

**Report To:** Safe, Sustainable Communities Committee      **Date:** 30 August 2011  
**Report By:** Corporate Director Education & Communities      **Report No:** SCS/69/11/AH/DH  
**Contact Officer:** Drew Hall      **Contact No:** 714272  
**Subject:** **Council's Duties Under Mines & Quarries Act 1954**

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## 1.0 PURPOSE

- 1.1 To advise Committee on work undertaken by Officers from Safer and Inclusive Communities to implement the Council's statutory powers in respect of Section 151 of the Mines and Quarries Act 1954.

## 2.0 SUMMARY

- 2.1 The Mines and Quarries Act 1954, requires that the owners of every mine or quarry which operated after 1872 but has not been worked in the last 12 months, to secure every surface entrance to prevent any person from accidentally falling down the shaft or accidentally entering the mine or quarry.

- 2.2 The Act, gives the Council powers to use the Statutory Nuisance provisions in the Environmental Protection Act 1990 to require owners found to be in breach the Mines and Quarries Act 1954 to undertake works to ensure the safety of the public, and, if necessary, to carry out those works in default and recover the costs from the owner.

The Council has a duty to cause their area to be inspected from time to time to detect any Statutory Nuisances

- 2.3 Officers from Safer & Inclusive Communities have been active in this area. A study has been completed to identify locations, land owners have been advised of their responsibilities and a regular programme of inspections has been established.
- 2.4 Currently there are no locations of major concern. Inverclyde is fortunate in having relatively few sites covered by the Act, particularly in comparison to former coalfield areas, some of which may have sites running into the thousands, many poorly mapped or recorded.

## 3.0 RECOMMENDATIONS

- 3.1 That the committee note the terms of the report and the action taken, and proposed, to comply with our statutory duties.

**Albert Henderson**  
**Corporate Director Education & Communities**

## **4.0 BACKGROUND**

- 4.1 Section 151 of the Mines and Quarries Act 1954, as amended, requires that the owners of every mine or quarry which operated after 1872 but has not been worked in the last 12 months, to secure every surface entrance to prevent any person from accidentally falling down the shaft or accidentally entering the mine.

In respect of quarries, whether being worked or not, properly maintained safety barriers are required where the quarry may constitute a danger to the public by virtue of its accessibility from a road or being a place where the public resort.

- 4.2 Members will be aware of the well published fatality in East Ayrshire where a woman fell down an unidentified mine shaft while out walking her dog.
- 4.3 The Mines and Quarries Act 1954, as amended, permits the Council to use the Statutory Nuisance provisions in the Environmental Protection Act 1990 to require owners found to be in breach of Section 151 of the Act to undertake works to ensure the safety of the public, and, if necessary, to carry out those works in default and recover the costs from the owner
- 4.4 The Council has a duty under section 79 Environmental Protection Act 1990 to cause their area to be inspected from time to time to detect any Statutory Nuisances.

## **5.0 Action Taken**

- 5.1 Officers from Safer & Inclusive Communities have undertaken an extensive desktop exercise to identify locations covered by this legal provision and have also carried out a series of field visits to inspect all relevant sites. A report on this exercise is in Appendix 1.
- 5.2 Officers have chaired a number of meetings with site owners, including appropriate Council services, to advise of the survey findings and clarify their legal duties as the current owners, and have put in place a programme of regular inspections of the areas in question to ensure ongoing compliance with the Act.

## **6.0 IMPLICATIONS**

### **6.1 Strategic**

There are no strategic implications arising from this report.

### **6.2 Financial**

There are no additional financial implications arising from this duty at this time. There will be some ongoing costs to the Council as a property owner in maintaining sites in a safe condition; however these would have arisen in any case.

### **6.3 Legal**

The Council has a duty consider and deal with safety issues surrounded abandoned mines and quarries.

### **6.4 Equalities**

There are no implications arising from our equalities duties under this report.

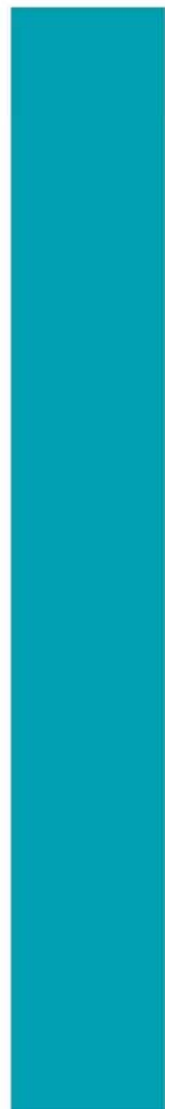
## **7.0 LIST OF BACKGROUND PAPERS**

- 7.1 Investigation and hazard assessment of abandoned mines and quarries (**Appendix 1**)

## **Investigation and hazard assessment of abandoned mines and quarries**

**Inverclyde**

**September 2010**



Site Name	Inverclyde Council Area	LQR Reference  <b>010/0013/LQR</b>
Document Title	Investigation and hazard assessment of abandoned mines and quarries (within Inverclyde)	
Description	Review of historical and environmental information held by Inverclyde Council for the identification of abandoned mineral extraction workings. Preliminary hazard assessment of identified sites.	

Revision	Date		
Draft 1	24.07.10	Prepared by	Roslyn McIntosh Contaminated Land Officer
Draft 2	20.08.10		
Final	23.09.10	Checked by	Jim Blair/Janet Stitt Public Health and Housing Team Leader
		Approved by	Drew Hall Community Safety and Wellbeing Service Manager

**Safer and Inclusive Communities**

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# 1 INTRODUCTION

Section 151 of the Mines and Quarries Act 1954 places a duty on the owner or person entitled to work certain mines or quarries to ensure the safety of the public (Appendix A).

Local authorities are required to enforce the above provisions through the mechanism of "statutory nuisance" under the Environmental Protection Act 1990.

That Act places a duty on local authorities "*to cause its area to be inspected from time to time to detect any statutory nuisances*".

This report fulfils that duty and this Service will schedule regular inspection to ensure compliance.

***That is;***

- (a) a shaft or outlet of an abandoned mine (other than a mine to which the proviso to the foregoing subsection applies) or of a mine (other than as aforesaid) which, notwithstanding that it has not been abandoned, has not been worked for a period of twelve months, being a shaft or outlet the surface entrance to which is not provided with a properly maintained device such as is mentioned in that subsection;***
- (b) a shaft or outlet of a mine to which the proviso to the foregoing subsection applies, being a shaft or outlet with respect to which the following conditions are satisfied, namely,—***
  - (i) that its surface entrance is not provided with a properly maintained device such as is mentioned in that subsection; and***
  - (ii) that, by reason of its accessibility from a highway or a place of public resort, it constitutes a danger to members of the public; and***
- (c) a quarry (whether in course of being worked or not) which—***
  - (i) is not provided with an efficient and properly maintained barrier so designed and constructed as to prevent any person from accidentally falling into the quarry; and***
  - (ii) by reason of its accessibility from a highway or a place of public resort constitutes a danger to members of the public.***

## 1.1. Methodology

The purpose of this project is to identify abandoned mine and quarry sites presenting a statutory nuisance;

- Desk top review of information held on abandoned mines and quarries within Inverclyde area
- Consult with BGS and Clyde Muirshiel Regional Park for additional information
- Using GIS and GPS accurately locate position of abandoned mineral workings
- Field reconnaissance at identified sites by appropriately qualified and experienced geo-environmental expert.
- Map and list sites that require further action or protective measures

Given the similarity of hazards, air shafts associated with water culverts and railway infrastructure were also considered in this study.

## 1.2. Limitations

This report is advisory and therefore there have been no provisions for collateral warranty. Whilst this report has been undertaken in line with current legislation and best management practices applicable at the date of issue, those referring to information and conclusions contained within this report, rely upon it at their own risk and the authors owe them no duty of care and skill.

Inverclyde Council Safer and Inclusive Communities accept no responsibility or liability for the consequences of this document being used for any purpose or project.

The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data. Should additional information become available which may affect the opinions expressed in this report, Inverclyde Council Safer and Inclusive Communities reserves the right to review such information and, if justified, to modify the opinions accordingly. It should be noted that conclusions and recommendations made in this report are based on the information reviewed.



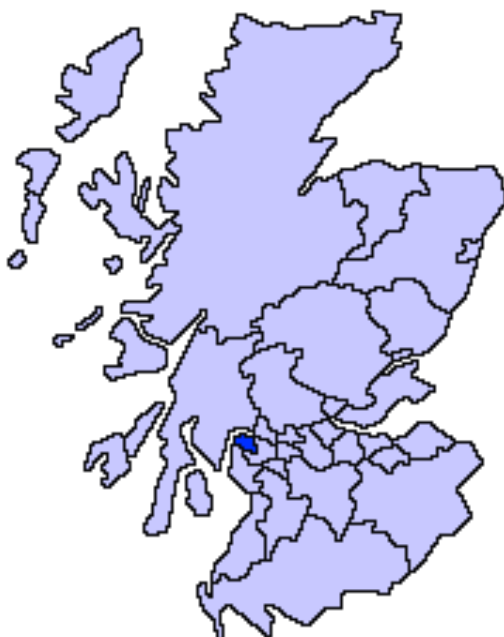
This report is based on a variety of information sources that are considered to be accurate. However the accuracy of such information supplied cannot be guaranteed.

The opinions and advice set out in this report relates specifically to Inverclyde. Advice provided within this report should not be transferred to other schemes without prior consultation with the Inverclyde Council Safer and Inclusive Communities.

This report does not provide warranty or endorsement for the information supplied. These are considered to be warranted as indicated by the originator of each report.

## 2 INVERCLYDE AREA

### 2.1. Location



Inverclyde covers an area of approximately 173.6 km<sup>2</sup> and is situated on the west coast of Scotland, 25km west of Glasgow. Bounded by the Clyde to the north and west, Inverclyde shares its southern boundary with North Ayrshire, and to the east with Renfrewshire.

Figure 1 illustrates Inverclyde regional area and its administrative ward boundaries.

### 2.2. Geology

#### 2.2.1. Superficial Deposits

Figure 2 illustrates the spatial distribution of superficial deposits across Inverclyde.

The coastal areas of Inverclyde are dominated by raised beach deposits along the southern bank of the Clyde estuary down to Wemyss Bay. A 4 km wide gap in these deposits occurs at Gourock where bedrock is at or near surface. In general the deposits extend approximately 1 km inland, although they are also present up to 2 km east of Ardgowan Point.

The distribution of inland superficial deposits is patchy. The southern boundary of the Council area is dominated by peat which covers the high ground (west to east) on Blood Moss, Leap Moor to the widest expanse of peat on Duchal Moor.

To the north of the peat deposits and within the coastal rim, the west of Inverclyde is dominated by areas of little or no drift deposits. Isolated patches of

boulder clay appear on the west side of Loch Thom, surrounding Coves Reservoir south of Gourock Bay, and east of the sand and gravel deposits at Inverkip.

Extensive deposits of boulder clay are shown within the east area of Inverclyde, becoming shallow and impersistent in the higher grounds where bedrock frequently outcrops.

The natural superficial drift deposits in the local area are indicated to be deposits of glacial till and localised deposits of alluvium and peat. No thickness is specified within the geological plans. However, given the presence of rocky outcrops in the area the thickness of superficial deposits are anticipated to be thin.

### **2.2.2. Anthropogenic Deposits**

Reclaimed land is present around the urban coastline for the creation of roads, rail, harbours and other industrial developments. The deposits that make up these areas of reclaimed land are largely unknown.

Land filling of wastes into former quarries and watercourse ravines is also recorded throughout the Inverclyde area.

### **2.2.3. Bedrock**

Figure 3 illustrates the spatial distribution of bedrock geology and faulting across Inverclyde.

The bedrock of Inverclyde is dominated by the extrusive igneous basalt and mugearite rocks or lavas of the Carboniferous **Clyde Plateau Volcanic** formation. Basaltic rocks extend from the eastern boundary of Inverclyde as far west as Loch Thom. Younger, sedimentary rocks surround this basalt plateau on both the northern and western coast of Inverclyde, from Port Glasgow to Gourock and south of Gourock to Wemyss Bay respectively. These two blocks of sedimentary rocks are separated by a sill of basalt (Craigmuschat) which continues through to the coast at Cloch Point.

The block of sedimentary rocks from Port Glasgow to Gourrock is from the Carboniferous Tournisian, Inverclyde Group. These dominate the costal sedimentary rocks from Port Glasgow to Cloch Point to Wemyss Bay.

### Inverclyde Group

<b>Kinnesswood Formation</b>	Purple-red, yellow, white and grey-purple, fine- to coarse grained sandstones which are mostly cross-bedded and arranged in upward-fining units. Fine-grained, planar or poorly bedded sandstones, red mudstones and nodules and thin beds of concretionary carbonate (cornstone) also occur. Cornstones form as a result of a fluctuating water table through the soils of semi-arid floodplains.
<b>Ballagan Formation</b>	Grey mudstones and siltstones, with nodules and beds of ferroan dolomite (cementstone), the beds are generally less than 0.3 m thick. The basal cementstones are interpreted as having been deposited in a lagoonal, coastal-flat environment under conditions of high salinity and periodic desiccation.
<b>Clyde Sandstone Formation:</b> Gourock Sandstone Knocknairshill Sandstone	White, cross-bedded fine- to coarse-grained sandstone, commonly pebbly, with beds of red-brown or grey silty mudstone.

## 2.3. Mineral Extraction

Historical operations for mineral extraction across Inverclyde have generally been on a small scale. Copper ore extraction was recorded in South Gourrock, with Barytes extracted in the Duchal Moor area of the Renfrewshire hills (Clyde Muirshiel Regional Park).

Numerous quarries are present from small scale operations providing stone for local construction to larger quarries for the production of building materials and aggregate for export.

There are no existing mineral extraction operations ongoing.

### **3 COPPER MINING AND QUARRYING**

The copper deposits coincide with the Carboniferous Gourock Sandstone bedrock and extraction is recorded to have taken place in south Gourock (Figure 4). These workings date back to the 1780s. The Gourock Copper Mining Company worked the mines between 1861 and 1875.

#### **3.1. Literature Review**

##### **3.1.1. Review of Mineral Valuers Report**

The Mineral Valuers Report indicates there are three old mine shafts present at the Drumshantie Mine. These shafts are considered to constitute a danger of ground collapse, which will be influenced by the depth and nature of overburden. There was also reported to be a risk of damage from the subsidence the shallow underground mine workings.

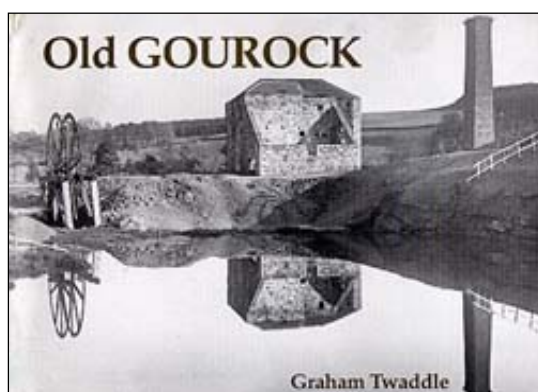
##### **3.1.2. Lead, Copper and Nickel Ores of Scotland**

Two localities of copper mining are recorded, one south of Drumshantie and one East of Larkfield. The Drumshantie mine was worked prior to 1810. Both these mines were being worked about 1874.

##### **3.1.3. Undated geologist's field slip**

Another reference to the copper mines was noted on an undated geologist's field slip detailing a visit to the copper mines at this time abandoned, at Drumshantie and Larkfield. A further note, dated 1873, details that the copper mines had resumed operation and noted a shaft going down to the west of the open workings to a depth of 63ft (19m).

### 3.1.4. Old Gourock (Twaddle, 1999)



*“Copper mining was a sporadic industry in Gourock from 1780 and met with little commercial success.”*

The front cover of the book is an image of the Drumshantie copper workings.

## 3.2. Drumshantie Gourock

The copper mineral was originally extracted by opencast quarrying (Figure 5). As the mineral seam went deeper the mineral was mined from the opencast face and shafts.

A copy of a mine abandonment plan obtained from BGS. This details a plan of the shafts and opencast mining with adits into the rock. There are three shafts noted, two south of the Gourock Burn and one to the northeast. The shaft to the northeast of the Gourock Burn is noted to be 10½ fathoms deep (approximately 18.5m).

The digital mine plan image was manipulated using our GIS to overlay historical plans to create a best fit plot for mine shaft localities with field boundaries corresponding to the county series maps (Figure 5).

The table below indicates the approximate grid reference for mining features.

Ref	Feature	Description	E	N
GRK-A	Shaft	Indicated within St Ninian's Primary School grounds at 10.5 fms deep (19m)	223890	676639
GRK-B	Shaft	South of Kirn Drive, about 50m west of the community centre.	223961	676581
GRK-C	Adit	South of Kirn Drive, about 30m northwest of the community centre.	223997	676609
GRK-D	'Stalk'	A chimney, but may be for ventilation and connected to an air shaft?	224030	676608
GRK-E	Shaft	South of Kirn Drive, about 20m east of the community centre.	224064	676586

Mining at this locality was predominantly open cast. There are no records of treatment of these shafts. The zone of influence around each shaft has been calculated to be approximately 11m (Enviros, 2007).

### **3.2.1. Field Reconnaissance - 21<sup>st</sup> June 2010**

The GPS positions and surrounding environs were visually inspected for hazards or evidence of ground subsidence that would be attributable to mineral extraction activity in the area. Field reconnaissance records and photographs are contained within Appendix B.

The positions were mostly located to the south of Kirn Drive and in the vicinity of the community centre. There was no indication of open mine workings and possible openings at B, C and D are located within densely wooded areas, which are fenced off to easy access. Shaft E is situated at the community centre car park. The area was fairly recently resurfaced but there was no indication of settlement or cracks at the ground surface.

Shaft A is located within St, Ninian school playground. The tarmac surface is very uneven at this locality, compared with other similar surfacing at other areas of the school grounds. This may be partly attributable to drainage problems in this area. However, there are also some minor cracks in the brickwork of the school building located in the corner nearest the shaft. Regular monitoring or further assessment would be required to determine whether this is indicative of ground settlement around the mine shaft.

## **3.3. Larkfield, Gourock**

The copper mineral appears to have been extracted by opencast mining. There are no records of shafts in the area although historical plans indicated some features that were worth further consideration during field reconnaissance.

### **3.3.1. Field Reconnaissance - 21<sup>st</sup> June 2010**

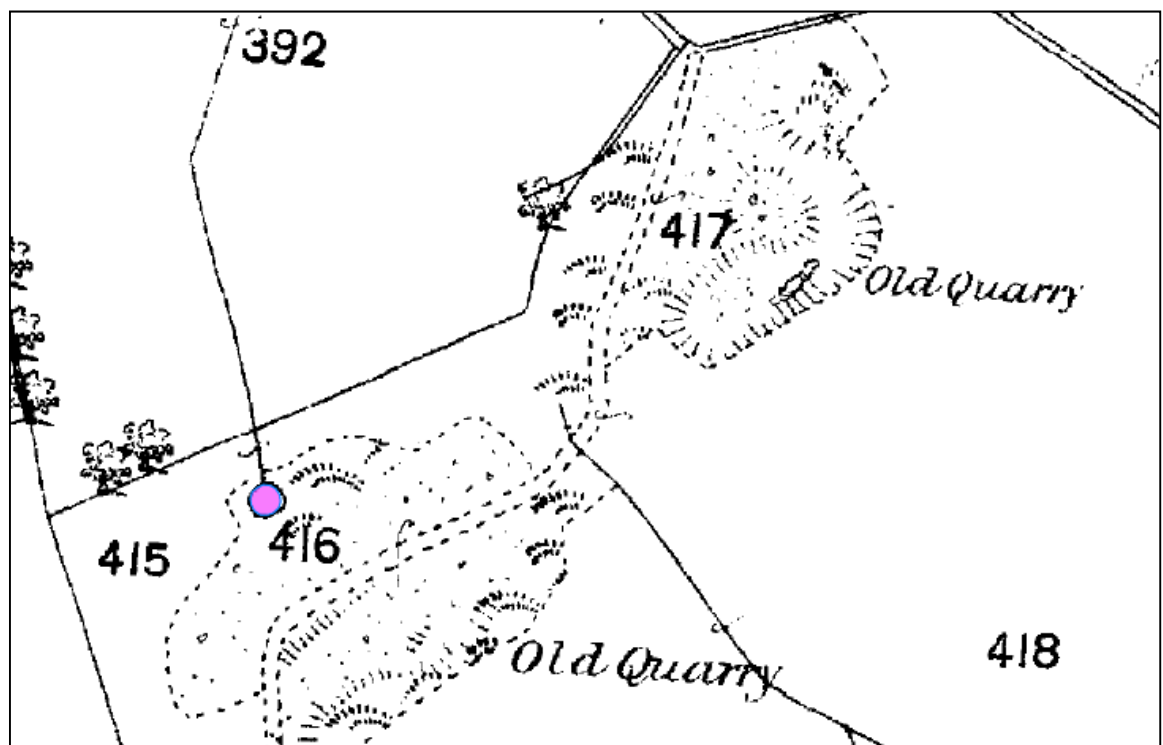
The GPS positions and surrounding environs were visually inspected for hazards or evidence of ground subsidence that would be attributable to mineral extraction activity in the area. Field reconnaissance records and photographs are contained within Appendix C.

There is no building within the site or immediate area that would be affected by mining activities and the workings are located within a lower lying area adjacent to the Coves reservoirs.

Quarrying of the exposed rockface was evident, although this is now mostly overgrown by dense shrub vegetation. Spoil heaps of gravel and cobble sandstone with occasional fragments of copper ore is present at the base of the quarried workings. The soil is sparsely vegetated, but this may be attributable to the absence of suitable growing medium than an indication of phytotoxicity.

The circular drainage feature identified in the illustration below was still evident at the site. Photographic records are contained within appendix C.

#### Historical Extract 1897



Green-blue staining was observed along the course of a runoff drainage route. This was dry at the time of the visit following a period of dry weather. This green colouring is likely to be copper carbonate precipitate, also known as verdigris.



## 4 BARYTES MINING AND QUARRYING

Barytes is a mineral composed of barium sulphate it is relatively common and widely distributed (BGS, 2005).

Barytes is mostly used as a drilling mud in the oil exploration industry, but is also used as a bulking material for the manufacture of ceramic, glass, chemicals, fillers, extenders and aggregates.

Extraction of barytes took place within the areas of Clyde Muirshiel Regional Park which straddles three local authorities, North Ayrshire, Renfrewshire and Inverclyde. These workings are dominant at Muirshiels mine, which is indicated predominantly within Renfrewshire. However, it is not unforeseen that the extent of operations or similar workings of barytes in the vicinity could extend to within Inverclyde.

RCAHMS Canmore records indicate additional workings at Lairds Seat, Inverclyde and at Little Misty Law, Renfrewshire. This is based on observations using satellite images (“Google Earth”).

The GPS positions of barytes mineral extraction activities activity have been indicated as follows;

Ref	Feature	Description	E	N
ICB-1	Workings	Lairds Seat, Inverclyde: Barytes workings. Methods unknown.	229021	667429
ICB-2	Workings	Queenside Hill, Renfrewshire: Barytes workings opencast and mining.	228238	664864
ICB-3	Workings	Little Misty Law, Renfrewshire: Barytes workings. Methods unknown	229604	662078

#### **4.1. Consultation with Clyde Muirshiel Regional Park**

The barytes extraction is also within the boundaries of Clyde Muirshiel Regional Park. It is known that Renfrewshire council have taken protective measures to fence off mineshafts which present a danger to members of the public.

The rangers on observing any hazardous feature associated with mineral extraction, report this to their manager who in turn reports this to the corresponding local authority.

Barytes workings outside the Muirshiel mining operations are not known to the park rangers. The workings noted within the RCAHMS Canmore records, were suggested by the rangers to be access roads for shooting events on the estate with turning circles at the points suggested to be areas of barytes extraction. A site visit would be able to confirm.

Muirshiel mine closure plans were made available at the Muirshiel ranger's office. These were examined in order to delineate the extent and nature of the workings.

#### **4.2. Muirshiels Barytes**

Barytes mining was carried out within Clyde Muirshiel Park since the mid-1700s until the late 1960s, from which 300,000 tonnes of barytes was produced (Figure 6). Only one vein to the northwest of Queenside Hill is reported to have been worked by both opencast and underground mining. However, ordnance survey plans indicate workings possibly on an adjacent vein, 570m to the southeast.

It is understood that the Local Authority (possibly Strathclyde Region) undertook sealing of the barytes mine shafts and landscaping of the area (SNH, Site Ref: 8666).

On review of the availability of mine plans from the BGS, the Muirshiel barytes mine workings appear to be entirely within the current Renfrewshire boundary. No Barytes mine plans were available within the Inverclyde area. However, it is of relevance that the SNH report suggests there to be small copper and barytes prospecting within the Clyde Muirshiel area (SNH, Site Ref:8666). Such workings may be ancient, are small scale and largely undocumented.

The RCAHMS Canmore records (Item MS 5090) indicates barytes workings in the vicinity of the Muirshiel workings at Little Misty Law, Renfrewshire (Figure 6).

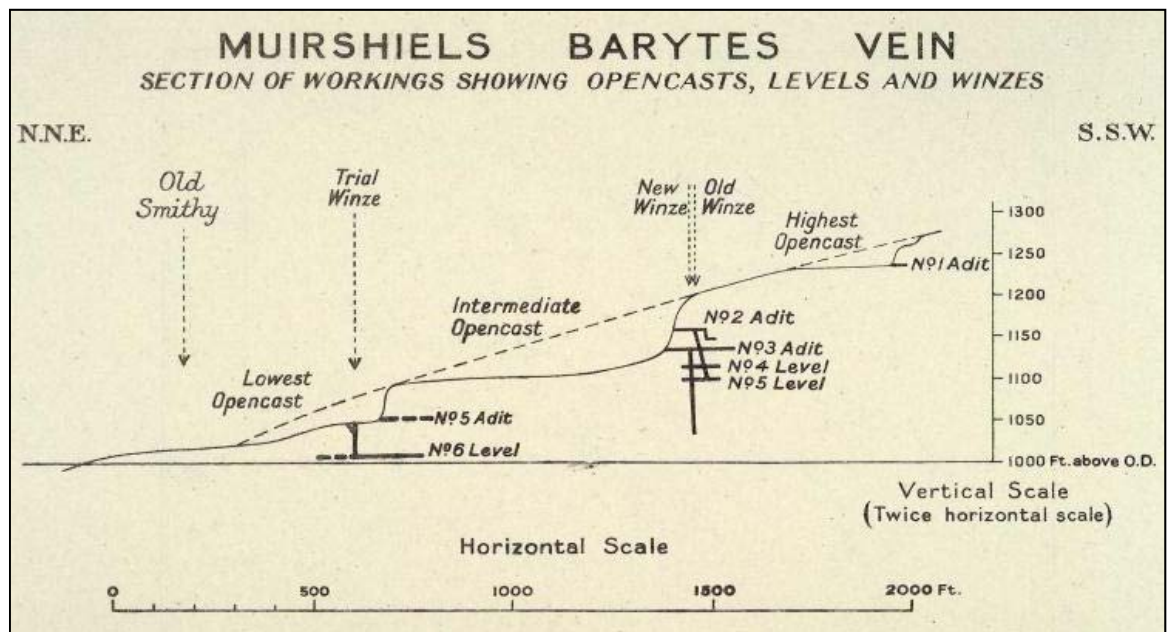
#### 4.2.1. British Geological Survey (MacGregor, 1944)

The barytes from the Muirshiels mine is mostly all a tough compact 'cockscorb' type (small flower shaped crystals) and is thinly striped pink and white colour. Of the main workings, only one vein was worked, it trends in a general north-north-east direction. The greatest width of barytes proved is 3.8m.

There are three areas of opencast workings;

<b>Lowest Opencast</b>	sinking a winze on the vein near No5 adit entrance.
<b>Intermediate Opencast</b>	width varies, 12m to 4.5m (north to south).
<b>Highest Opencast</b>	width varies, 7.3m to 1.5m (north to south) and there is a bend about 30.5m from the northern end.

The cross-section below illustrates the *Muirshiels barytes vein; section of workings showing opencasts, levels and winzes* (MacGregor, 1944).



Review of the closure mine plans confirm the workings do not extend to within Inverclyde area. Review of aerial satellite images for the area also does not identify any features that would suggest that the working extended into Inverclyde or beyond that illustrated within the closure plans.

### **4.3. Laird's Seat Barytes**

The RCAHMS Canmore records (Item MS 5090) indicate barytes workings at Lairds Seat, Inverclyde (NS 29021 67429). Figure 7 indicates the location of possible barytes workings within Inverclyde.

#### **4.3.1. Field Reconnaissance - 15<sup>th</sup> July 2010**

The GPS positions and surrounding environs were visually inspected for hazards or evidence of ground subsidence that would be attributable to mineral extraction activity in the area. Field reconnaissance records and photographs are contained within Appendix D.

This has not been a site of mineral extraction and is a turning area for vehicles. There is no evidence of the barytes mineral in the area or along the access road. This access road is understood to have been constructed to allow access by the estate tenants for hunting.

A Clyde Muirshiel Park officer confirmed the landowner of this area to be Inverclyde Council.

## **5 QUARRYING FOR AGGREGATE AND BUILDING MATERIALS**

Although numerous quarrying activities have taken place within Inverclyde (Figure 8), there are none currently active.

Other than opencast mining for copper and barytes which are discussed in sections 3 and 4 of this report respectively, the quarries are most commonly for sandstone and whinstone extraction.

The historical and current plans were inspected for evidence of quarrying. Each quarry position was allocated a reference number and the GPS coordinates were obtained using GIS. The underlying geological bedrock was also identified using the Land Quality GIS system.

The GPS positions and surrounding environs were visually inspected for hazards or evidence of ground subsidence that would be attributable to mineral extraction activity in the area.

Field reconnaissance was carried out on the 20<sup>th</sup> and 21<sup>st</sup> of July 2010. Records, location maps and photographs are contained within Appendix E.

## **6 SHAFTS FOR THE CONSTRUCTION OF INFRASTRUCTURE**

A number of shafts have been sunk for the construction of tunnels through the ground. These shafts are a necessary procedure for the excavation and extraction of underground materials. These shafts often remain as a component of the infrastructure to enable access for maintenance work and/or ventilation.

In some cases these shafts were backfilled during the construction process or subsidence of surrounding ground has taken place over time. In either scenario, the infilling of the shaft is unlikely to be conducted to any engineering standard and further subsidence or total collapse of the shaft (and tunnel) may occur.

These features are shafts used for the mining of materials from the ground, which may present hazards as those encountered in abandoned mineral extraction features and have therefore been included within this study.

### **6.1. Shafts for the Construction of Railway Tunnels**

Consideration of subsurface railway infrastructure has been made. However, these features may not necessarily be in an 'abandoned' state, in which case the condition of the feature will be recorded and if necessary appropriate Local Authority and Railway authorities notified of any cause for concern.

The locations of shafts and tunnels have been identified using historical and current ordnance survey plans. Historical and location plans are in Appendix F. Aerial images have also been examined for evidence of shafts that might be present along the route of the railway tunnels.

One shaft is known to exist off 32 Newton Street, Greenock (NGR: 227032, 676450). This line, now disused, connected Greenock Station to the former Princes Pier.

### **6.2. Shafts for the Construction of Water Supply Culverts**

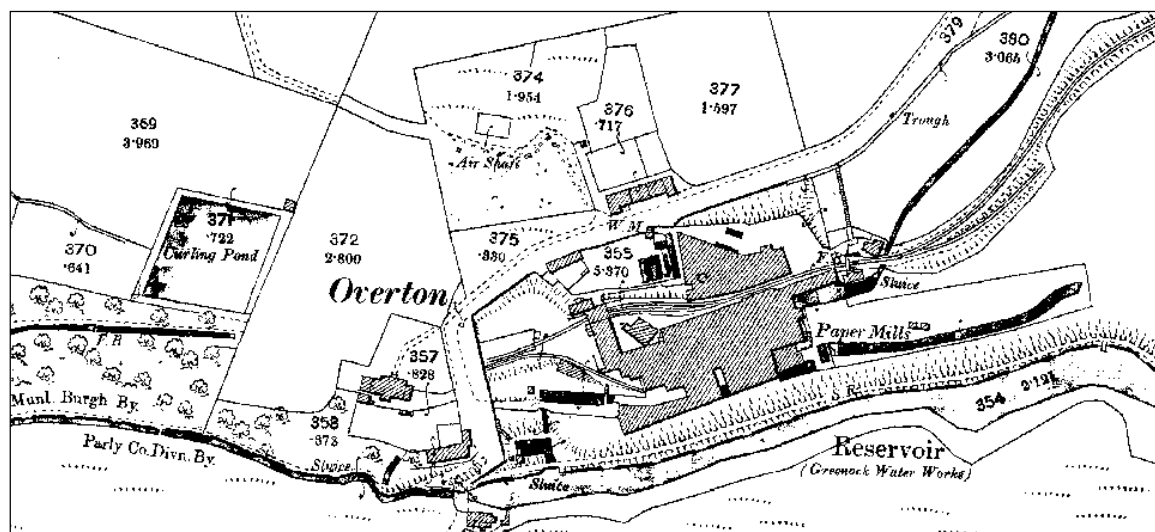
The water supply culverts will be under the ownership of Scottish Water. The locations of the shafts have been identified using historical and current ordnance survey plans. Historical and location plans are provided in Appendix F. Aerial

images have also been examined. The locations of these shafts are indicated on Figure 9.

Ref	Shaft Location	Easting	Northing
SW1	Overton	226635	674993
SW2	Craigieknowe Burn	228487	674239
SW3	Whitelees Moor	228584	673838
SW4	Burnhead Moor	228637	673353
SW5	Burnhead	228697	672917
SW6	Glenbrae	228735	672440
SW7	Gryfe Reservoir	228690	671850

Air Shaft, **SW1** appears in the 1897 second edition historical plan. The following extract indicates its position to the north of Overton Paper Mills. The shaft is not indicated in the subsequent survey plan of 1912.

### Historical Extract 1897



In the absence of economic minerals in the area the most likely explanation for the presence of this shaft is that it was formed in the construction of Shaw's Water Aqueduct (Greenock Cut). This comprised a network of water conduits collecting and distributing through Greenock a system of falls that could be used to power industry schemes. The area has since been developed for residential housing. The position of the shaft is indicated within the rear garden of the Mill House, adjacent to a children's play area. The shaft has been infilled, but it is unknown if this was engineered or capped. A culvert at this locality does not feature within Scottish Water Supply Network and the shaft might be considered to be 'abandoned'. This culvert may be the responsibility of the property

landowner or the owner of the Shaw's Water Aqueduct system, Inverclyde Council/Scottish Water.

#### **Overton Air Shaft looking westward across site**



A site visit was carried out at the Overton Air Shaft (SW1) on the 17<sup>th</sup> August 2010. Photographs from the reconnaissance are contained in Appendix F.

Air shafts, **SW2** to **SW7** are in a linear arrangement and appear to be associated with a water culvert from the Gryfe Reservoirs to Whinhill water supply treatment works. Given that the system is still in use for public water supply, it is considered most likely that the maintenance of these features is the responsibility of Scottish Water.

The aerial photographs show the entrance to air shaft SW2 to be housed within a small building, SW3 and SW4 are concealed by a square cover at ground level. The air shaft opening at SW5, SW6 and SW7 is enclosed by a circular wall. This is likely to have been part of the original construction. It is not known if these circular features have a safety mesh or cover within them, or if the height would effectively prevent public access. Furthermore, the structural condition of each feature is unknown.



**Aerial Photographs for Air Shafts SW2 to SW7 (circa 2007)**



**SW2 - Overton**



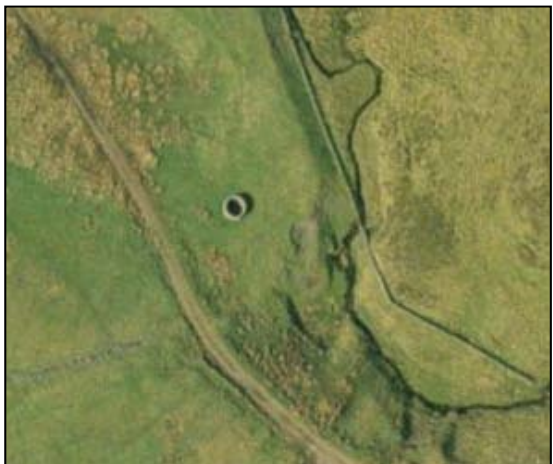
**SW3 - Craigieknowe Burn**



**SW4 - Whitelees Moor**



**SW5 - Burnhead Moor**



**SW6 - Burnhead**



**SW7 - Gryfe Reservoir**

## 7 CONCLUSIONS

Numerous abandoned mines and quarries have been identified across Inverclyde and a field reconnaissance was conducted at each locality.

The following hazards were considered in the assessment;

- Harm to public from falling rock debris,
- Subsidence of underground voids causing damage to property and potential harm to public
- Open quarry face and unprotected cliff edges presenting risk to public

The hazard assessment matrix (Appendix G) evaluates the level of risk given the current land use, environmental conditions, proximity to urban and public access routes at each locality.

**Table 7.1: Identified Hazardous Abandoned Mines and Quarries**

Ref	Location	Hazard	Intervention Action
GRK-A	Mine Shaft	Subsidence	Regular monitoring
GRK-B	Mine Shaft	Subsidence	Regular monitoring
GRK-E	Mine Shaft	Subsidence	Regular monitoring
GRK004	Craigmuschat Quarry / Landfill	Fall from height, rock fall and subsidence	Regular monitoring, secure quarry cliff edge and/or warning signage.
GNK001	Cartsdyke Quarry	Fall from height	Secure quarry cliff edge and/or warning signage.
GNK005	Auchmountain Quarry	Fall from height and rock fall	Secure quarry cliff edge and/or warning signage.
PGW005	Clune Brae Quarry	Fall from height and rock fall	Secure quarry cliff edge and/or warning signage.
PGW006	Bardrainey Quarries	Fall from height	Secure quarry cliff edge and/or warning signage.

The assessment has highlighted hazardous abandoned mines and quarry sites requiring further consideration with respect to ensuring public health protection. These sites are listed in table 7.1 and shown on a hazard location plan (Figure 10).

Officers of this Service will identify and liaise with the persons responsible and relevant stakeholders, to ensure adequate protection measures are put in place. Officers will thereafter be required to periodically inspect these sites to review the hazard assessment and ensure protection measures are maintained.

All land with the possible exception of Auchmountain Quarry, is understood to be owned and managed by Inverclyde Council.

The following constraints should also be considered in the event that further works are required involving intrusive investigations or other excavations.

- Services and Utilities
- Culverted Watercourses
- Invasive Non-Native Species

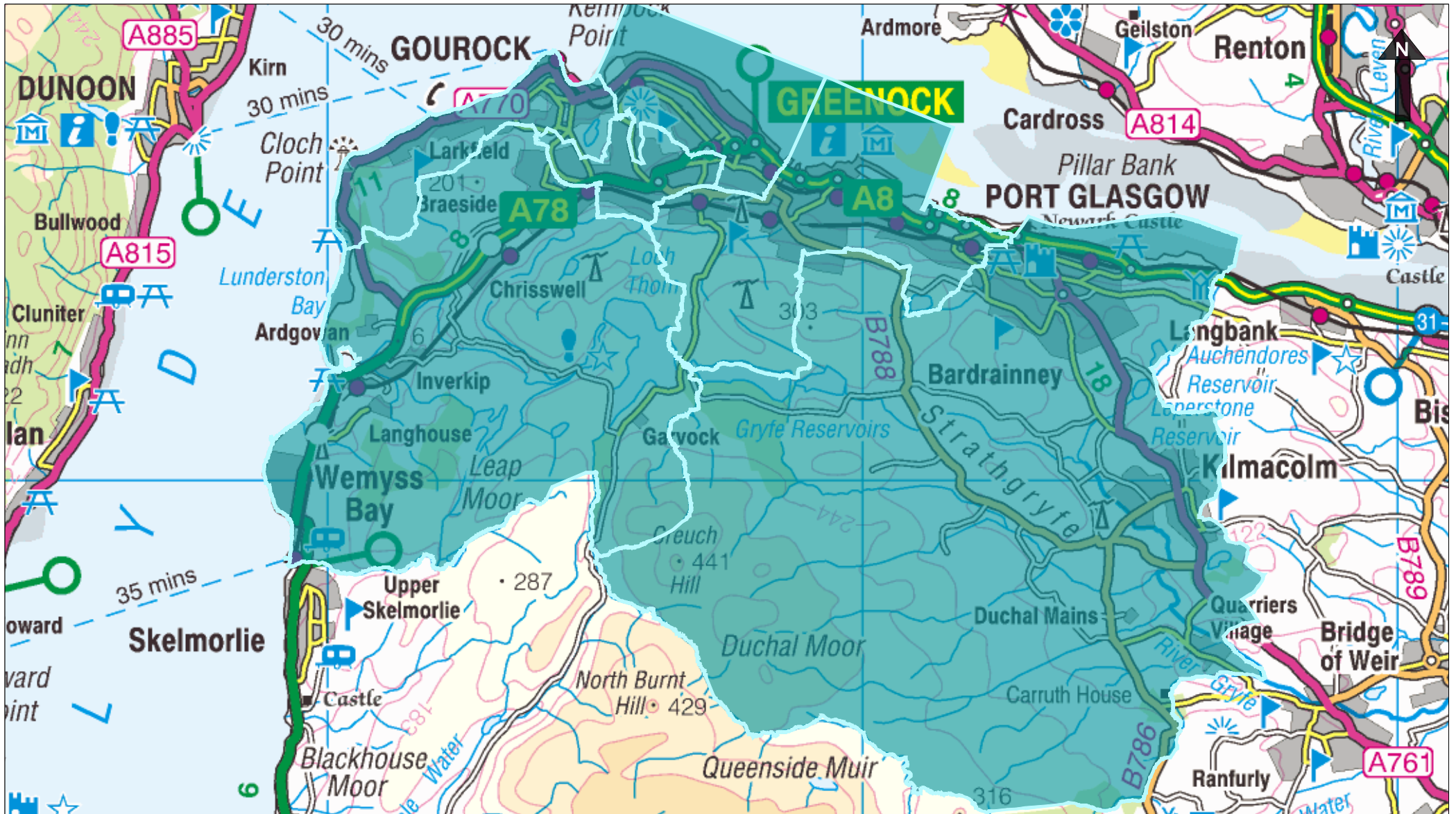
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# Figures

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Date: 08/07/2010

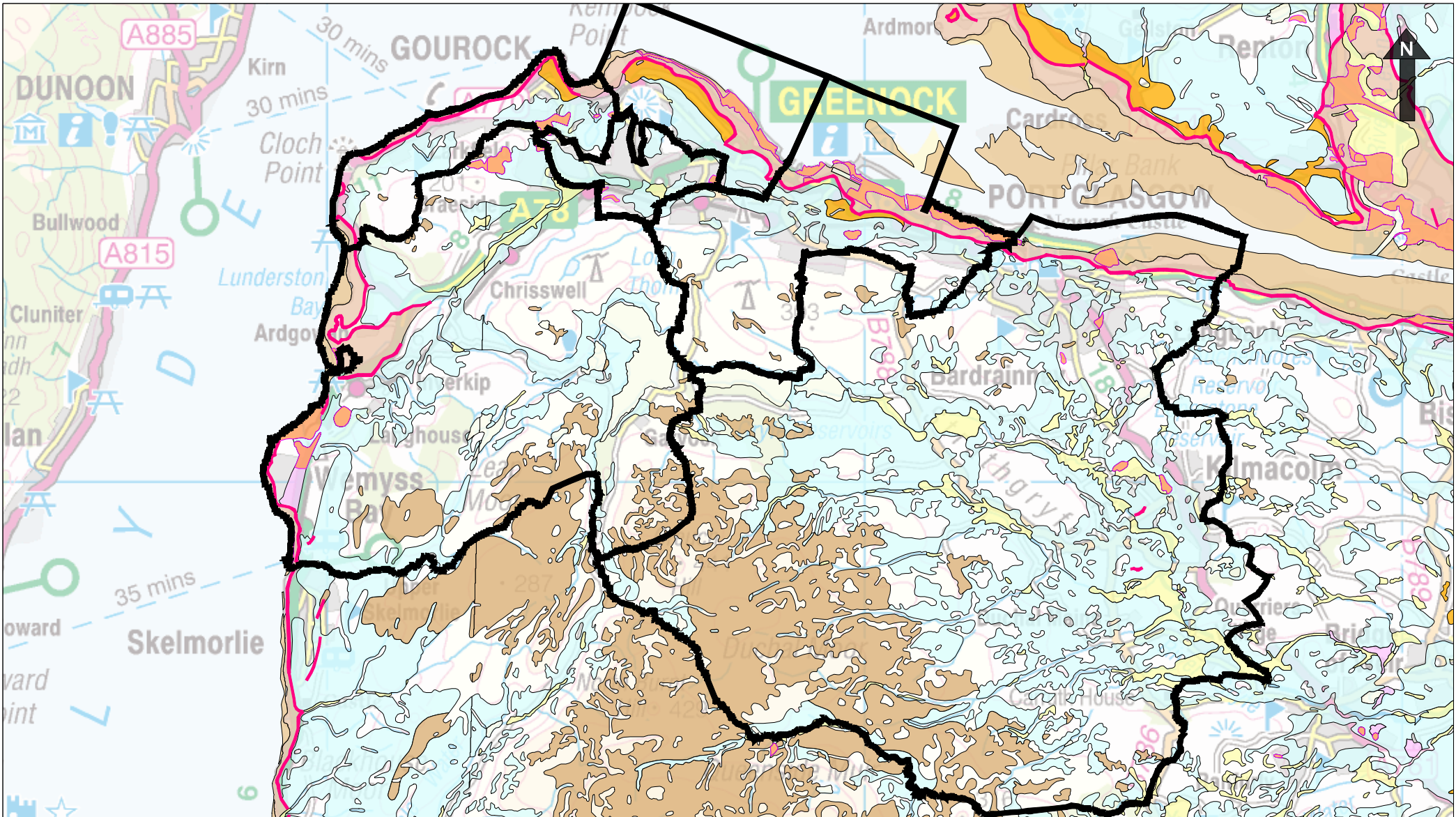
**Figure 1: Inverclyde Area and Wards**

Scale: 1:100000



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**Figure 2: Superficial Deposits and Features**

Scale: 1:100000

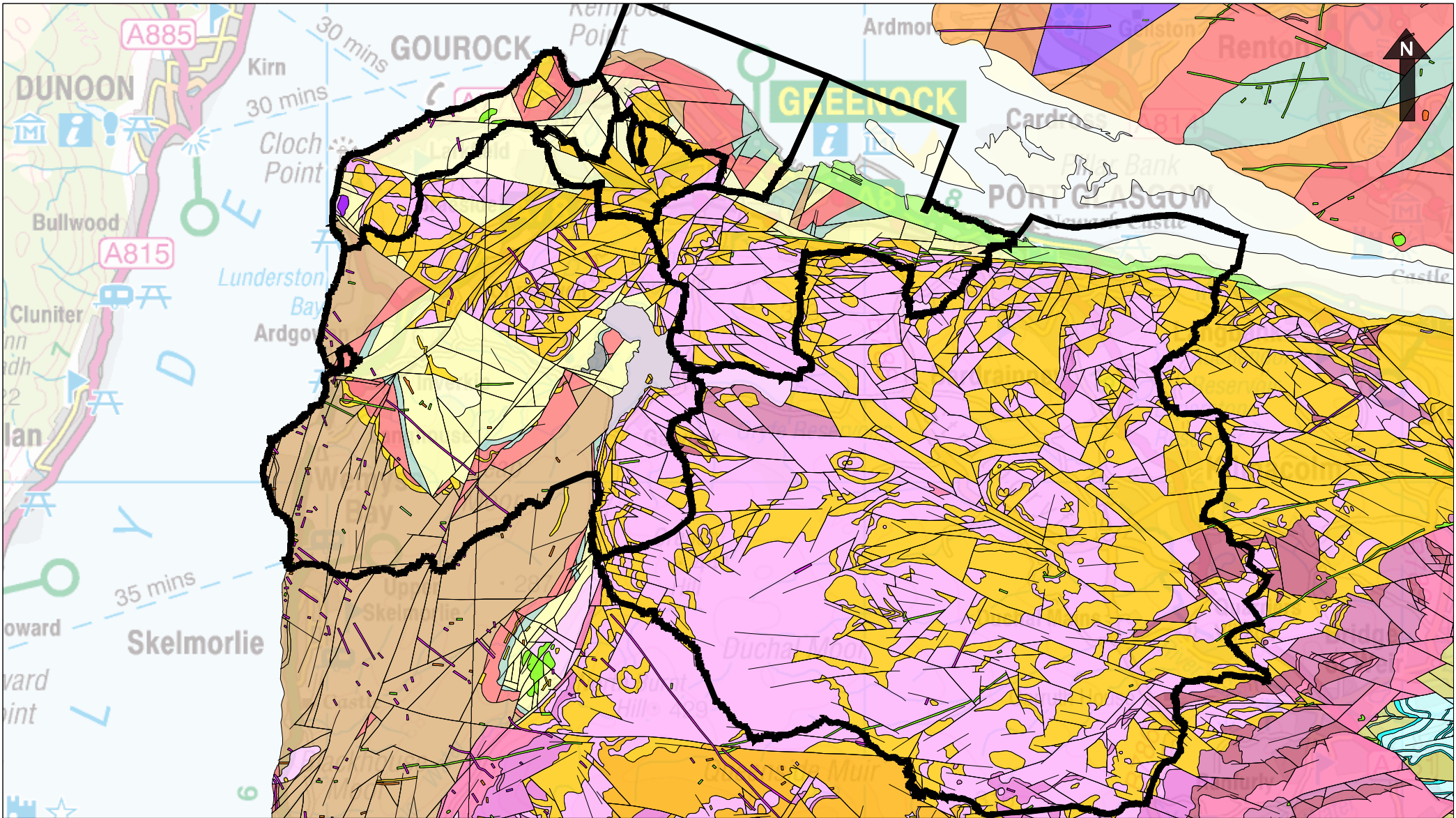


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**Figure 3: Bedrock and Faulting**

Scale: 1:100000

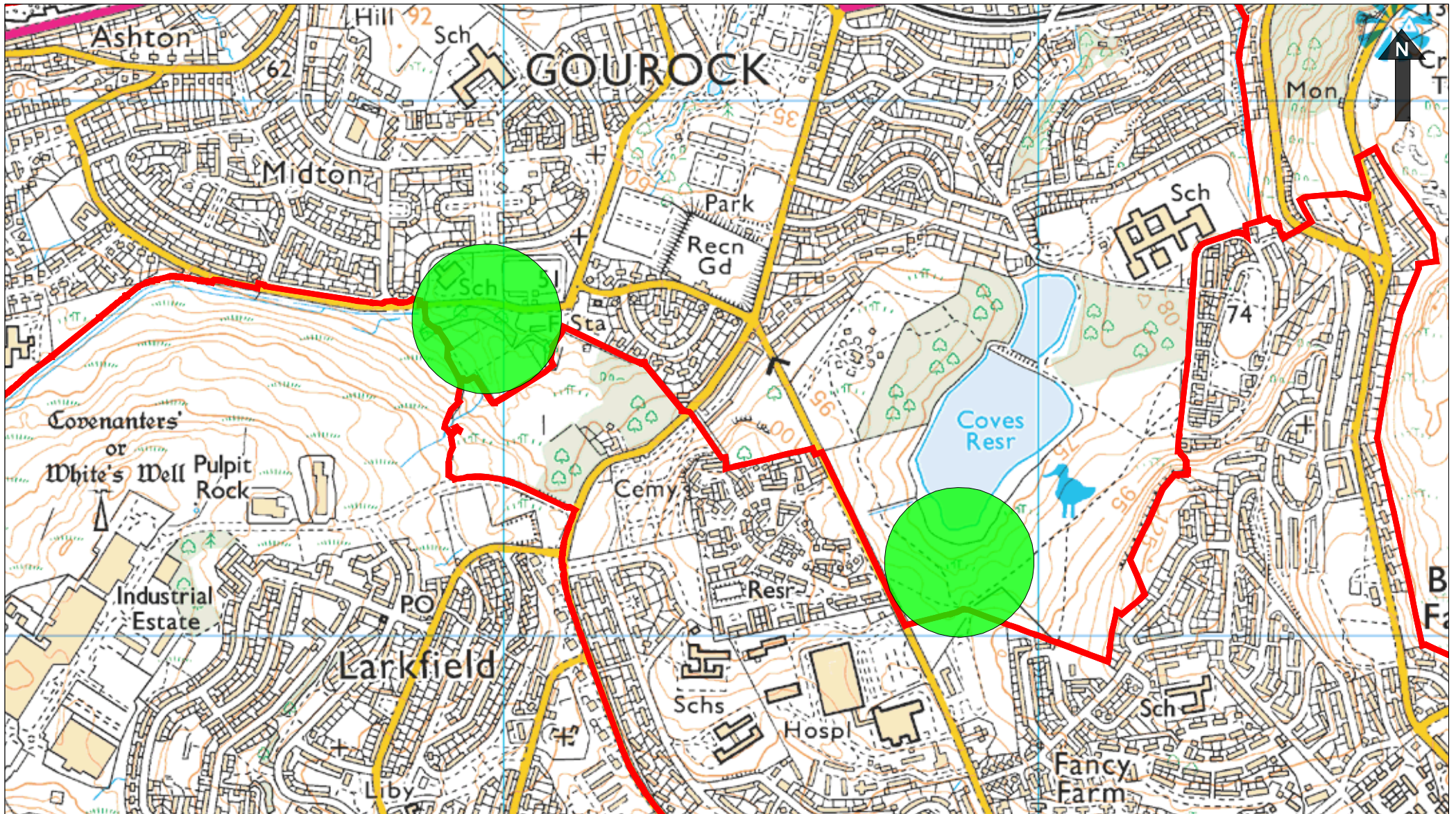


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**Figure 4: Copper Mineral Extraction Sites**

Scale: 1:10000

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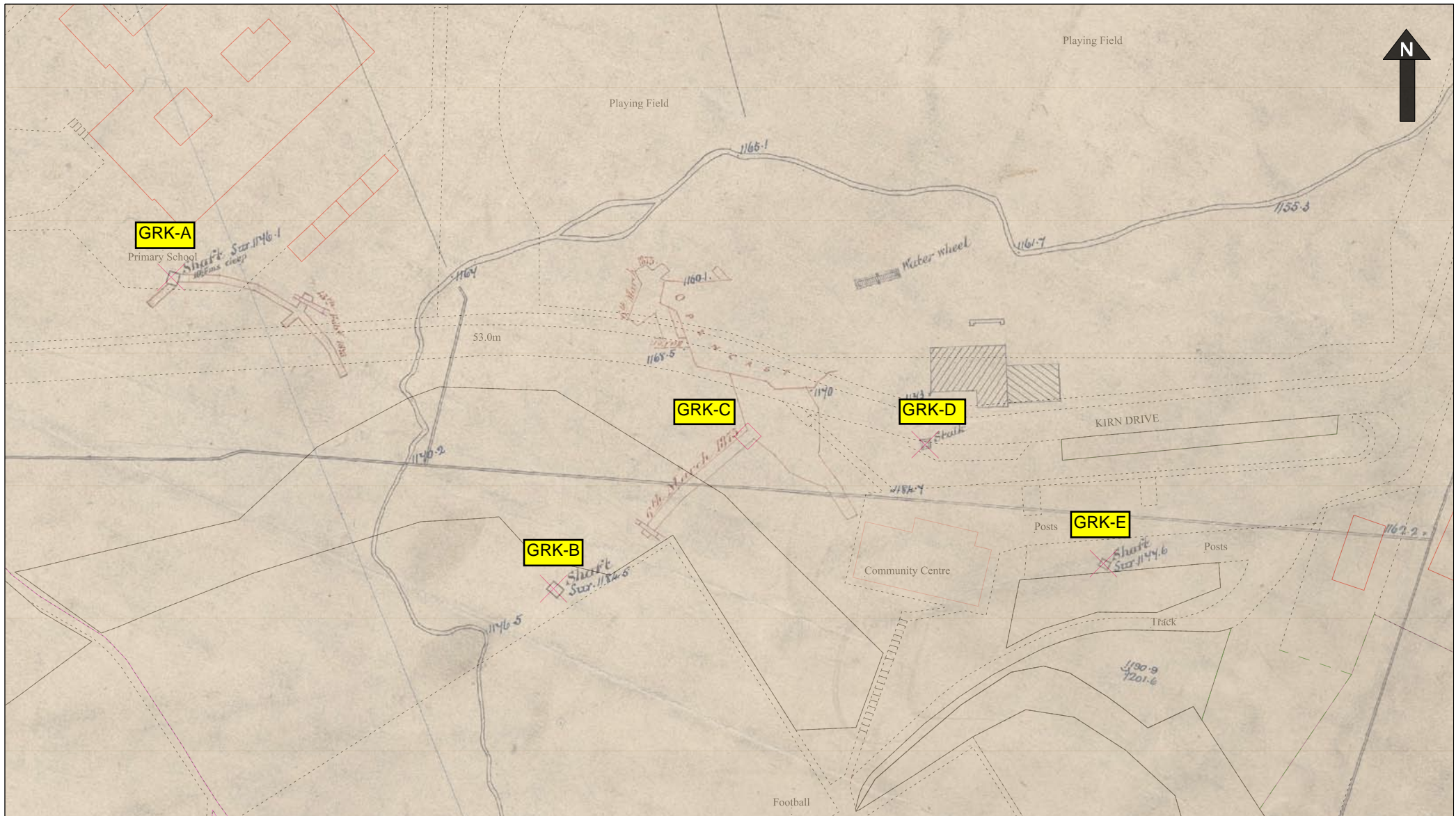


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**Figure 5: Drumshantie Copper Mine Plan**

Scale: 1:1000

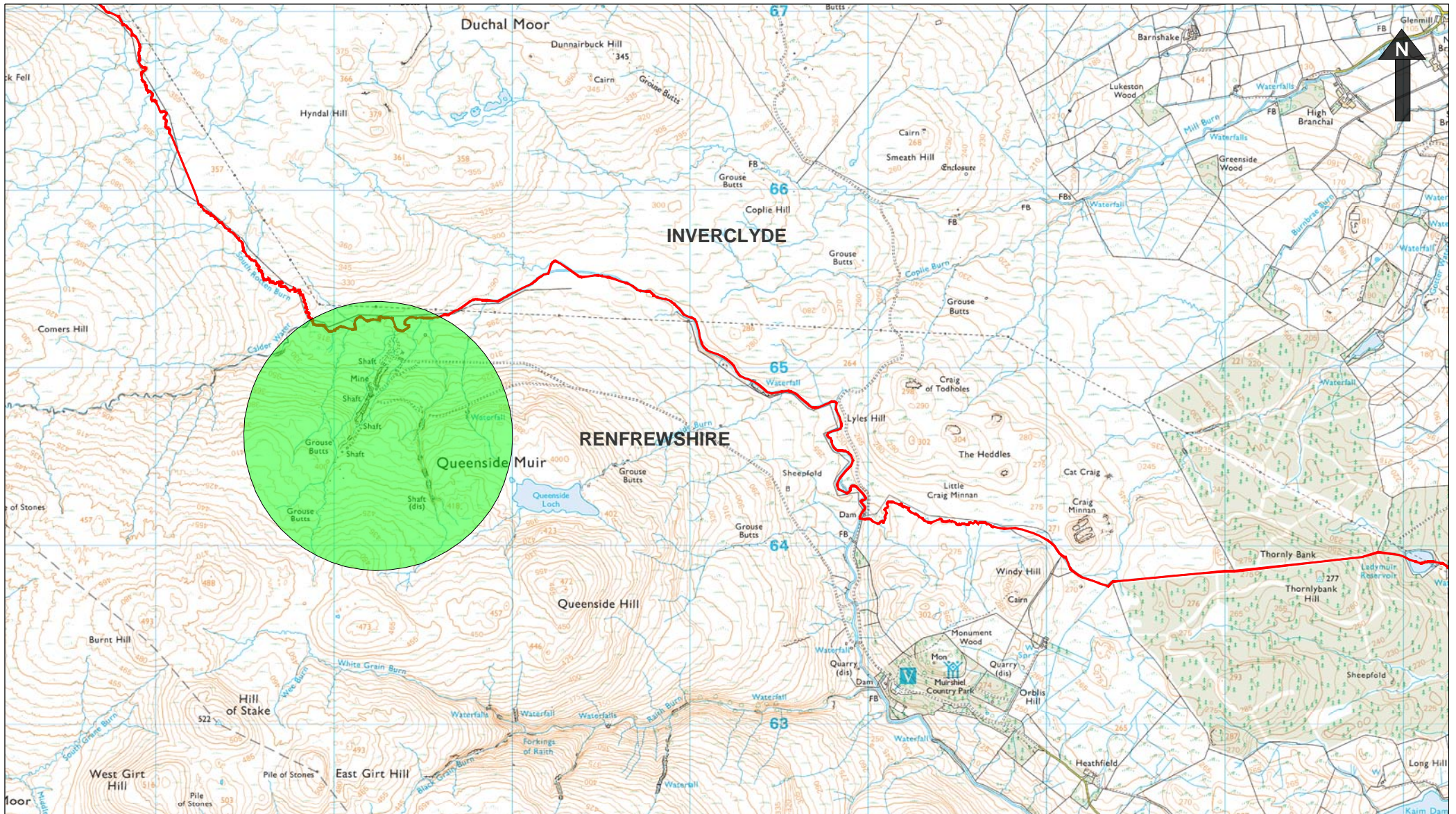


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**Figure 6: Barites Mineral Extraction**

Queenside Hill

Scale: 1:30000

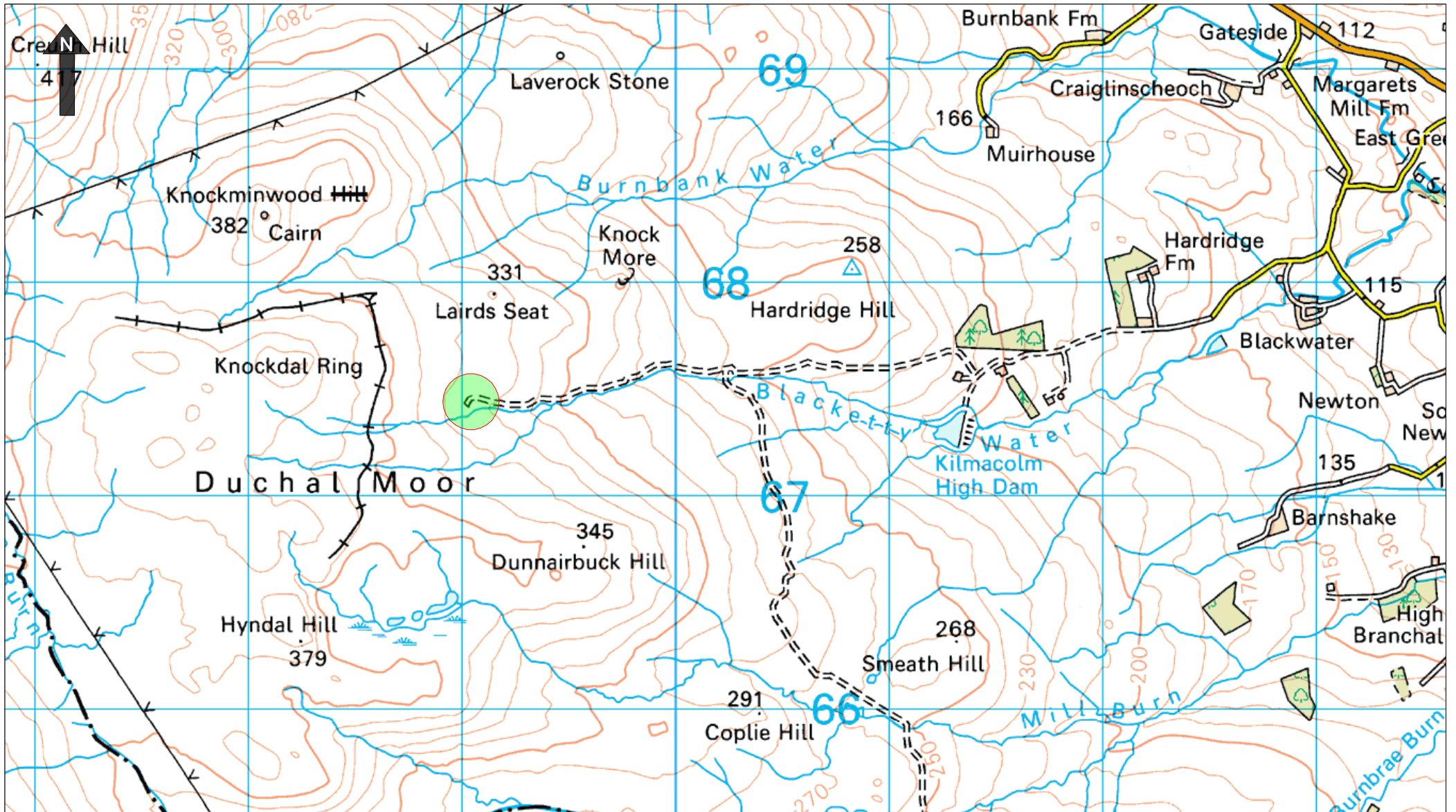


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**Figure 7: Lairds Seat Barytes Mineral Extraction**

Scale: 1:25000

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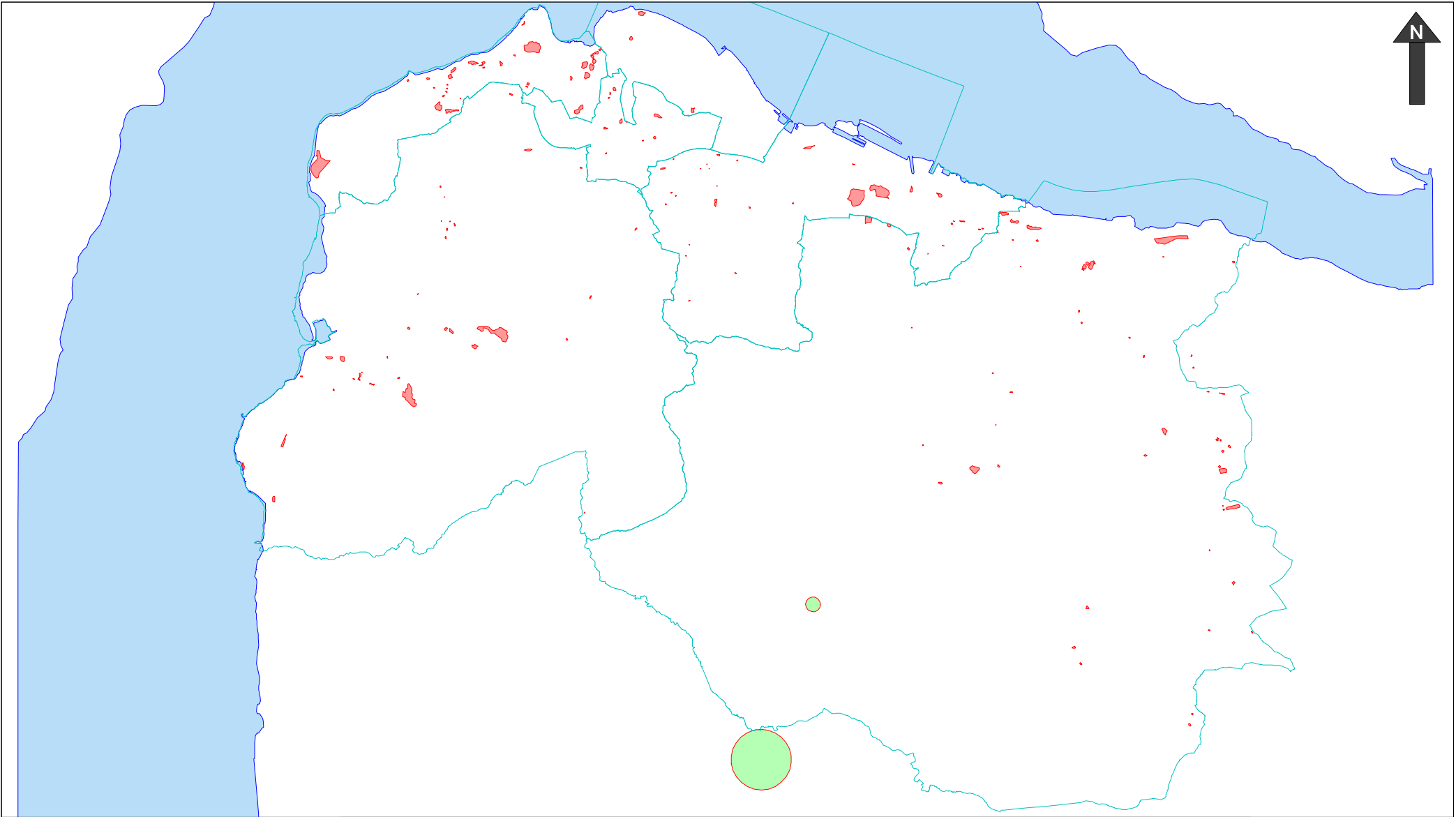
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**Figure 8 - Quarrying Activities Across Inverclyde**

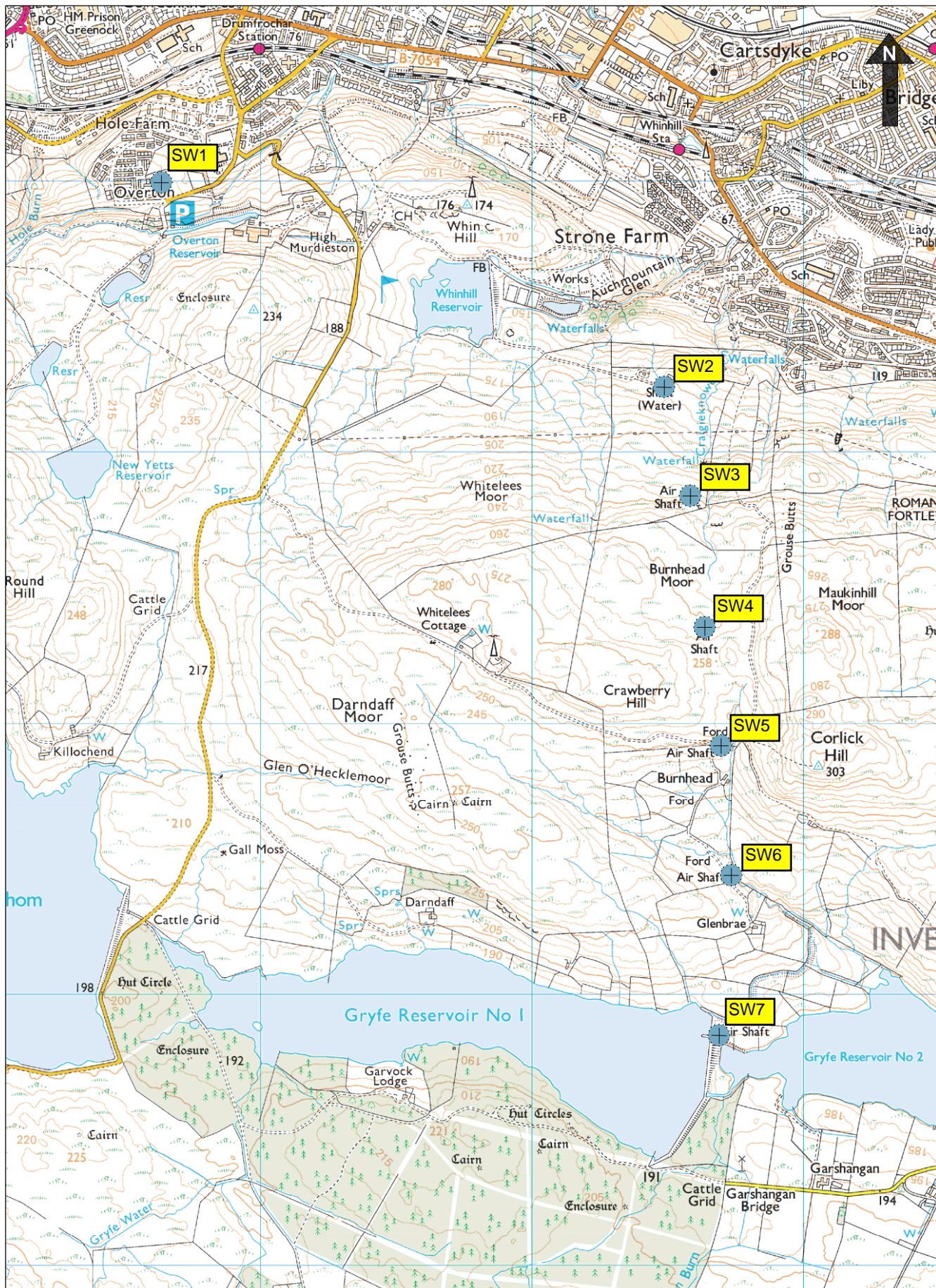
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Figure 9 - Air Shafts (Water Culvert)



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**Figure 10 - Map of Abandoned Mine Shaft and Quarry Hazards**

Scale: 1:49999



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