwater in soils.
R10 – Continuous groundwater in rock	Yes	The rock strata are classified by SEPA as an aquifer and as such any water in the deeper aquifer may meet the criteria outlined in the WAT-PS-10-02 (Assigning Groundwater Assessment Criteria for Pollutant Inputs) and UKTAG (i.e. that in order to qualify as a body of groundwater an aquifer must be capable of supplying 10m ³ /day or 50 people on a continuous basis).
<i>Water environment – groundwater dependent terrestrial ecosystem (GDTE or wetland)</i>		
R11 – GDTE/Wetland	No	No GDTE/Wetland within 250m of the site.

10.0 STAGE 1 PRELIMINARY QUALITATIVE RISK ASSESSMENT

10.1 Methodology

Contaminants are likely to be present at the site and ground gases may be being generated, therefore risks posed by the site to receptors have been evaluated in accordance with the methodology given in the guidance document CIRIA C552. This methodology for risk evaluation is a qualitative method of interpreting the available data from the information gathering phase of the assessment. It involves the classification of the:

- magnitude of the probability (likelihood) of the risk occurring.
- magnitude of the potential consequence (severity) of risk occurring.

The descriptions of the magnitudes of the consequences and likelihoods of risks occurring given in Tables 6.3 and 6.4 of CIRIA C552 have been used in this assessment.

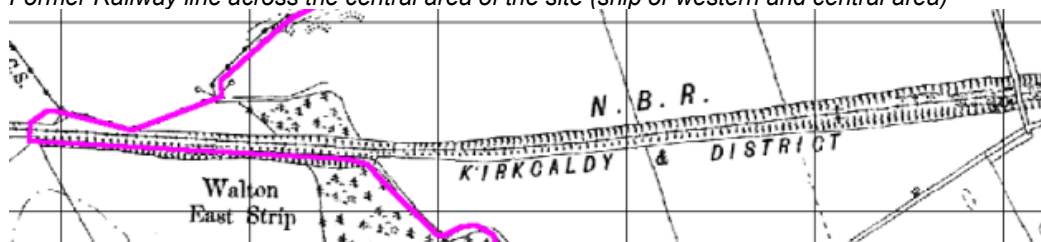
Once the consequence and probability have been classified, a risk category, ranging from "very high risk" to "very low risk", can be assigned to each possible contaminant linkage. The table below summarises the consequence versus probability matrix with the assigned risk category and the actions corresponding with the classification.

Comparison of Consequences v Probability					
		Consequence			
		Severe	Medium	Mild	Minor
Probability	High likelihood	Very High Risk	High Risk	Moderate Risk	Moderate/ Low risk
	Likely	High Risk	Moderate Risk	Moderate/ Low risk	Low Risk
	Low likelihood	Moderate Risk	Moderate/ Low risk	Low Risk	Very Low Risk
	Unlikely	Moderate/ Low risk	Low Risk	Very Low Risk	Very Low Risk
Estimated Risks					
Very High risk		There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not already undertaken) and remediation are likely to be required.			
High risk		Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present substantial liability. Urgent investigation (if not already undertaken) is required, and remedial works may be necessary in the short term and are likely over the longer term.			
Moderate risk		It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that harm would be severe, or if any harm were to occur, it is more likely that the harm would be relatively mild. Urgent investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.			
Low risk		It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.			
Very Low risk		There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.			

Our researches have indicated that the majority of the site has been occupied by greenfield with a low likelihood of the presence of contamination sources, although some contamination from agricultural practices may be present.

It is anticipated that made ground is present associated with the former railway/landfill, well, farm buildings, ruins and electricity pylons. Snips of the areas are shown below.

Former Railway line across the central area of the site (snip of western and central area)



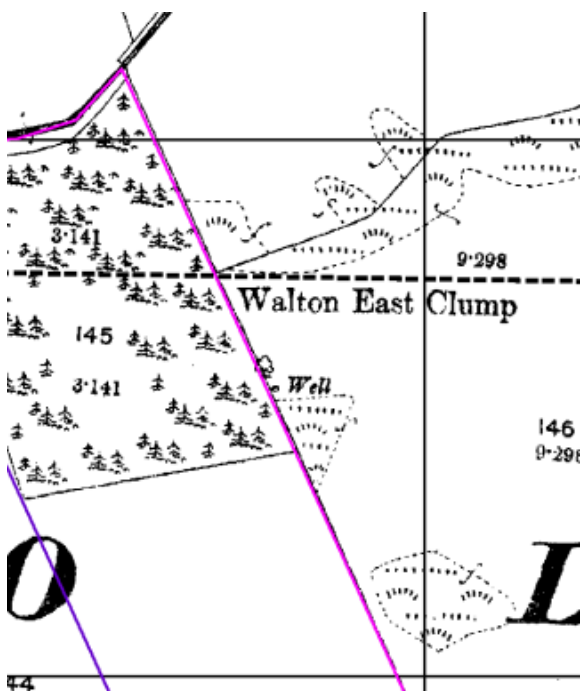
Former Railway line across the central area of the site (snip of central and eastern area)



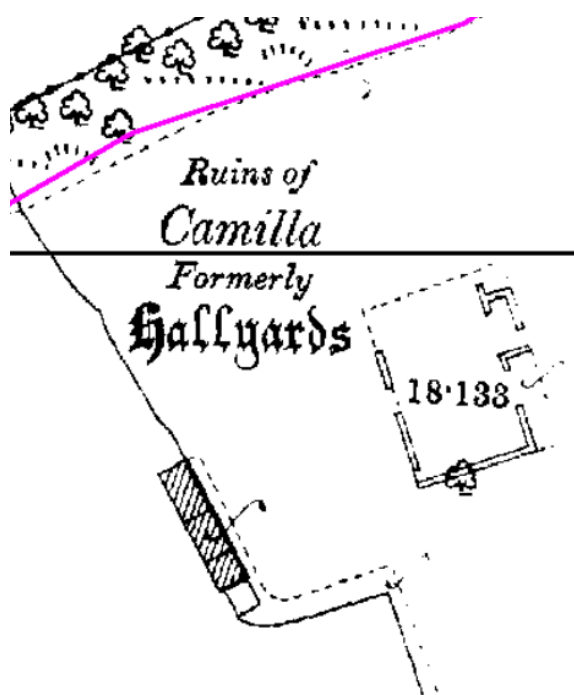
Extent of railway cutting indicated to be utilised as a landfill (source Local Authority)



Former Well at the south-western site boundary



Ruins and farm building in northern area of the site



Farm building in south-eastern area of the site



10.2 Risks to Site Development

Greenfield Area

Exposure of end use receptors to contaminants				
Probability of risk being realised		Consequence of risk being realised		Consequence of risk being realised
Unlikely	The site lies on predominantly natural glacial deposits, with some alluvial soils present in the west. Some other areas of the site are underlain directly by bedrock geology of the Pathead Formation or the Mildand Valley Sill Complex. However, no sources of contamination have been identified.	Medium	Potential for chronic damage to human health likely to result in "significant harm".	Low
Migration of soil gas/vapours to on site properties				

Probability of risk being realised		Consequence of risk being realised		Consequence of risk being realised
Likely	Made ground associated with the former railway (which is recorded as a landfill), farm buildings and infilled well have been recorded within parts of the site. Migration from these sources into the areas of greenfield at the site is considered possible.	Medium	Potential for chronic and/or acute damage to human health likely to result in "significant harm".	Moderate/High
	There is a potential contaminant linkage and circumstances, under which an event could occur are possible.			
	However, it is by no means certain that even over a longer period such an event would take place and is less likely in the shorter term.			
Phytotoxic Risks				
Probability of risk being realised		Consequence of risk being realised		Risk classification
Unlikely	The site lies on predominantly natural glacial deposits, with some alluvial soils present in the west. Some other areas of the site are underlain directly by bedrock geology of the Pathead Formation or the Mildand Valley Sill Complex. However, no sources of contamination have been identified.	Medium	Affect to Plant Growth	Low
Groundwater contamination at the site due to the leaching of contaminants				
Probability of risk being realised		Consequence of risk being realised		Risk classification
Unlikely	The site lies on predominantly natural glacial deposits, with some alluvial soils present in the west. Some other areas of the site are underlain directly by bedrock geology of the Pathead Formation or the Mildand Valley Sill Complex.	Medium	Pollution of sensitive water environment	Low
	The underlying glacial deposits and bedrock are not considered sensitive groundwater bodies. The alluvial deposits may contain granular material and could potential be a sensitive waterbody. However, no sources of contamination have been identified.			
Surface water contamination at the site due to contaminants migrating to local waters				
Probability of risk being realised		Consequence of risk being realised		Risk classification
Unlikely	The Dronachy Burn is present within the site running south-east to east. However, the site lies on natural superficial deposits or bedrock and limited sources of made ground contamination are likely.	Medium	Pollution of sensitive water environment.	Low
Exposure of buildings and services to site contaminants				
Probability of risk being realised		Consequence of risk being realised		Risk classification

Unlikely	The site lies on predominantly natural glacial deposits, with some alluvial soils present in the west. Some other areas of the site are underlain directly by bedrock geology of the Pathead Formation or the Mildand Valley Sill Complex. However, no sources of contamination have been identified.	Medium	Damage to integrity of concrete building elements and potable water supplies.	Low
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Area of Former Railway, Landfill, Former Well, Farm Buildings, Ruins and Electricity Pylons

Exposure of end use receptors to contaminants				
Probability of risk being realised		Consequence of risk being realised		Consequence of risk being realised
Low Likelihood	The site is to be developed into a Data Centre, with areas of mixed native woodland, wildflower meadow and pond/biodiversity wetland. Human receptors would most likely be restricted to construction and maintenance workers. There is a potential contaminant linkage and circumstances, under which an event could occur are possible. However, it is by no means certain that even over a longer period such an event would take place and is less likely in the shorter term.	Medium	Potential for chronic damage to human health likely to result in "significant harm".	Moderate/Low
Migration of soil gas/vapours to on site properties				
Probability of risk being realised		Consequence of risk being realised		Consequence of risk being realised
High Likelihood	The site is to be developed into a data centre, with areas of mixed native woodland, wildflower meadow and pond/biodiversity wetland. Human receptors would most likely be restricted to construction and maintenance workers. However, a landfill is indicated to be present within the site (infilled railway cutting), in addition to localised made ground associated with former farm buildings, and an infilled well. There is a contaminant linkage and circumstances, under which it is very likely an event will occur in the short term. Circumstances are such that an event almost inevitable in the longer term.	Medium	Potential for chronic and/or acute damage to human health likely to result in "significant harm".	High
Phytotoxic Risks				
Probability of risk being realised		Consequence of risk being realised		Risk classification
Low Likelihood	The site is to be developed into a data centre, with areas of mixed native woodland,	Medium	Affect to Plant Growth	Moderate/Low

	wildflower meadow and pond/biodiversity wetland. However, it is by no means certain that even over a longer period such an event would take place and is less likely in the shorter term.			
Groundwater contamination at the site due to the leaching of contaminants				
Probability of risk being realised		Consequence of risk being realised		Risk classification
Low Likelihood	Some areas of made ground are anticipated associated with the former railway, well, farm, buildings, ruins and existing pylons. However, these areas are indicated to be underlain by either glacial till or bedrock of the Pathead Formation or Midland Valley Sill Complex, which are considered to be of low resource potential.	Medium	Pollution of sensitive water environment	Moderate/Low
Surface water contamination at the site due to contaminants migrating to local waters				
Probability of risk being realised		Consequence of risk being realised		Risk classification
Likely	There is a potential contaminant linkage and circumstances, under which an event could occur are possible. However, it is by no means certain that even over a longer period such an event would take place and is less likely in the shorter term.	Medium	Pollution of sensitive water environment	Moderate
Exposure of buildings and services to site contaminants				
Probability of risk being realised		Consequence of risk being realised		Risk classification
Likely	There is a potential contaminant linkage and circumstances, under which an event could occur are possible. However, it is by no means certain that even over a longer period such an event would take place and is less likely in the shorter term.	Medium	Damage to integrity of concrete building elements and potable water supplies.	Moderate

11.0 PART 2A CONSIDERATIONS

11.1 Introduction

Site owners have specific obligations under Part 2A of the Environmental Protection Act (EPA) as amended by the Contaminated Land (Scotland) Regulations to address contamination issues at their sites. In addition, Part 2A of the Act requires that Local Authorities inspect their areas and prioritise sites for further action where required. The actions required may include further investigation or remedial actions and the local authority may, where appropriate, impose a remediation order requiring actions to be taken.

This section assesses the likely priority the site would have in terms of contaminated land legislation, based on its contaminative history and environmental setting. The risk assessment methodology used in this report follows the guidance given in the Department of the Environment Contaminated Land Review Report No. 6 (DOE CLR No.6) in terms of preliminary prioritisation of potentially contaminated sites.

11.2 Site Prioritisation Methodology

The initial assessment of the site was carried out using the JPB Site Evaluation and Risk Assessment Model (SERA). The SERA model has been developed to evaluate sites by determining the level of priority the site should be given based on the source-pathway-receptor model. The model is based on DOE Report CLR6 and Part 2A of the EPA but develops the principles further than CLR6 by determining the level of priority of a site more objectively and in more detail.

Numerical scores are given for the principal sources of contamination, pathways and receptors to derive individual contaminant linkage scores (PLSs), which may be combined to give an overall Site Assessment Value (SAV). The PLSs can be used in conjunction with the DOE CLR6 document to determine whether the site is likely to fall within the remit of contaminated land legislation and to inform any further intrusive investigation which may be required.

The SERA methodology and default parameters used are contained in the SERA model document which is freely available for inspection at the client's request. A description of CLR6 categories is given below.

Priority Category 1

This defines sites that are considered to be probably not suitable for the current end use and environmental setting. This is due to the assessment considering that there is a strong likelihood of contaminants at the site at such concentrations, together with suitable pathways, that there is a risk to adjacent receptors. Sites assessed as falling within Category 1 are considered to require immediate action to prevent pollution occurring. In this respect the procedure almost fits the contaminated land regime definition of causing significant harm and any sites that are placed within this category would almost definitely fall within the remit of the contaminated land legislation.

Priority Category 2

The condition of the site is such that possibly it may not be suitable for its present use and environmental setting, due to the possible presence of contaminants. The assessment of the site is that there is only a possibility of an impact and action may be required in the medium term. This category would also fall within the legislation under the "significant possibility" term.

Priority Category 3

A site that the assessment considers to be suitable for present use and environmental setting although there may be contamination present lies within this category. The assessment considers that the presence of contamination does not cause a concern, as there is a low risk to the possible receptors. The conclusion, if a site falls within this category, is that remedial work is unlikely to be required as long as the site is utilised for that end use. In this respect this category would not be assessed as contaminated land under the contaminated land legislation.

Priority Category 4

The fourth category is considered to be the lowest risk and would almost certainly be outwith the scope of the contaminated land legislation

11.3 SERA Assessment

The SERA output is more refined using more details about the hazards likely to be present, the pathways and receptors. Based on the available desk study information a SERA model assessment was carried out for the site in its current condition. The parameter input for each of the potential contaminant linkages and the SERA outputs are summarised in Appendix 12. Risks to human health, surface waters, groundwater, ecological and property receptors were individually assessed for each area. The CLR 6 categorisation is summarised below

Greenfield Area

Human Health	Surface Water	Ground Water	Ecological	Property	Overall
Category 4	Category 4	Category 4	Category 4	Category 4	Category 4

A priority **Category 4** indicates it is considered to be the lowest risk and would almost certainly be outwith the scope of the contaminated land legislation.

Area of Former Railway, Landfill, Former Well, Farm Buildings, Ruins and Electricity Pylons

Human Health	Surface Water	Ground Water	Ecological	Property	Overall
Category 3	Category 3	Category 4	Category 3	Category 4	Category 4

Based on the **current site conditions** the site falls within **Category 3**, primarily due to the potential for contaminants to affect human health, surface water and ecological receptors.

A priority Category 3 indicates a site that the assessment considers to be suitable for present use and environmental setting although there may be contamination present lies within this category. The assessment considers that the presence of contamination does not cause a concern, as there is a low risk to the possible receptors. The conclusion, if a site falls within this category, is that remedial work is unlikely to be required as long as the site is utilised for that end use. In this respect this category would not be assessed as contaminated land under the contaminated land legislation.

The Local Authority (Fife Council) has indicated that part of the former railway cutting within the site was infilled and utilised as a landfill. Fife Council have referenced that the nature of the infill material is indicated to comprise excavated soils.

12.0 CONCLUSIONS AND RECOMMENDATIONS

12.1 General

Every effort has been made to conduct a thorough and complete examination of all available data pertaining to the site at Auchtertool, Mossmorran, Fife to create a concise and factual report. ILI Cato Limited are considering the viability of the site for a Data Centre, with areas of mixed native woodland, wildflower meadow and pond/biodiversity wetland.

On the basis of the assessment, it is considered prudent to undertake an in-depth ground investigation at the site with the following objectives:

- To identify any chemical contamination constraints.
- To characterise the groundwater regime and identify any risks posed to water resources.
- To examine the ground gas regime and any constraints posed by gas emissions; and
- To determine a foundation horizon and potential foundation solution.

Such an investigation would allow any issues of concern regarding protection of site workers, potential environmental liabilities associated with the site and any financial implications during redevelopment to be more fully assessed.

12.2 Chemical Contamination

Based on the proposed development of the site as a Data Centre, with areas of mixed native woodland, wildflower meadow and pond/biodiversity wetland, we envisage that there may be a constraint from chemical contamination and gas emissions and remedial measures may be required. The requirement for, and extent of, such works would be dependent upon the findings of Stage 2 intrusive investigations.

Stage 1 Preliminary Risk Assessment

Greenfield area

Risk	Risk classification
Exposure of sensitive residential receptors to contaminants	Low
Migration of soil gas/vapours to on-site properties	Moderate/High
Phytotoxic Risks	Low
Groundwater contamination at the site due to the leaching of contaminants	Low
Surface water contamination at the site due to contaminants migrating to local waters	Low
Exposure of buildings and services to site contaminants	Low

During any future site operations, potential risks to public safety and site personnel are considered at present to be **moderate/high** due to the potential for ground gas migration from the Dronarchy Den Landfill (infilled railway cutting), made ground and former well within the site. These risks could be minimised by ensuring all works are carried out in accordance with the Construction Industry Research and Information Association (CIRIA) Report 132 "A Guide for Safe Working on Contaminated Sites 1996".

Contingent Liabilities

With regard to any inherent liabilities on ownership, the liability relating to humans is considered to be **moderate/high**. In addition, the risk of pollution migrating off site is considered to be **low**. As such the related liability is considered to be **moderate/high**, primarily due to the potential for soil gas/vapours at the site.

Under the regulatory framework outlined in Section 2.1, the local authority has a duty to identify and enforce the remediation of "contaminated land", by serving a remediation notice on an appropriate person. The notice would only be served if, after a period of consultation with the site owner or the person causing the pollution, no works had been carried out. **Based on this it is assumed that the site will be Priority Category 4. By undertaking an intrusive site investigation, it would be possible to reassess this categorisation with actual site data.**

Area of Former Railway, Landfill, Former Well, Farm Buildings, Ruins and Electricity Pylons

Risk	Risk classification
Exposure of sensitive residential receptors to contaminants	Moderate/Low
Migration of soil gas/vapours to onsite properties	High
Phytotoxic Risks	Moderate/Low
Groundwater contamination at the site due to the leaching of contaminants	Moderate/Low
Surface water contamination at the site due to contaminants migrating to local waters	Moderate
Exposure of buildings and services to site contaminants	Moderate

During any future site operations, potential risks to public safety and site personnel are considered at present to be **High** due to the potential for ground gas associated with Dronarchy Den landfill (infilled railway cutting), the made ground and former well at the site. These risks could be minimised by ensuring all works are carried out in accordance with the Construction Industry Research and Information Association (CIRIA) Report 132 "A Guide for Safe Working on Contaminated Sites 1996".

Contingent Liabilities

With regard to any inherent liabilities on ownership, the liability relating to humans is considered to be **high**. In addition, the risk of pollution migrating off site is considered to be **high**. As such the related liability is considered to be **high**, primarily due to the historical land uses of the site (landfill site).

Under the regulatory framework outlined in Section 2.1, the local authority has a duty to identify and enforce the remediation of "contaminated land", by serving a remediation notice on an appropriate person. The notice would only be served if, after a period of consultation with the site owner or the person causing the pollution, no works had been carried out. **Based on this it is assumed that the site will be Priority Category 3. By undertaking an intrusive site investigation, it would be possible to reassess this categorisation with actual site data.**

12.3 Gas Emissions

Ground Gas Emissions

The researches have indicated that part of the former railway cutting within the site was infilled and utilised as a landfill. The nature of the infill is indicated to predominantly be excavated soils, however it could contain biodegradable material and could degrade to produce elevated levels of gas including methane, carbon dioxide, hydrogen sulphide and carbon monoxide. Fife Council indicate that the site was producing carbon dioxide. In addition, made ground associated with the former farm buildings is present in parts of the site, and a former well is present at the south-western site boundary.

Alluvium is recorded within the western area of the site which may contain organic silts which could provide a source of ground gas emissions. This may cause a constraint to any future developments and further intrusive investigations are required to confirm ground gas conditions.

Off Site Source

Old quarries which have likely been infilled are indicated 30m and 90m north of the site. The nature of the infill material is unknown and could potentially be a source of gas. Any ground gases generated from this source may have the potential to migrate towards the site.

Deep Seated Gas

The site in part lies within a Coal Authority Coal Mining Reporting Area (CMRA) and the CL:AIRE publication, "Good practice for risk assessment for coal mine gas emissions" recommends that where a site lies within a CMRA further assessment of risks from a deeper gas source is required.

Based on the above information, an assessment in accordance with CL:AIRE publication "Good practice for risk assessment for coal mine gas emissions" indicates that where it meets the following criteria it is considered to lie in a "Negligible Risk Zone" and no mitigation or further action is required.

- No mine entries within 50m of the site boundary.
- Workings are at depths of in excess of 150m.
- No faults or pathways connecting the surface to deeper unflooded workings.
- The site is out with areas of shallow workings or probable workings on the Coal Authority viewer.

The BGS mapping information indicates that a sequence of geological faults are present beneath the site. However, it is considered that these faults do not connect the surface to deeper unflooded workings.

Given the above information, it is concluded that the site lies within a "Negligible Risk Zone" and no further assessment of risks from a deeper gas source is required.

Radon

Radon Class	Radon Affected Area	Estimated percentage band of dwellings exceeding the action Level	Radon Protective Measures (Scotland)
1	No	0-1	None
2	Yes	>1-<3	Basic
3	Yes	>3 to <5	Basic
4	Yes	>5 to <10	Basic
5	Yes	>10 to <30	Full
6	Yes	>30	Full

Based on this classification the site is not within an area requiring radon protection and, therefore, **no protective measures are required**.

12.4 Foundation Options

The desk study has indicated the site to be overlain by made ground; along the area of the former railway and area of Landfill, farm buildings and well. Due to the inherent variability of this material it is considered that this horizon would not be very suitable as a founding horizon in its present condition. Consideration of vibro-improvement or piling may be required. It should be noted that the area of former cutting/landfill truncates through the proposed development area.

The location of the former well (infill status unknown) located at the southwest site boundary could act as a local physical constraint if future development was to encroach in its vicinity and hence remedial works to infill/stabilise the well may be required.

The desk study has indicated the natural superficial deposits at the site are predominantly glacial till. Where these deposits are present at shallow depth, it is possible that standard strip or pad foundations may be feasible, subject to actual proposed building loadings.

However, alluvial deposits are indicated to be present beneath the western area of the site. Based on the available information it is likely that standard strip or pad foundations may not be feasible within these areas of the site if buildings are to be constructed within this area. As standard foundations are considered not to be feasible based on the existing information, ground improvement techniques such as vibro or piling may be required. **Consideration will have to be made on settlement due to any loading of the alluvial deposits.**

The geological maps indicate there are areas of the site where bedrock is at or near surface, and this may be encountered during any excavations during the development such as the construction of sewers. This material would be suitable for a foundation horizon.

A detailed site investigation will be required to confirm the foundation solution.

12.5 Mining

The table below summarises the potential risks associated with former mining legacy for the proposed development site, identified from list sources of information.

Mining Issue	Yes/No	Risk Assessment
Underground mining (recorded at shallow depths)	No	The documentary research has not found any records for shallow mining beneath the site, the risks relating to mining are considered to be low .
Underground mining (recorded at depth)	No	The Mining Remediation Authority Coal Mining Report indicates that according to the records in their possession, the property is not within the zone of likely physical influence on the surface from past underground workings.
Mine entries (shafts and adits)	No	During the study no evidence of any mineshafts or adits being present within the site was encountered.
Coal mining geology (fissures)	No	MRA report/web page indicates no evidence of any issues.
Record of past mine gas emissions	No	MRAA report/web page indicates no evidence of any issues.
Recorded coal mining surface hazard	No	MRAA report/web page indicates no evidence of any issues.

Mining Issue	Yes/No	Risk Assessment
Surface mining (opencast workings)	No	MRA report/web page indicates no evidence of any issues.

As with any coalfield/former mining area, there is the potential for unrecorded mine entries to be present. As in the development of all sites in former mining areas, vigilance should be maintained by all site workers during any ground excavations to identify any features suspected to be possible mine entries.

12.6 Asbestos

It is considered possible that the current farm buildings on site may contain asbestos containing materials. Under the Control of Asbestos Regulations 2012 the existing building must have an asbestos register and management plan in place which both identifies and manages any asbestos containing materials. This is the responsibility of the Dutyholder for the current building. Should an asbestos register and management plan not be available we would recommend that an Asbestos Management Survey is carried out as a minimum and an asbestos register and management plan should be prepared for the site. If the buildings are to be refurbished or demolished, then a Refurbishment/Demolition Asbestos Survey must be carried out and any asbestos containing materials removed and disposed of prior to demolition. The provisions of the Asbestos Regulations 2012 and other relevant asbestos regulations should be followed at all times.

In order to protect site operatives, site occupiers and the general public the requirements of Control of Asbestos Regulations 2012 and Asbestos Codes of Practice should be followed by site staff at all times. The following specific regulations will be of relevance:

Control of Asbestos Regulations 2012 Regulation 6:

"An employer shall not carry out work which is liable to expose his employees to asbestos unless he has -

- (a) made a suitable and sufficient assessment of the risk created by that exposure to the health of those employees and of the steps that need to be taken to meet the requirements of these Regulations.*
- (b) recorded the significant findings of that risk assessment as soon as is practicable after the risk assessment is made; and*
- (c) implemented the steps referred to in sub-paragraph (a)."*

Control of Asbestos Regulations 2012 Regulation 16 which states that an employer must,

"Prevent or, where this is not reasonably practicable, reduce to the lowest level reasonably practicable, the spread of asbestos from any place where work under his control is carried out".

Where there are indications that made ground materials contain ACMs this material should be excavated and removed by a licensed asbestos removal contractor under controlled conditions to a suitably licensed landfill site.

The above works should be carried out by an Asbestos Removal Contractor licensed in accordance with the Control of Asbestos Regulations 2012 Regulation 8 and associated Asbestos Codes of Practice.

All asbestos materials removed from site should be considered to be "special waste" under the Special Waste Regulations 1996 and should be disposed of to an appropriately licensed landfill in accordance with the Duty of Care requirements of the Environmental Protection Act 1990 and the Environment Act 1995.

Using the above technique contaminated soils are excavated and transported to licensed landfills for disposal, the excavation must then be backfilled with clean inert material, or the site regraded to a lower level. We would consider that such material may be designated as "special waste" under the Special Waste Regulations 1996 (as amended) and should be disposed of in accordance with those regulations following pre-notification to SEPA.

12.7 Invasive Plant Survey

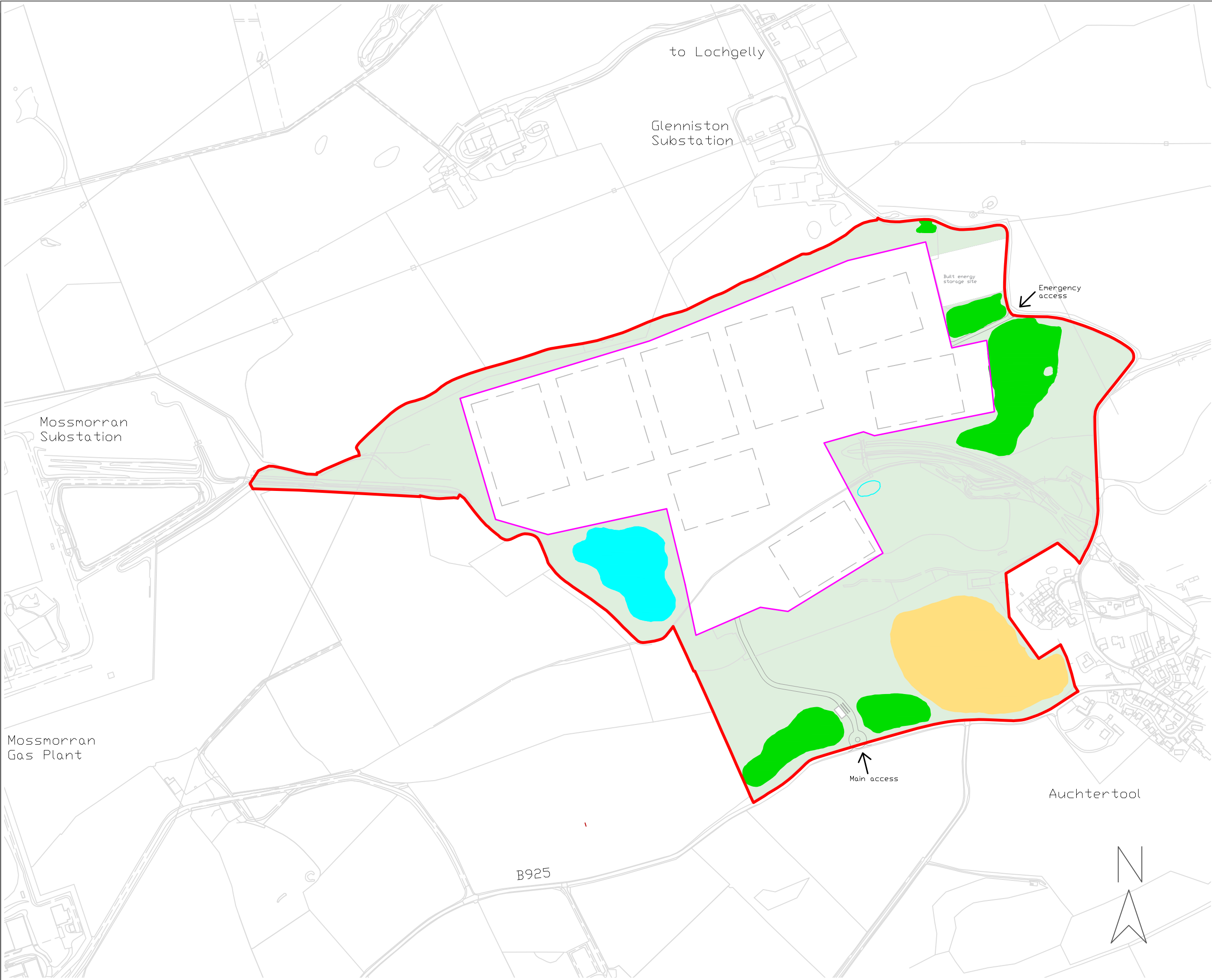
An invasive plant survey was carried out during the works prior to commence of the investigation. The report is included in Appendix 3. The summary of the report is

- No Japanese Knotweed, Giant Hogweed or Himalayan Balsam plants were identified during the walkover.
- However, the ecologist noted the presence of some invasive or non-native species that may be of concern, including Horsetail during the visit. The report notes that nine areas of Horsetail were identified on site, with seven areas described as sporadic, and two areas of growth described as prolific.

S6A	SURVEY FINDINGS
	There was no evidence of controlled species, such as Japanese Knotweed, Giant Hogweed & Himalayan Balsam during this survey. Horsetail was identified within this survey area. There are a total of 9 infestations across the site. Access to some areas of the site were limited due to dense vegetation such as gorse, and steep embankments. The soil disturbance within the ploughed fields may also have limited our findings.
S6B	SURVEY RECOMMENDATIONS
	Recommendations for Site Investigation Contractor Regarding Horsetail, we would advise that the risk of spread from these activities is low. Recommendations for Developer Although Horsetail is not controlled by legislation it is a highly invasive perennial weed which spreads quickly and vigorously, reproducing through spores and root fragments. As it often causes damage to roads and footways, we would recommend that some form of management/treatment is carried out to minimise the risk of future damage to roads, infrastructure and delay to road adoptions. Should there be any concern or queries when carrying out the work, KleerKut can be contacted for guidance.

APPENDICES

Appendix 1 Drawings



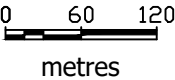
Cato

-  Site
-  Area for data centre
-  Potential data hall
-  Pond including biodiversity wetland
-  Mixed native woodland
-  Wildflower meadow

Site at Auchtertool,
Mossmorran, Fife
KY2 5XW

Ordnance Survey grid
reference 321000 691000

Scale 1:6000 at A3



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Ordnance Survey 0100031673
© Copyright LoganPM Ltd 2025

LOGAN^{PM}
Energy Project Management

Illustrative initial layout

Drawing number	Status
J407/031/21042025	Draft

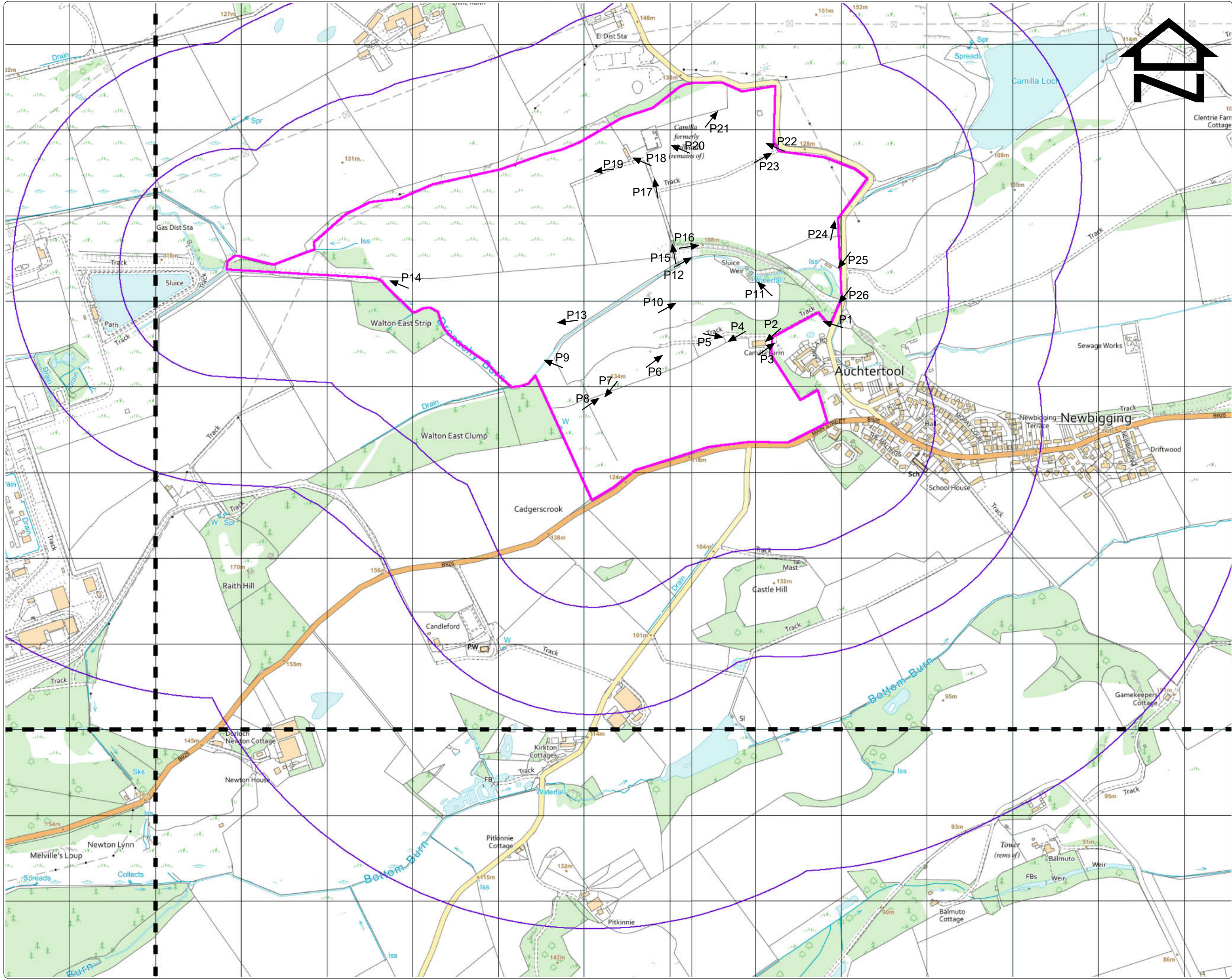


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CLIENT	ILI Cato Limited			
PROJECT TITLE	Auchtertool, Mossmorran, Fife			
DRAWING TITLE	Site Location Plan			
DRAWN BY ED	APPROVED BY DOP	DATE 01/05/2025	SCALE NTS	DRAWN Z

Key:

— = Site boundary

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LEGEND

← APPROXIMATE LOCATION AND ORIENTATION OF PLATE

NOTES

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CLIENT

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LIMITED**

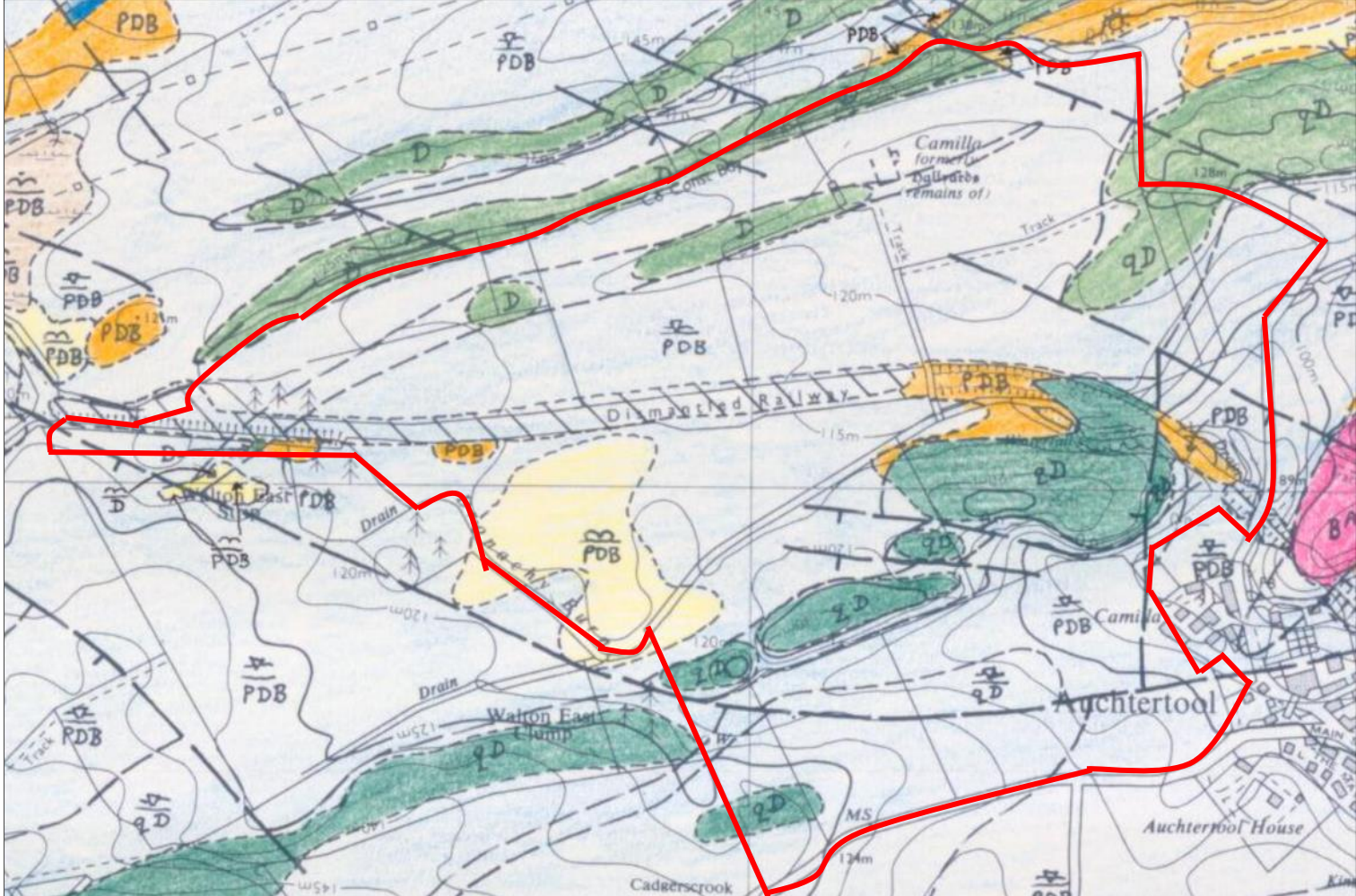
PROJECT TITLE

**AUCHTERTOOL, MOISSMORRAN,
FIFE**

DRAWING TITLE

PLATE LOCATION PLAN

DRAWN BY	MLG	APPROVED BY	TNO
SCALES	NTS	ORIGINAL DRAWING SIZE	A3
DATE	JUNE 2025	DRAWING No.	TG116-01/R/F/02



Alluvium

Till

PATHHEAD FORMATION (PDB)
mudstone and siltstone, with
some limestones and sandstones;
marine shelf and deltaic.

Dolerite and basalt, unclassified, sills.

Quartz dolerite, sills.

made ground

Inclined strata, dip in degrees.

Geological boundary

Fault at surface, crossmark on downthrow side.

Coal seam outcrop.

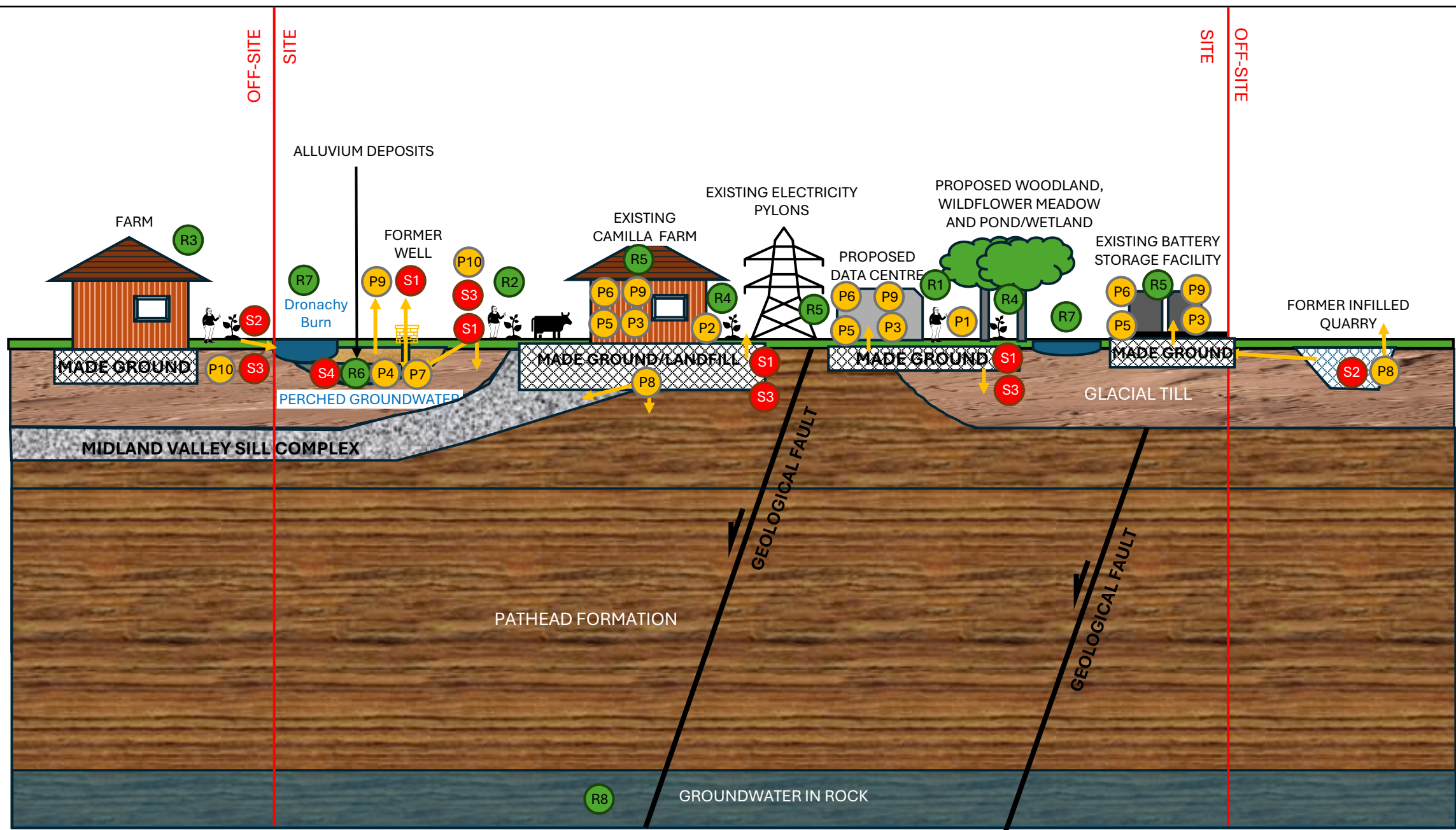
Broken lines are inferred.

Key:
— = Site boundary

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CLIENT		ILI Cato Limited				
PROJECT TITLE		Auchtertool, Mossmorran, Fife				
DRAWING TITLE		BGS Map NT29SW - Solid and Drift Geology				
DRAWN BY ED		APPROVED BY DOP		DATE 01/05/2024		SCALE NTS
						DRAWING No. ZG116-01/R/F/03



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CLIENT

ILI Cato Limited

PROJECT TITLE

AUCHERTOOL,
MOSSMORRAN, FIFE

DRAWING TITLE

INITIAL CONCEPTUAL SITE
MODEL SECTION

DRAWN BY	APPROVED BY
DOP	TNO
DATE	SCALE
JUNE 2025	NTS
DRAWING No. ZG116-01/R/F04	

Sources

- S1 – Contamination from former land use – agricultural land (pesticides), Dronachy Den landfill (infilled railway cutting) made ground (former railway, farm buildings), infilled wells and potential ground gas
- S2 – Contamination from adjacent land use – agricultural land and infilled quarries
- S3 – Leachable contaminants including pesticides, metals and hydrocarbons
- S4 – Gas generation from potential organic deposits within alluvial soils

Pathways

- P1 – Contact with soil
- P2 – Ingestion of vegetables
- P3 – Inhalation of dusts/vapours & gases
- P4 – Ingestion of groundwater
- P5 – Building contact with soil
- P6 – Migration via services
- P7 – Perched groundwater
- P8 – Vertical migration
- P9 – Gas migration through granular deposits
- P10 – Surface runoff

Receptors

- R1 – Site users
- R2 – Workers and trespassers
- R3 – Adjacent land users
- R4 - Plants
- R5 – Buildings and infrastructure
- R6 – Shallow perched groundwater
- R7 – Surface water feature
- R8 – Continuous groundwater in rock

Appendix 2 Photographic Records



Plate 1: View of track up to Camilla Farm from single track road on the southeast of site boundary.



Plate 2: Photo looking at Metal barn associated with Camilla Farm in the southeast of site.



Plate 3: View looking east looking over Camilla Farm with construction compound noted east of the barn.



Plate 4: View of arable farming field to the south of site with overhead cables running north to south.



Plate 5: Photo of track running from Camilla Farm towards the centre of site.



Plate 6: Photo looking north through the centre of site showing undulating topography and mixed surface vegetation.



Plate 7: Overview of western boundary with steep slopes with dense vegetation growth on.



Plate 8: Photo of steep slope in the south of site looking east showing arable farming fields.



Plate 9: Photo of western site boundary looking north.



Plate 10: Photo of arable farming within the centre of site looking northeast.



Plate 11: Photo shows waterfall feature (centrally) in east of site with steep slopes and dense vegetation growth.



Plate 12: Photo of Dronachy Burn flowing through the centre of site, flowing west to east.



Plate 13: Photo looking west along Dronachy Burn towards dense forest on western boundary of site.



Plate 14: Photo looking at western site boundary showing dense forest plantation seen on the western boundary.



Plate 15: Photo looking north showing bridge that may have been associated with the historical railway.



Plate 16: Image showing deep verges/cutting to the east of historical bridge possibly associated with historical railway.



Auchtertool, Mossmorran, Fife, Stage 1 Site Investigation
Date of Visit: 03.06.2025

Plate 17: Photo looking north showing overhead cables running north to south through site.



Plate 18: Image of abandoned farm building seen in the north of site.



Plate 19: Photo looking west along northern boundary showing a small area of dense forest to the west of site.



Plate 20: Photo showing derelict monument seen to the north of site adjacent to the abandoned farm building.

