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Inventory of Closed Mining Waste Facilities

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1 Executive Summary

The Mining Waste Directive came into force in Scotland on 1st April 2010, implemented through The Management of Extractive Waste (Scotland) Regulations 2010.

The Directive and Regulations require the publication of an inventory of closed and abandoned mining waste facilities which cause serious negative environmental impacts or have the potential of becoming in the medium or short term a serious threat to human health or the environment.

Existing legislation in various forms requires the identification of former mining waste facilities which are causing such impacts on the environment. This inventory however provides a single list of all such sites which will aid in the targeting of improvements to reduce environmental impacts. It is a requirement of the Directive also to update the inventory periodically.

The inventory has been populated using data from the British Geological Survey and applying risk based assessments to identify sites causing serious environmental impacts. The inventory has also been populated through consultation with Local Authorities, the Scottish Environment Protection Agency and the Coal Authority.

The Scottish Government assumed responsibility for preparing the initial inventory on a Scotland-wide basis. Responsibility for maintaining the inventory will revert to each Planning Authority in Scotland in accordance with Regulation 28 of the 2010 Regulations.

This inventory contains 91 sites, the majority of which relate to water pollution impacts.

2 Introduction

2.1 Background

Directive 2006/21/EC of the European Parliament and of the Council on the management of waste from the extractive industries (the Mining Waste Directive) was introduced in 2006 (European Commission 2006).

Article 20 of the Mining Waste Directive requires Member States to publish an inventory of closed and abandoned mining waste facilities which cause serious negative environmental impacts or have the potential of becoming in the medium or short term a serious threat to human health or the environment.

The Mining Waste Directive came into force in Scotland on 1st April 2010, implemented through The Management of Extractive Waste (Scotland) Regulations 2010 (the 2010 Regulations). The requirements of Article 20 were implemented through Regulation 28 which obliges each Planning Authority¹ in Scotland to prepare and maintain the inventory required in Article 20 of the Mining Waste Directive.

Scottish Government Guidance on the 2010 Regulations is accessible through:

- <http://www.scotland.gov.uk/Resource/Doc/212607/0102162.pdf>

The guidance includes definitions of extractive waste and waste facilities.

There are various legal terms referred to throughout this document that are themselves defined in the Mining Waste Directive or in the 2010 Regulations. This document has been written in non-technical language and so those definitions are not repeated here.

The following key summary points should though be understood in respect of the various terms that are used in this document:

- The 2010 Regulations refer to extractive waste from mines, quarries and surface mines and should not be confused as referring solely to deep mines;
- Extractive waste is material that originates from a mine or quarry only and does not include other forms of waste;
- The sites to be included in the inventory are extractive waste facilities, rather than the mines or quarries that would have been operated and generated the wastes. It is not necessary therefore to identify mines, adits, quarries or other

¹ Defined in the 2010 Regulations as the local authority responsible for planning permission where an extractive waste area or waste facility is located.

extractive sites, unless it is a closed waste facility itself that is causing the concern; and

- Some extractive sites will have more than one extractive waste facility and the regulations require each facility to be identified separately. Extractive waste facilities will most commonly be quarry tips, surface coal tips, oil shale bings, colliery or quarry lagoons or tailings dams.

The Scottish Government assumed responsibility for preparing the initial inventory on a Scotland-wide basis. This document publishes the inventory prepared on behalf of the Scottish Government. It also describes the data, and methods used in deriving the inventory, along with the inventory for Scotland itself. It is envisaged that the responsibility for maintaining the inventory will revert to each Planning Authority in Scotland in accordance with Regulation 28 of the 2010 Regulations.

2.2 Overview of Historic Mining in Scotland

Scotland has a long history of mining including metalliferous, non-metalliferous mines and various types of surface mining or quarrying operations.

Quarries operate throughout Scotland principally for the extraction of aggregates in the form of sand and gravel or hard rock. There are by far more operational quarries of this type than any other extractive operation in Scotland. These operations generally use surface mining techniques as opposed to deep mining techniques.

The majority of Scottish underground mines have historically been coal mines with the earliest records of coal mining dating back to the 12th Century (Younger, 2001). Due to the distribution of Scotland's Carboniferous geology, the majority of closed and operational coal mines are located within the Midland Valley of Scotland across the Planning Authority areas of North Lanarkshire, South Lanarkshire, Glasgow, Renfrewshire, East Ayrshire, Midlothian, East Lothian, West Lothian, Clackmannanshire and Fife.

One of Scotland's most important industries, coal mining was facilitated by the development of the steam engine. This is reflected in the increase in the amount of coal produced annually, from 475,000 tonnes annually towards the end of the 17th century, to more than 40,000,000 tonnes annually by the early 20th century (National Coal Board, 1958). After peaking in the early 20th century, the coal industry in Scotland was in decline (Younger, 2001). The last operational deep mine was at Longannet, in Fife, which was closed after flooding occurred in 2002. The closure of Longannet effectively ended deep mining in Scotland. The majority of current significant coal extraction operations in Scotland are now within opencast workings.

The first records of metalliferous mining in Scotland appear in the 13th century, relating to the best known areas for the mining of metals in Scotland, Wanlockhead (Dumfries and Galloway) and the Leadhills (South Lanarkshire), where historical gold mining works gave way to extensive lead mining resulting in a legacy of contamination. It is believed that mining may have been undertaken in this area as early as 1239, with the majority undertaken between 1600 and the 1930s (Coal Authority, 2011).

There is evidence of a number of metalliferous and non-metalliferous resources being mined throughout Scotland since the 13th century, although this was on a smaller scale than coal:

“...Overall, Scotland has produced 5,000,000 tonnes of iron ore, around 650,000 tonnes of barite, 300,000 tonnes of lead, about 16,000 tons of chromium, 7,000 tonnes of zinc, 200 tonnes of antimony and a few tonnes of gold and silver. Some copper, nickel and manganese have also been recovered” (Trewin, 2002).

Therefore, within Scotland coal mining was the most prolific form of extraction but was generally confined to the central areas of Scotland as was iron ore extraction. Conversely other metalliferous deposits are relatively discrete and small scale but are more scattered throughout Scotland.

2.3 Other Statutory Controls

It is recognised in the Scottish Guidance that some of the regulation that is required by the Mining Waste Directive is already provided by other regulatory controls in Scotland. The Scottish Guidance explains that where such controls already exist, that reliance can be placed on those existing regulatory frameworks. Those principles have been followed in preparation of the inventory. The existing legislative framework that is relevant to the preparation of the inventory is outlined below:

- The Planning System - The Scottish Guidance describes that existing planning procedures will continue to be the principal control over extractive waste matters. The Town and Country Planning (Scotland) Act 1997 (as amended) serves as the legislative control over land use development and the management of sustainable development. As a requirement of Section 28 of the 1997 Act, planning permission is required for the carrying out of any development of land including extractive operations and the management of extractive waste. In considering an application for planning permission, the 1997 Act makes provision for planning permissions to be granted subject to conditions and subject to planning obligations as appropriate. Each of these respective provisions allow for effective control of developments to be maintained by planning authorities. The 1997 Act also incorporates provision for the periodic review and updating of mineral planning permissions to ensure that the operating conditions at a site remain acceptable to modern environmental standards.
- Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 (the EIA Regulations) - The EIA Regulations operate alongside the planning system and require the environmental effects of certain developments to be taken into account by planning authorities, prior to the granting of planning permission for development. A significant proportion of planning applications for minerals related development require EIA to be undertaken.
- Mines and Quarries (Tips) Act 1969 – placing a duty of care on local authorities to inspect all disused tips (accumulation or deposit of refuse from a mine or quarry whether in solid, solution or suspension) and to ensure that they do not present a danger to the public by way of instability. Responsibility is also placed on mine and quarry managers to ensure the safety of waste facilities within their

control at operational sites and to also place plans with the Health and Safety Executive (Mines Inspectorate) on abandonment. The Act has been used to ensure that facilities closed since the 1969 Act was implemented are left in a safe condition.

- The Quarries Regulations 1999 - The safe operation of sites, including operations encompassing the management of extractive waste is regulated by the Health and Safety Executive through the Quarries Regulations 1999. The Quarries Regulations are accompanied by an Approved Code of Practice (ACOP), which aids their implementation. The regulations place an overarching requirement for quarries to be operated safely and the ACOP describes that “*The Quarries Regulations 1999 are intended to protect the health and safety of people working at a quarry and others who may be affected by quarrying activities... They are also intended to safeguard people not working nearby, or visiting, for example to buy materials*”. Regulation 6 places an overall obligation on the operator of a quarry to design and operate it so as not to endanger health and safety. Part VI of the regulations is of particular relevance to the management of extractive waste requiring operators to:
 - prepare excavations and tips rules;
 - ensure that excavations and tips are appraised by a competent person and, where required, subjected to a geotechnical assessment;
 - keep specified records;
 - ensure that excavations and tips are subject to further geotechnical assessments at specified intervals and in specified circumstances;
 - ensure that records of substances tipped at notifiable tips are kept; and
 - give notice to the HSE with respect to specified tips and excavations.
- The implementation of Contaminated Land Regulations legislation in Part 2A of the 1990 Environmental Protection Act, as amended (2000) has placed the duty of prioritising and inspecting potentially contaminated sites on the Local Authority including mines, but specifically excludes mine water from sites abandoned prior to 1999.
- The Water Framework Directive (WFD) addresses the Water Quality issues associated with abandoned mine sites through the River Basin Management Plans (RBMP) which set out measures to improve the quality of water which are failing to reach good status. This was transposed in Scotland in 2003 by the Water Environment and Water Services (Scotland) Act (WEWS) 2003. The 2003 Act created a new River Basin Management Planning process. The 2003 Act and the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR) is the key regulatory tool to the implementation of the WFD in Scotland. CAR enables SEPA to control activities which may have an impact on the water environment and on the interests of other users of the water environment; and is therefore one of the key tools which will enable achievement of the

environmental objectives. It introduced a risk-based framework of controls such as general binding rules, registration and licences.

3 Methodology Development and Approach

The requirement to be addressed by the work described in this document is defined in Article 20 of the Mining Waste Directive. This states that:

“Member States shall ensure that an inventory of closed waste facilities, including abandoned waste facilities, located on their territory which cause serious negative impacts or have the potential of becoming in the medium or short term a serious threat to human health or the environment is drawn up and periodically updated.”

The requirements of Regulation 28 of The Management of Extractive Waste (Scotland) Regulations 2010 are similarly worded:

“(1) The planning authority shall prepare and maintain an inventory of closed waste facilities, including abandoned waste facilities, in its area which cause serious negative environmental impacts or have the potential of becoming in the medium or short term a serious threat to human health or the environment.

(2) The inventory shall be made available to the public.

(3) The inventory shall be prepared by 1st May 2012 and shall take into account the methodologies referred to in Article 21 of Directive 2006/21/EC on the management of waste from extractive industries, if these are available”.

Reference is also made within Article 20 to methodologies to be taken into account if available described in Article 21.

Article 21 of the Mining Waste Directive stated that the Commission assisted by a Committee (described in Article 23) would ensure that there was an appropriate exchange of technical and scientific information between Member States with a view to developing methodologies relating to:

- a) The implementation of Article 20 (*the requirement to prepare an inventory*); and
- b) The rehabilitation of those closed waste facilities identified under Article 20 in order to satisfy the requirements of Article 4. Such methodologies shall allow for the establishment of the most appropriate risk assessment procedures and remedial actions having regard to the variation of geological, hydrogeological and climatological characteristics across Europe.

The available guidance from the European Commission and key points within that guidance document are summarised in the following section.

3.1 European Commission Guidance

In February 2011 the European Commission published a guidance document for 'A Risk-based Pre-selection Protocol for the Inventory of Closed Waste Facilities as required by Article 20 of Directive 2006/21/EC'.

This document describes that it is not intended to be a 'rigid protocol' or 'definitive advice' on a methodology. It also acknowledges that the Directive does not require the development and application of a harmonised risk assessment methodology and refers to the particular circumstances of Member States.

Key points of the guidance document are as follows:

- The pre-selection protocol allows for a category of EXAMINE FURTHER for sites which are not initially included in the inventory but are worthy of further examination and may eventually be included within the inventory;
- The protocol adopts a precautionary position with regard to identifying sites for the inventory;
- The term closed mine waste facilities includes abandoned facilities;
- The selection procedures should be risk based and address source –pathway-receptor components;
- The protocol adopted should be reasonable and proportionate for the task.
- Providing interpretation of 'serious' in connection with impacts to the environment or human health (See Section [3.4] below)
- Providing interpretation that short term can mean 6 to 12 months, Medium term can mean 1 to 10 years and Long term can mean greater than 10 years.

The guidance document goes on to suggest a series of parameters (for example chemistry or stability) that should be considered in the assessment.

The methodology applied has been developed with awareness and understanding of this guidance document. The risk assessment method used in preparation of this inventory has been developed using what is considered the most appropriate method for Scotland.

3.2 Context and Principles for Assessment in Scotland

There is no complete inventory of all historic mining operations relating to Scotland. Many of the oldest mine workings will be unrecorded and so will not appear in any data set. The BGS dataset BRITPITS² does though contain an extensive listing of extractive sites. It indicates there are 32,847 known historic mining related sites in Scotland. This list excludes all sites flagged in the dataset as operational, or not yet started as these

will be regulated under existing legislation and guidance and by definition are not closed or abandoned.

Another principal source of information was the Local Authorities in Scotland. Each local authority was consulted via their Planning Authority and asked to identify any facilities they considered should be included in the inventory. This was undertaken by way of a pro-forma questionnaire that is reproduced in Appendix A. Similar requests were made of the Coal Authority and of SEPA. By virtue of a local authority, the Coal Authority or SEPA being concerned to identify any sites, based on their local knowledge and in fulfilment of their statutory functions, any such site proposed with relevant risks (as defined in Tables 1 to 3) was automatically included within the inventory.

Groundwater is a consideration for closed or abandoned extractive waste facilities. Groundwater across much of Midland Valley of Scotland, where much of the historic mining has taken place is chemically and physically impacted by historic coal mining (Ó Dochartaigh et al, 2011), however this is primarily due to groundwater interaction with local host geology or the mineral workings themselves rather than necessarily seepage of water from waste facilities. Therefore impacted groundwater within the Central Belt is not linked automatically to mining waste facilities in our appraisal.

The definition of extractive waste (subject to limited exclusions) in the 2010 Regulations is “waste produced from an extractive industry and resulting from prospecting, extraction, treatment and storage of mineral resources and the working of quarries”. This wide ranging definition does not apply any distinction between the types of extractive waste that may be contained within any facility or the risks that may be posed by different mineral type.

The actual types of waste deposits will vary and is not always evident from either the BRITPITS database or aerial photography. In reality in Scotland the type of waste deposit could include tailings ponds, spoil heaps, or tips. The spread of mine waste through natural processes whether they be windblow, or erosion and re-deposition (runoff and transport in watercourses) remote from the waste facility is not considered in the preparation of the inventory.

3.3 Source–Pathway-Receptor

The current approach to risk assessment for environmental impacts in Scotland follows the Source-Pathway-Receptor model which is consistent with European Commission guidance above. To prove a complete linkage, there must be a Source (i.e. waste source with potential to create a risk) linked to a receptor (i.e. watercourse) with a viable means of connecting the source and receptor (Pathway) causing a potential impact. The key pollutant linkages considered when populating the inventory are summarized in Table 1.

Table 1: Source Pathway Receptor Definitions

Risk	Pathway	Receptor
Pollution	Dermal contact, ingestion	Human health Ecology (protected Sites) Property (Crops and Livestock)
	Leaching	Surface Water Groundwater
	Erosion	Surface Water Ecology (surface water) Ecology (protected sites) Property (Crops and Livestock)
	Windblown dust	Human health (inhalation and ingestion) Ecology (protected sites) Property (crops and livestock)
Stability	Heap, dam or pond failure	Human Health Surface Water Ecology (Surface Water) Ecology (Protected Sites)
Flammability	Smoke, heat, dust and gas	Human Health Property (Buildings)

3.4 Serious Environmental or Human Health Impacts

The Mining Waste Directive does not define "serious negative environmental impacts or the potential of becoming in the medium or short term a serious threat to human health or the environment". The working group guidance refer to Commission decision 2009/337/EC (European Commission, 2009) and recommended the interpretation as summarised in Table 2.

Table 3 details the serious environmental impacts relating to the key risks identified in conjunction with definitions detailed in Table 2. These are based on relevant guidance for each area of interest.

Table 2: Defining serious environmental impacts

Receptor	Serious environmental impact
Human Health	Loss of Life. Injuries leading to disability or prolonged states of ill health.
Environment	Intensity of the potential contaminant source strength is not decreasing significantly within a short time. Leads to any permanent or long-lasting environmental damage. Affected environment cannot be restored through minor clean-up and restoration efforts

Table 3: Criteria for assessing serious environmental impacts

Risk	Magnitude
Water Pollution	Site causes failure of Environmental Quality Standard (EQS) in surface water over a distance of more than 500 metres, or Site causes pollution of groundwater extending more than 50 metres in a principal aquifer or 250 metres in a secondary aquifer
Contaminated Land	Site determined as “contaminated land” for Part 2A due to “significant harm” or significant possibility of significant harm” to key receptors: <ul style="list-style-type: none"> • Human Health • Ecology • Property - Buildings, services, crops, livestock, pets and wild animals subject to shooting or fishing rights.
Instability	Stability risk assessment or inspection has indicated a risk of instability and presence of receptors
Particulates (Dust Generation)	Site causes local air quality to fail to meet Air Quality Objective for PM2.5 or PM10
Suspended Solids	Site causes surface water to fail to achieve “ good ecological status” due to suspended solids
Fire	Combustion of wastes identified within the past 10 years and not permanently remediated, and any of the following receptors present: <ul style="list-style-type: none"> • Human Health • Ecology • Property - Buildings, services, crops, livestock, pets and wild animals subject to shooting or fishing rights

4 Populating the Inventory

4.1 BRITPITS

The British Geological Survey (BGS) BRITPITS³ dataset is an extensive list of mining activity that has been collated across the UK and Northern Ireland including all active, inactive, dormant and ceased sites.

This database provided spatial data on the location and nature of ceased mineral workings in Scotland. The BRITPITS dataset does not distinguish extractive waste facilities from other mine entries such as adits or shafts or quarries. Not all the entries in the dataset would therefore necessarily be extractive waste facilities, although the entries have potential to have one or more waste facilities associated with that entry.

Further details on the use of this dataset are provided within the following sections of this report.

4.2 Assessment Elements

Assessing the data available and populating the inventory included the following elements:

- Local Authorities, SEPA and the Coal Authority were canvassed to identify sites they were aware of which should be included in the inventory;
- Water Quality based assessment (water quality failures) and associated BRITPITS entries, excluding inert waste facilities and categories which would not generate significant waste products;
- Interrogation of detailed aerial photography in conjunction with the GIS database of BRITPITS points to identify mining waste areas within catchments identified as failing water quality standards; and
- Site visits (ground-truthing) to confirm the GIS screening approach and BRITPITS features for proposed sites related to water quality failures.

4.3 Local Authority Consultation

In Scotland Local Authorities have statutory responsibilities for planning, development, environmental protection relating to stability of land, health and nuisance matters related to burning spoil heaps and also for contaminated land. Across those functions there are differing requirements to monitor and maintain records of sites in their areas that may present serious impacts to the environment or public health.

3

Each Local Authority and each of the National Park Authorities was canvassed for information that they held locally with regard to facilities that should be included in the inventory. The Scottish Environment Protection Agency (SEPA) and the Coal Authority were similarly approached. The canvassing drew attention to the insolvency of surface coal mining companies who had been operating in Scotland. Those events have given rise to complex issues of abandonment, planning enforcement and environmental regulation at several sites. Extractive waste facilities at those sites have the potential to be considered abandoned included within the inventory.

The type of information that would be available locally was:

- any work previously undertaken under the 2010 Regulations to identify sites that should be included in a local Inventory, together with the rationale or background information for its inclusion;
- any disused tips identified under Part II of the Mines and Quarries (Tips) Act 1969 that, by reason of stability, constitute a danger to members of the public;
- contaminated land comprising abandoned mines, quarries or extractive waste facilities identified under Part II of the Environmental Protection Act 1990;
- any additional local knowledge of closed sites which may pose a risk to the environment and human health. This will include sites where an organisation is aware of sites causing serious risk to the environment or human health. Such sites may have historic leaching to local watercourses, stability concerns or a history of combustion.

A pro-forma questionnaire was issued to each authority, SEPA and the Coal Authority for collation of information. A copy of that questionnaire is included at Appendix A. In summary the questionnaire sought to establish:

- the presence and location of any extractive waste facilities to be included in the inventory;
- details of the mineral that had been mined in association with the facility, together with details of any owners or previous operators of the facility; and
- details of how the authority had become aware of the facility and whether investigations had been undertaken regarding the nature of the facility under the various local authority functions.

4.4 Water Quality Based Assessment

The BRITPITS dataset provides information on the commodity produced at each mineral working recorded. This data has been used within the assessment to filter the ceased mineral workings to include only those commodities considered potentially harmful to the environment. Those workings that produced commodities considered inert were excluded from the process. Section 4.4.2 details commodities considered inert.

Data Collection and Approach

Water quality information was collated from SEPA's Water Framework Directive (WFD) River Basin Management Plan (RBMP) classification results 2012. Watercourses classified as failing for individual metals were identified from these results. SEPA provided information and comment on the source of these watercourse failures, from which watercourses failing for individual metals as a result of historical mining activity could be identified. This information was then used in the GIS based spatial screening exercise described below to identify potential inventory sites for further investigation.

The locations of historical mineral workings were compared with the watercourse failures discussed above using a spatial analysis process in GIS. This analysis produced a potential inventory of mineral workings and related spoil associated with the failing water quality.

The key stages of the GIS analysis are summarised below:

- Identify watercourses which fail for individual metals as a result of historical mining activity under the SEPA WFD RBMP 2012 classification results;
- Define the contributing catchments for the watercourses identified; and
- Spatially link ceased mineral workings and spoil (BRITPITS entries) with failing watercourses by contributing catchment.

Exclusion of Inert Wastes

The BRITPITS dataset provides information on the commodity produced at each mineral working recorded. This data has been used within the assessment to filter the ceased mineral workings to include only those commodities considered potentially harmful to the environment. Those workings that produced commodities considered inert were excluded from the process, the following section details commodities considered inert.

The following list details the commodities considered inert and excluded from detailed assessment. This approach is consistent with the principles described within the Scottish Guidance for treatment of inert waste, the *de facto* list of inert waste contained in the guidance which reflects the significantly lower environmental risks that could result from those materials:

- Chalk
- Chert
- Crushed rock
- Dolomite
- Gravel
- Igneous & metamorphic
- Limestone
- Marble
- Marine sand & gravel
- Peat
- Sand & gravel
- Sand
- Sea salt
- Slate
- Soil
- Silica sand
- Silica rock
- Sandstone

In addition to the above inert wastes the following categories were also excluded from the water quality based assessment given that wastes generated from those operations do not fall within the definition of extractive waste:

- Oil (offshore)
- Natural gas
- Mine drainage gas
- Landfill gas

In addition the consideration of extractive waste from Coal bed methane was also excluded on the basis that no closed or abandoned extractive waste facilities are known to exist in this category given the infancy of that development sector.

4.5 Ground Truthing of Spatial Analysis

Following the data collection exercise, and the application of the GIS analysis described above BRITPITS points were identified within catchments which were failing water quality standards. Site visits were carried out to confirm the outputs of the GIS assessments described in Section 4.4.1. These visits essentially provided a check on the accuracy and effectiveness of the GIS based assessment and allowed locations which were uncertain in terms of presence or absence of spoil to be viewed and therefore updated within the database.

5 Inventory Sites

5.1 Water Quality Assessment Results

Three waterbodies were initially identified as being classified as failing for metals related to mining activity. These were:

- the Dippool Water, South Lanarkshire;
- the Glengonnar Water, South Lanarkshire; and
- the Wanlock Water, Dumfries and Galloway.

Within these catchments a total of 165 BRITPITS sites were present following initial analysis within GIS (the draft inventory list).

Site visits were carried out to each catchment to confirm mining waste locations. The main outcomes from these site visits were as follows:

1. Results of the GIS and aerial photography site screening method were very consistent with observations in the field;
2. Many BRITPITS points did not relate to mining waste (rather to mine entries or other non-waste features);
3. In some cases a number of BRITPITS points fell within the same single area of mining spoil (in which case these points were rationalised into one inventory point within the spoil area centre); and
4. The Dippool Water catchment contained only very small mining waste areas generally quite removed from the watercourse and did not clearly link to the failing of water quality in the river.

With regard to point 4 above further desk-based investigation was undertaken. It became evident that the water quality failure of this watercourse (iron, Fe) was more related to minewater rebound rather than leaching from mining waste (Scotland's Water Environmental Review 2000-2006, SEPA). Therefore this catchment and the BRITPITS points within it were removed from the draft inventory list.

On updating the draft inventory list with the results of the field observations and further desk based investigation 85 inventory points were identified within the Glengonnar Water and Wanlock Water catchments. A typical spoil heap is shown in Figure 1.



Figure 1: Spoil Heap at Wanlockhead

5.2 Sites Identified through Consultation

A number of sites were identified through consultation with the Planning Authorities, SEPA and the Coal Authority as having potential to be included in the inventory. There had been an initial presumption that all sites identified through that consultation should be included in the inventory. Following receipt of proposed sites it was apparent however that some of the sites identified did not meet the risk criteria, and represented an over cautious approach from some respondent authorities.

Each site proposed was therefore compared by the project team against the risk criteria described in Section 3 of this report. Where the sites identified met the criteria they have been included within the inventory. Those which did not meet the criteria, generally through a lack of information, have been considered as falling within the EXAMINE FURTHER category.

Having reviewed all sites initially proposed, a further 6 sites have been included within the inventory on the basis of combustion or instability. No sites were identified under the classification of contaminated land.

6 Summary of Inventory

The inventory for Scotland of closed mining waste facilities which are or could be causing serious environmental impact contains 91 mining waste facilities.

Water pollution accounts for 85 of the inventory sites.

From the Local Authority consultation exercise a further 6 sites were identified subdivided as follows:

- 2 sites due to flammability;
- 4 sites due to instability; and
- 0 sites for contaminated land.

The list of inventory sites is provided in Table 4, and locations are shown in Figures 1 and 2.

This report is also available through the Scottish Government website.

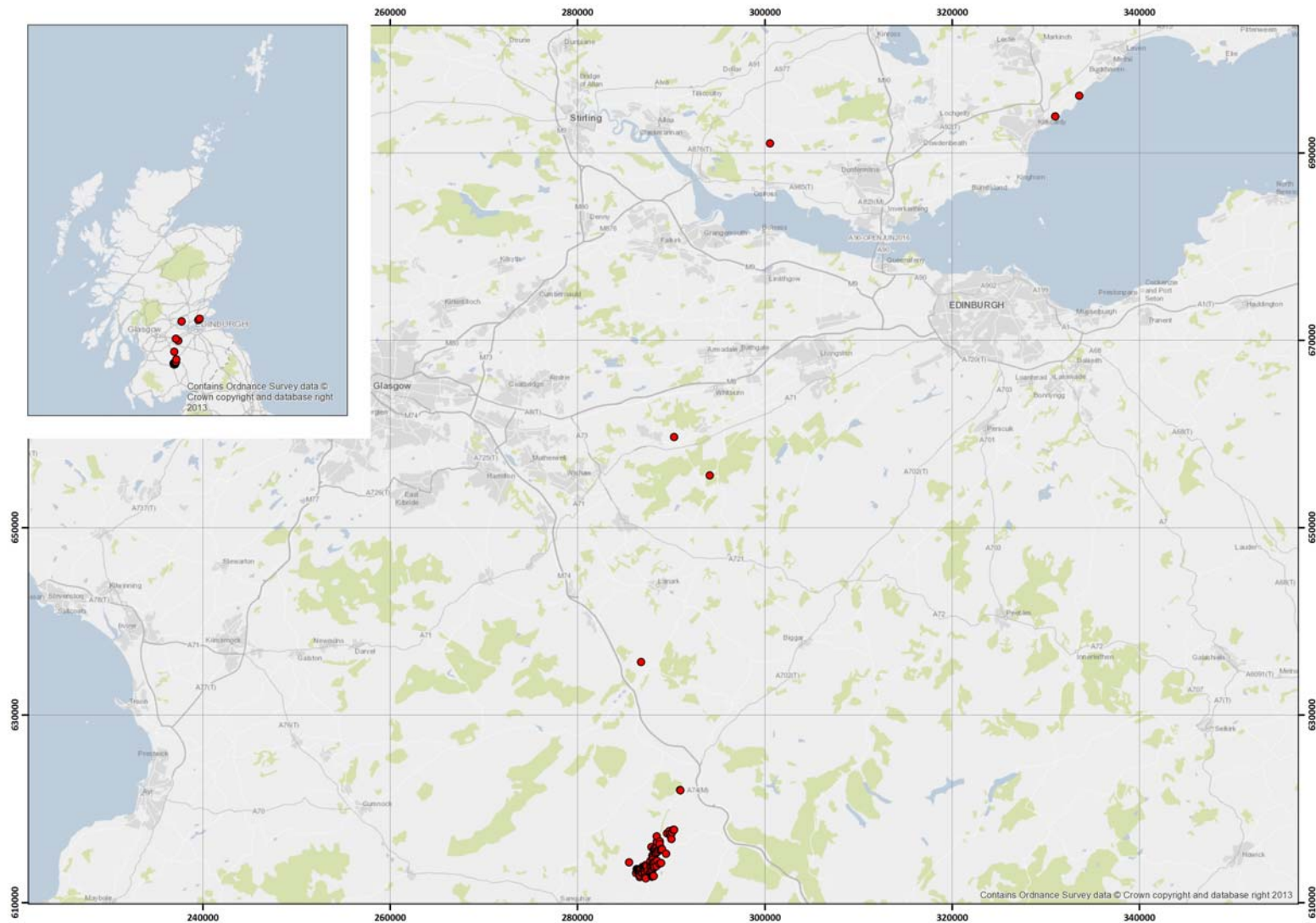


Figure 1: Distribution of inventory sites – Scotland overview

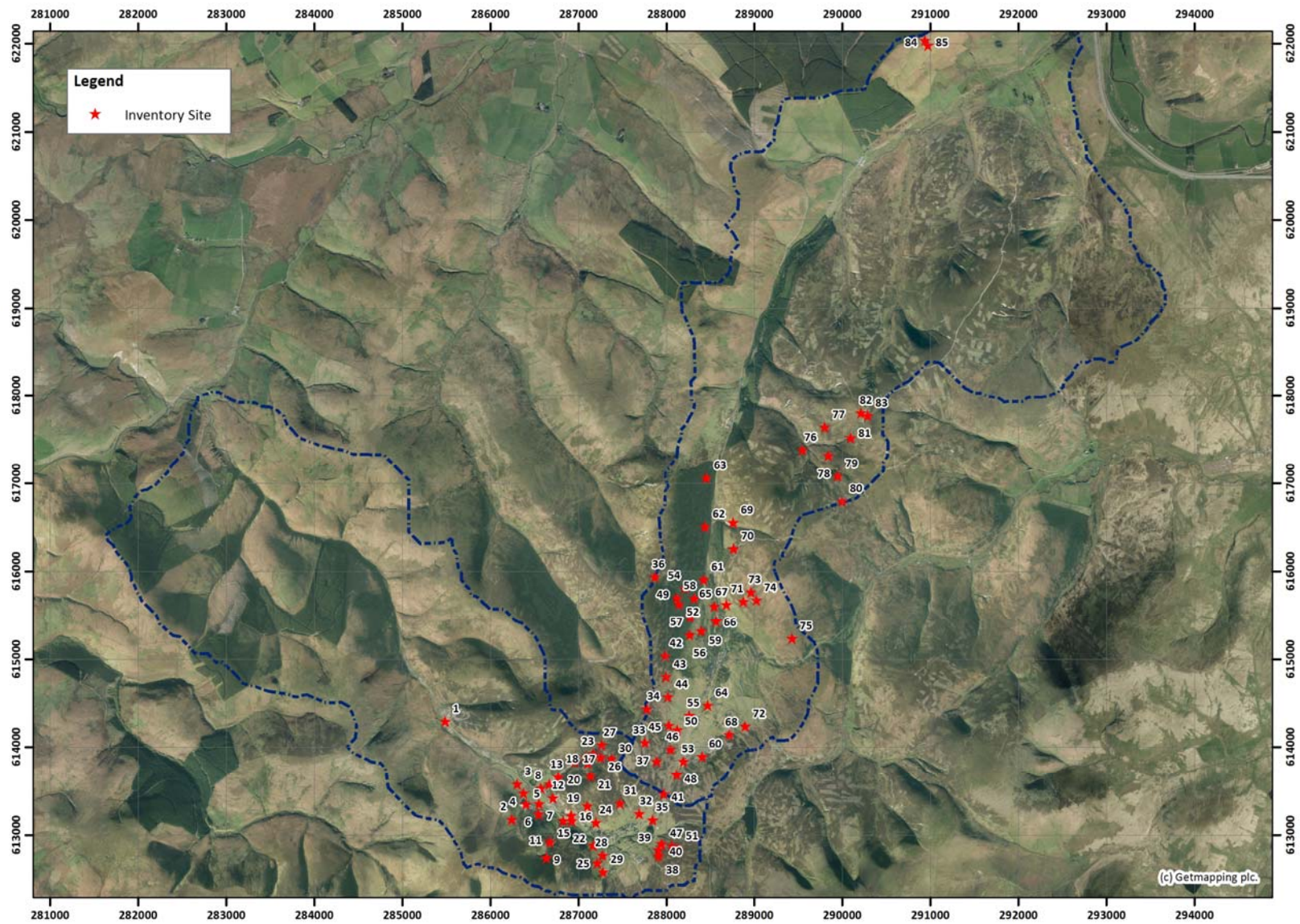


Figure 2: Distribution of water quality related inventory sites

Table 4: MWD Article 20 inventory for Scotland

UIN	BGS ID	Pit Name	Mine Type	Reason	Local Authority	Easting	Northing
1	n/a	Processing area with tailings	Lead	Water Quality	Dumfries and Galloway	285493	614291
2	175246	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	286247	613171
3	175245	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	286307	613574
4	175209	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	286380	613473
5	175240	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	286411	613348
6	175233	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	286552	613233
7	175239	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	286558	613351
8	175236	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	286576	613529
9	175222	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	286638	612743
10	175235	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	286673	613576
11	175223	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	286677	612922
12	175244	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	286713	613419
13	175237	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	286778	613658
14	175232	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	286830	613160
15	175242	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	286922	613221
16	175241	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	286927	613159
17	175238	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	286971	613826
18	175229	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	287089	613882
19	175226	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	287107	613326
20	175230	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	287113	613811
21	175201	Wanlock Dod Lead Pits	Lead	Water Quality	Dumfries and Galloway	287140	613668
22	175216	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	287172	612878
23	175228	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	287174	613922
24	175231	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	287201	613136
25	175217	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	287217	612681
26	175227	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	287260	613878
27	175202	Wanlock Dod Lead Pits	Lead	Water Quality	Dumfries and Galloway	287269	614021

UIN	BGS ID	Pit Name	Mine Type	Reason	Local Authority	Easting	Northing
28	175218	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	287279	612766
29	175221	Wanlockhead Lead Mines	Lead	Water Quality	Dumfries and Galloway	287283	612579
30	175203	Wanlock Dod Lead Pits	Lead	Water Quality	Dumfries and Galloway	287381	613864
31	175200	Wanlock Dod Lead Pits	Lead	Water Quality	Dumfries and Galloway	287474	613358
32	n/a	Spoil Area	Lead	Water Quality	Dumfries and Galloway	287697	613241
33	47244	Wanlock Dod Lead Lead Mines	Lead	Water Quality	South Lanarkshire	287760	614045
34	47247	Wanlock Dod Lead Mines	Lead	Water Quality	South Lanarkshire	287780	614430
35	175213	Belton Grain Vein	Lead	Water Quality	Dumfries and Galloway	287846	613168
36	47305	Susannah Vein Workings	Lead	Water Quality	South Lanarkshire	287875	615935
37	47241	Wanlock Dod Lead Lead Mines	Lead	Water Quality	South Lanarkshire	287895	613835
38	175249	Belton Grain Vein	Lead	Water Quality	Dumfries and Galloway	287914	612759
39	175248	Belton Grain Vein	Lead	Water Quality	Dumfries and Galloway	287915	612829
40	175250	Belton Grain Vein	Lead	Water Quality	Dumfries and Galloway	287951	612897
41	175254	Belton Grain Vein	Lead	Water Quality	Dumfries and Galloway	287972	613462
42	47287	Corbie Hall Lead Mine	Lead	Water Quality	South Lanarkshire	287990	615035
43	47288	Corbie Hall Lead Mine	Lead	Water Quality	South Lanarkshire	288000	614800
44	47249	Wanlock Dod Lead Mines	Lead	Water Quality	South Lanarkshire	288020	614570
45	47251	Wanlock Dod Lead Mines	Lead	Water Quality	South Lanarkshire	288030	614245
46	47243	Wanlock Dod Lead Lead Mines	Lead	Water Quality	South Lanarkshire	288050	613970
47	175252	Belton Grain Vein	Lead	Water Quality	Dumfries and Galloway	288065	612872
48	47231	Glengonnar Lead Mines	Lead	Water Quality	South Lanarkshire	288120	613680
49	47299	Glennery Scar Vein Workings	Lead	Water Quality	South Lanarkshire	288120	615695
50	47253	Wanlock Dod Lead Mines	Lead	Water Quality	South Lanarkshire	288125	614195
51	175253	Belton Grain Vein	Lead	Water Quality	Dumfries and Galloway	288138	612845
52	47298	Glennery Scar Vein Workings	Lead	Water Quality	South Lanarkshire	288145	615625
53	47240	Glengonnar Shaft	Lead	Water Quality	South Lanarkshire	288200	613835
54	47303	Lady Manners Scar Lead Mine	Lead	Water Quality	South Lanarkshire	288210	615808
55	47250	Wanlock Dod Lead Mines	Lead	Water Quality	South Lanarkshire	288265	614355
56	47293	Leadhills Lead Mines	Lead	Water Quality	South Lanarkshire	288270	615275

UIN	BGS ID	Pit Name	Mine Type	Reason	Local Authority	Easting	Northing
57	47295	Leadhills Lead Mines	Lead	Water Quality	South Lanarkshire	288275	615480
58	47297	Glennery Scar Lead Mines	Lead	Water Quality	South Lanarkshire	288320	615690
59	47292	Leadhills Lead Mines	Lead	Water Quality	South Lanarkshire	288400	615320
60	47239	Lead Lead Mine Hill Lead Lead Mines	Lead	Water Quality	South Lanarkshire	288411	613891
61	47302	Lady Manners Scar Lead Mine	Lead	Water Quality	South Lanarkshire	288425	615905
62	47314	Glengonnar Water Lead Mine	Lead	Water Quality	South Lanarkshire	288440	616505
63	47323	Gripps Lead Mine	Lead	Water Quality	South Lanarkshire	288455	617055
64	47254	Leadhills Lead Mines	Lead	Water Quality	South Lanarkshire	288470	614475
65	47296	Leadhills Lead Mines	Lead	Water Quality	South Lanarkshire	288550	615600
66	47291	Leadhills Lead Mines	Lead	Water Quality	South Lanarkshire	288570	615435
67	47286	Glengonnar Water Lead Mines	Lead	Water Quality	South Lanarkshire	288685	615620
68	47237	Lead Lead Mine Hill Lead Lead Mines	Lead	Water Quality	South Lanarkshire	288717	614138
69	47313	Big Wool Gill Lead Mines	Lead	Water Quality	South Lanarkshire	288760	616550
70	47308	Broad Law Lead Mines	Lead	Water Quality	South Lanarkshire	288765	616255
71	47282	Broad Law Lead Mines	Lead	Water Quality	South Lanarkshire	288880	615655
72	47257	Leadhills Lead Mines	Lead	Water Quality	South Lanarkshire	288900	614235
73	47284	Broad Law Lead Mines	Lead	Water Quality	South Lanarkshire	288965	615765
74	47283	Broad Law Lead Mines	Lead	Water Quality	South Lanarkshire	289025	615670
75	47266	Thief Slack Lead Mine	Lead	Water Quality	South Lanarkshire	289430	615235
76	47330	Wool Law Lead Mine	Lead	Water Quality	South Lanarkshire	289550	617375
77	47331	Wellgrain Dod Lead Mine	Lead	Water Quality	South Lanarkshire	289800	617635
78	47328	Middle Grain Lead Mine	Lead	Water Quality	South Lanarkshire	289845	617310
79	47326	Middle Grain Shafts	Lead	Water Quality	South Lanarkshire	289950	617080
80	47278	Wool Law Lead Mine	Lead	Water Quality	South Lanarkshire	290000	616795
81	47329	Well Grain Lead Mine	Lead	Water Quality	South Lanarkshire	290095	617515
82	47332	Wellgrain Dod Lead Mines	Lead	Water Quality	South Lanarkshire	290215	617800
83	47333	Wellgrain Dod Lead Mines	Lead	Water Quality	South Lanarkshire	290290	617770

UIN	BGS ID	Pit Name	Mine Type	Reason	Local Authority	Easting	Northing
84	47357	Drake Law Lead Mines	Lead	Water Quality	South Lanarkshire	290940	622030
85	47356	Drake Law Lead Mines	Lead	Water Quality	South Lanarkshire	290975	621970
86	17666	Frances Colliery	Coal, Deep	Instability	Fife	330990	693900
87	17580	Wilsontown Colliery Pit No 3	Coal, Deep	Instability	South Lanarkshire	294110	655600
88	22440	Douglas Colliery	Coal, Deep	Instability	South Lanarkshire	286790	635665
89	17659	Michael Colliery Pits 1 & 2	Coal, Deep	Instability	Fife	333560	696120
90	18764	Comrie Pit No. 1	Coal, Deep	Combustion	Fife	300541	691002
91	17564	Southfield Colliery	Coal, Deep	Combustion	North Lanarkshire	290300	659690

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Annex A Pro-forma Questionnaire

The Management of Extractive Waste (Scotland) Regulations 2010

Regulation 28: Information from Planning Authorities to Prepare list of Closed Mining Waste Facilities, including Abandoned Sites

A Form is to be Completed for Each Mining Waste Facility

Table 1: Planning Authority and Contact Details Etc.

Please provide details as requested to allow further contact as may be required.

	Response
Planning Authority Name:	
Planning Authority Contact Name:	
Planning Authority Contact Email:	
Date of Returning Information:	

Table 2: Locational Details for Mining Waste Facility Etc.

Information to allow all mining waste facilities to be uniquely identified and mapped to National Grid Coordinates. Some mining sites will have more than one mining waste facilities and each facilities may be known locally by one or more names. Information of any contact details held for site or mine owners or operators to be provided. Closed extractive waste facilities may be located within active operations.

Waste Facility or Mining Site Name:	
Alternative Waste Facility or Mining Site Name:	
OS Grid Reference:	
Previous Site Operator (if known)	
Site Owner (if known):	

Table 3: Initial Screening

Information to allow all mining waste facilities to be initially screened for potential risks to the environment or human health. To understand how each planning authority has been made aware of the mining waste facility. Some facilities may appear on registers held by local authorities under existing health and safety obligations or in respect of contaminated lands. Councils may also be aware of facilities through local contacts from members of the public or other interested parties. This will include consideration of any current issues of potential abandonment at surface coal mines. Also information to understand the nature of the material that would be contained in the mining waste facility in terms of the mineral that had been extracted and whether the mining waste facility will contain solid materials, liquid or slurry materials.

Has your authority been made aware of the mining waste site as a result of:	Yes	No
- being disused tips under Part II of the Mines and Quarries (Tips) Act 1969;		
- contaminated land under Part II of the Environmental Protection Act 1990;		
- Other reason (provide details);		
What is the type of material that was mined or quarried?		
Does the mine waste facility contain solid, liquid or slurry materials?		

Table 4 Instability or Environmental Impacts

To gather information on the level of understanding held by each authority on the potential risks from the waste facility in question.

	Yes	No
Is the mining waste facility a " <i>closed</i> " tip located at an operational mine as defined under the Mines and Quarries (Tips) Act 1969		
Is the mining waste facility a " <i>disused</i> " tip as defined under the Mines and Quarries (Tips) Act 1969?		
Has the facility been inspected / had a stability risk assessment undertaken? If yes, does your authority consider there is risk of significant health and safety risk?		
Has any investigation been undertaken in relation to suspended solids or other water pollution incidents in connection with the waste facility? If yes, does your authority consider there is potential for significant environmental effects?		
Any Additional Information		