

Huntley Wood Investments Ltd

**DRAINAGE CHANNEL, DRAGON PARC,
MERTHYR TYDFIL**

Coal Mining Risk Assessment

12392/LP/20/CMRA

CLIENT: **Huntley Wood Investments Ltd**

PROJECT: **Drainage Channel, Dragon Parc, Merthyr Tydfil**

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1.0 INTRODUCTION

1.1 GENERAL

Huntley Wood Investments Ltd are proposing the construction of a drainage channel along the western and southern boundary of the Dragon Parc development site as part of the flood alleviation works.

Intégral Géotechnique (Wales) Limited have been appointed as the Geotechnical Engineers to undertake a coal mining risk assessment.

This report presents the findings of the desk study and searches and sets out the Coal Mining Risk Assessment in line with the Coal Authority's guidelines.

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1.2 PROPOSED DEVELOPMENT

The proposed drainage channel is a shallow dished feature to be constructed along the western and southern boundary of the site and will be in the order of 6m wide. The outfall will be located within the southern area of the site, with discharge into the River Taff. A new site access road will also be constructed over the drainage channel to enter the site from the south and link into the existing public highway. The drainage channel will be culverted at this point.

1.3 SCOPE OF WORKS

The objectives of the coal mining risk assessment are to:

1. Present a desk-based review of all available information within this report on the coal mining issues which are relevant to the site;
2. Use the information obtained to identify and assess the risks to the proposed development from coal mining legacy, including cumulative impact issues;
3. Set out appropriate mitigation measures to address the coal mining legacy issues affecting the site, including any necessary remedial works and/or demonstrate how coal mining issues have influenced the proposed development;

1.3 SCOPE OF WORKS (CONTINUED)

4. Demonstrate to the Local Planning Authority that the application is, or can be made safe and stable to meet the requirements of the National Planning Policy Framework and the requirements of the Coal Authority in respect of their determination of planning application consultations;
5. Minimise the risks and effects of land instability on properties, infrastructure and the public;
6. Help to ensure that various types of development should not be placed in unstable locations without appropriate precautions;
7. Bring unstable land, wherever possible back into productive use; and
8. Assist in safeguarding public and private investment by a proper appreciation of site conditions and necessary precautionary measures.

This report has been prepared in general accordance with the Coal Mining Risk Assessment Model Report Template and intends to demonstrate to the Local Planning Authority and the Coal Authority that the site is, or can be, made safe and stable, and to meet the requirements of the National Policy Planning Framework (NPPF).

The desk study comprised a review of:

- Old Ordnance Survey maps covering the site;
- British Geological Survey records;
- A Coal Authority Mining Report;
- Shaft Plan and Data Sheets;
- Abandonment Plans;
- Geological maps of the area provided by the British Geological Survey; and
- Existing site investigation data.

1.4 LIMITATIONS

This document is intended to be a working document for further development in discussion with all concerned including the Local Planning Authority and Coal Authority.

2.0 THE SITE

2.1 SITE LOCATION AND DESCRIPTION

The area of the proposed drainage channel is located along the western and southern areas of the proposed larger Dragon Parc development site in Abercanaid, at a National Grid Reference of 305378, 204204, see Figure 1.

The site is irregular in shape and occupies an area of approximately 2.7 hectares. The boundaries of the site are defined by the Dragon Parc development site and the River Taff to the east, existing commercial developments to the north, existing commercial developments, undeveloped land and an existing road to the west and an existing road to the south, see Figure 2.

The site is situated on the former floodplain of the River Taff with the site levels raised to the current elevation of approximately 158m AOD.

In the western area of the site, the hardstanding remained in-situ. A concrete bund around the former above ground tanks also remained, with the bund filled with water. A small building was also located in the western area.

The southern area was occupied by a former office building, which was being demolished during the 2019 site investigation works.

There are heavily vegetated areas along the boundaries of the site in the vicinity of the proposed drainage channel.

2.2 SITE OPERATIONS

The site has no current site operations with the site cleared in preparation for reclamation and redevelopment.

2.3 SURROUNDING LAND USE

The site lies in an area of mixed residential and commercial use. The River Taff lies to the east of the site.

2.4 AVAILABLE SITE INVESTIGATION DATA

Intégral Géotechnique (Wales) Limited has completed the following reports for the larger Dragon Parc site:

- Desk Study Report, Ardagh Metal Packaging, Abercanaid, Merthyr Tydfil, dated February 2016 (Reference: 11708/LW/16/DS).
- Coal Mining Risk Assessment, Ardagh Metal Packaging, Abercanaid, Merthyr Tydfil, dated February 2016 (Reference: 11708/LW/16/DS).

An intrusive site investigation was subsequently undertaken on behalf of Huntley Wood Investments Ltd with the findings reported in Report Ref: 12392/LW/19/SI, dated April 2019. As with the previous reports, this report covered the larger Dragon Parc site.

The intrusive site investigation included the excavation of trial pits and the drilling of deeper rotary probeholes. Four of the rotary probeholes (PH1, PH4, PH5 and PH10) were drilled in the vicinity of the proposed drainage channel. Coal was encountered in PH1 between 17.0m and 18.4m depth, in PH5 between 16.0m and 17.3m depth and PH10 between 19.7m and 21.0m depth. Old workings were encountered with PH4 in the vicinity of the mine entries on the southwest boundary of the site between 17.5m and 19.1m depth. Only 6m of rock cover was encountered above these workings within PH4.

Copies of the probehole logs from within the site and the wider site area and a location plan are presented in Appendix A.

3.0 SITE HISTORY

The recent history of the site has been traced with the aid of available historical maps which were contained within the Envirocheck which was previously obtained for the larger site area. The area of the proposed drainage channel will be referred to as “the site”.

The earliest edition of the map dated 1884 indicated the site to be occupied by a number of residential properties known as Abercanaid Houses. A dock crossed the western boundary of the site to the north of the houses. A network of tramways running on raised embankments, probably comprising colliery spoil, entered the site from the dock where they looped around the houses to reach Upper Abercanaid Pit (Coal) located on the southwest boundary of the site. The pit had associated buildings including an engine house and boiler house which encroached across the southwest boundary of the site. Shafts and air shafts were also indicated in the vicinity of the buildings, some of which were indicated to be on site. Spoil heaps were indicated within the site around the colliery buildings and tramways. Larger spoil mounds were indicated to the east of the site. A stream was indicated to cross the site from the west, in between Abercanaid Houses and Upper Abercanaid Pit, flowing in a south easterly direction towards the River Taff. In parts it flowed beneath tramways and spoil heaps most likely within a culvert. The canal and associated tow path flowed to the west and southwest of the site. Beyond the canal to the west, southwest and south were a number of old quarries, old coal levels, shafts and air shafts. An old shaft was also indicated adjacent to the eastern boundary of the northern site area. The River Taff flowed to the east of the site with the Taff Vale Railway located beyond.

The 1900 edition of the map indicated Abercanaid Houses to have been demolished and replaced with additional tramways, running along the south western boundary of the site, and spoil heaps. The buildings which formed Upper Abercanaid Pit had expanded. A new development of Engine Houses was also now present within the northern area of the site in the vicinity of the old shaft. The stream which crossed the site had been culverted further and was now only evident at the surface within the southeast area of the site.

The 1919 edition of the map indicated all the colliery buildings were no longer present on site with Upper Abercanaid Pit now disused. Evidence of old shafts remained on the southwest boundary of the site, one within the site boundary and one just encroaching across the boundary. An old shaft was also indicated just to the east of the northern area of the site. Additional spoil heaps were indicated to be present within the site and extending across the wider area to the east. A new road was constructed into the site from the southeast corner. The canal to the west and southwest was disused by this time.

The 1964 edition of the map indicated the site and the wider area to the east was almost entirely covered with spoil heaps. The site was also crossed by small access tracks.

3.0 SITE HISTORY (CONTINUED)

The 1972 edition of the map indicated the spoil heaps to be a Tip (disused). A pipeline crossed the southern area of the site on an east west orientation. Overhead electricity lines were also shown to cross the site. A new road was constructed across the northern area to access a factory which had been constructed adjacent to the western boundary.

By 1979 the site and the areas to the east had been cleared of colliery spoil. The overhead electricity lines had been removed from across the site. There was also no longer any indication of the pipeline. A new factory had been constructed to the north of the site by this time.

The 1986 edition of the map indicated a large factory unit to have been constructed to the east of the site, just encroaching across the eastern boundary. A smaller building with associated tanks were constructed within the central area in between the large factory unit and the western boundary. A pond was also indicated to be present adjacent to the building. Another building was constructed within the southeast area of the site with associated hardstanding/car parking areas.

The site remained relatively unchanged over the subsequent years although the factory units in the vicinity of the site continued to expand. The large factory building which encroached across the eastern boundary of the site was indicated to have been demolished by 2015. The building within the site adjacent to the western boundary was demolished by 2016. The building which occupied the southeast corner of the site was demolished by 2019. The site has remained covered with hard surfacing and scrub vegetation up until the present day.

4.0 SITE ENVIRONMENTAL SETTING

4.1 PHYSICAL SETTING

The site is situated on the former floodplain of the River Taff with the site levels raised to the current elevation of approximately 158m AOD.

4.2 GEOLOGY

The 1:10,560 scale geological map of the area (Sheet SO 00 SE) shows the site is underlain by rocks of the South Wales Middle Coal Measures of Carboniferous age. The rocks comprise grey mudstone and siltstone with several productive coal seams. The map indicates that these strata dip in a southerly direction in the area, with recorded dips of 10° indicated to the south of the site.

The map indicates the conjectural outcrops of five coal seams at or near the site. In the southern to central area of the site, outcrops of the Two Feet Nine, Four Feet, Upper Six Feet and Lower Six Feet are indicated to be present. The outcrops of the Nine Feet and Bute seams are indicated to be present in the vicinity of the sites northern boundary.

The site is therefore likely to be underlain at shallow depths by all of the above named coal seams. The northernmost part of the site may also be underlain at shallow depths by the Yard and Seven Feet seams, which typically lie some 25 to 30m below the Nine Feet seam.

The generalised vertical section of the geological map shows that all these coal seams have potentially workable seam thickness, as follows:

Coal Seam	Typical Seam Thickness (m)
Two Feet Nine	0.75
Four Feet	1.80
Upper Six Feet	0.90
Lower Six Feet	1.20
Nine Feet	3.65
Bute	1.20
Yard	0.75
Seven Feet	1.20

An extract from the geological map is presented on Figure 3.

Most of these seems are known to have been mined in the area and each of these seams is likely to underlie part of the site at shallow depths.

4.2 GEOLOGY (CONTINUED)

The geological map indicates that superficial deposits of Alluvium of the Quaternary period overlie the rock strata in the northern and south eastern areas of the site. These deposits typically comprise clay, silt, sand and gravel deposited by a river, stream or other body of running water as a sorted or semi-sorted sediment. Normally soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel. A stronger, desiccated surface zone may be present. Superficial Devensian Till deposits of the Quaternary period overlie the rock strata in the western and south western areas of the site. These deposits typically comprise poorly sorted and variable clays, sands and gravel.

Made ground comprising predominantly colliery spoil would be anticipated across the site and the surrounding area.

A summary of the anticipated geological succession is given below in Table 1.

Table 1: Summary of Anticipated Site Geology		
Geological unit	Horizon	Description
Recent	Made ground	Various materials but likely to contain colliery spoil
Quaternary	Alluvium (Northern and south eastern)	Clay, silt, sand and gravel deposited by a river, stream or other body of running water as a sorted or semi-sorted sediment. Normally soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel. A stronger, desiccated surface zone may be present
	Devensian Till (Western and south western)	Poorly sorted and variable clays, sands and gravel
Carboniferous	South Wales Middle Coal Measures	Grey mudstone and siltstone with several productive coal seams

4.3 MINING

A Coal Authority mining report has been obtained for the site and is presented in Appendix B.

An appraisal of the mining data and its significance is presented below.

4.3 MINING (CONTINUED)

Past Underground Coal Mining

The Coal Authority states the *“The property is in a surface area that could be affected by underground mining in 3 seams of coal at shallow to 140m depth, and last worked in 1950.*

The recorded workings at shallow to 140m depth are thought to be within the Seven Feet, Nine Feet and Four Feet coal seams.

Present Underground Coal Mining

The Coal Authority states the *“The property is not within a surface area that could be affected by present underground mining”.*

There are no issues regarding current workings.

Future Underground Coal Mining

The Coal Authority states the *“The property is not in an area where the Coal Authority has received an application for, and is currently considering whether to grant a licence to remove or work coal by underground methods.”*

“The property is not in an area where a licence has been granted to remove coal using underground methods”.

“The property is not in an area likely to be affected from any planned future underground coal mining. However, reserves of coal exist in the local area which could be worked at some time in the future”.

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

There are no issues regarding future workings.

Mine Entries

The Coal Authority states that *“Within or within 20m of, the boundary of the property there are 6 mine entries, the approximate positions of which are shown on the enquiry boundary plot”.*

The following information is provided for the mine entries:

4.3 MINING (CONTINUED)

- 305204-036** This shaft was filled grouted and capped in 1975.
- 305204-038** This shaft was filled grouted and capped in 1975.
- 305204-069** No treatment details.
- 305204-030** Information provided to the Coal Authority by British Coal indicated this shaft is filled.
- 305204-060** Uncovered during road improvements, we understand this adit was treated by K Wardell and Partners Consultant Mining Engineers.
- 305204-037** This shaft was filled grouted and capped in 1975.

More detailed locations of these mine entries, based on additional maps and reference to the historical maps and abandonment plans have been geo-fixed and the best estimate of the locations are shown on Figures 2 and 4.

The more detailed plans of the mine entry locations indicate a cluster of entries on the southwest boundary of the site. Based on the available information only shaft 305204-038 is considered to be on site located adjacent to, or possibly on the line of the proposed drainage channel. Shafts 305203-037 and 305204-036 are indicated to be on the boundary of the site but potentially still within an influencing distance of the drainage channel. Shaft 305204-030 is located off site. Adit 305204-060, which is indicated to trend away from the site, could not be positioned more accurately with no additional information on the historical maps, although it was uncovered during road improvement works. It could therefore be located within the influencing distance of the drainage channel, but is considered unlikely. Adit 305204-069 is indicated on the eastern boundary of the central area of the site and could be located within an influencing distance of the drainage channel. However, its location is indicated to be too far from the drainage channel based on the information we have.

Coal Mining Geology

The Coal Authority states that *"The Coal Authority is not aware of any damage due to geological faults or other lines of weakness that have been affected by coal mining"*.

There are no issues regarding faults in the area.

Past Opencast Coal Mining

The Coal Authority states that *"The property is not within the boundary of an opencast site from which coal has been removed by opencast methods"*.

There are no issues regarding past opencast workings.

4.3 MINING (CONTINUED)

Present Opencast Coal Mining

The Coal Authority states that *"The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods"*.

There are no issues regarding present opencast workings.

Future Opencast Coal Mining

The Coal Authority states that *"There are no licence requests outstanding to remove coal by opencast methods within 800 metres of the boundary". "The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted"*.

There are no issues regarding future opencast workings.

Coal Mining Subsidence

The Coal Authority states that *"The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994. There is no current Stop Notice delaying the start of remedial works or repairs to the property"*.

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

There are no recorded instances regarding subsidence.

Mine Gas

The Coal Authority states that *"The Coal Authority has no record of a mine gas emission requiring action"*.

There are no issues regarding mine gases. However, gas evolution from coal seams and accumulated sources such as abandoned tunnels and workings cannot be discounted and will require further assessment.

Hazards Related to Coal Mining

The Coal Authority states that *"The property has not been subject to remedial works, by or on behalf of the Coal Authority, under its Emergency Surface Hazard Call Out procedures"*.

There are no instances of subsidence related remedial works recorded for the area.

4.3 MINING (CONTINUED)

Overall Assessment

Extracts from abandonment plans, which have been obtained from the Coal Authority, are presented in Figures 5, 6 and 7. These plans indicate recorded workings in the Four Feet seam in the southwest of the site, the Nine Feet seam in the west/centre and southern areas and workings of the Seven Feet seam beneath the majority of the site. The northern area of the site remains clear of recorded workings.

There is therefore conclusive evidence to suggest that shallow coal mining has extensively taken place beneath the site and that mine shafts and adits are located on site, or near the site, associated with this activity.

Intrusive site investigation works have been undertaken within the site and one probehole (PH4) encountered evidence of old workings at depths of between 17.6m and 19.1m below existing ground level. Within borehole PH5, soft drilling conditions with poor returns was encountered directly below a coal seam at depths of between 17.3m and 18.1m below existing ground level. These probeholes were located within southwest area of the site in the vicinity of a cluster of mine entries.

The Coal Authority online viewer indicates that the whole site is classified as a high-risk development area. The high-risk classification is due to the presence of recorded shallow workings within the area, the presence of the mine entries and the possible presence of unrecorded shallow workings.

5.0 ASSESSMENT OF MINING CONSTRAINTS

5.1 RISKS FROM MINING LEGACY

The desk study search of the various coal mining information and maps identifies the following site-specific coal mining legacy risks to the site, see Table 2.

Table 2: Mining Legacy Risk Table				
Coal Mining Issue	Yes	No	Risk Assessment	
			Rating	Comments
Underground coal mining (recorded at shallow depths)	X		High risk	Recorded workings and roadways presented on the Coal Authority mine abandonment plans, of the Four Feet Seam, Nine Feet Seem and Seven Feet Seam.
Underground coal mining (probable at shallow depths)	X		High risk	Recorded workings and roadways presented on the Coal Authority mine abandonment plans, of the Four Feet Seam, Nine Feet Seem and Seven Feet Seam. Workings also identified at within the south west area of the site. Additional unrecorded workings possible beneath the site.
Mine entries (shafts)	X		High risk	Cluster of shafts indicated on the southwest boundary of the site all indicated to have been filled, grouted and capped in 1975. Shafts will need to be located.
Mine entries (adits)	X		High risk	Two adits indicated within influencing distance of the site. One on the eastern boundary of the central area of the site and one on the southwest boundary possibly within influencing distance of the drainage channel. Adits will need to be located.
Coal mining geology (faults and fissures)		X	Low risk	None recorded
Record of past mine gas emissions or potential	X		Moderate risk	All mine workings pose a potential gas risk which should be considered in any future investigations and development.

5.1 RISKS FROM MINING LEGACY (CONTINUED)

Table 2: Mining Legacy Risk Table (Continued)				
Coal Mining Issue	Yes	No	Risk Assessment	
			Rating	Comments
Recorded coal mining surface hazard		X	Low risk	None recorded.
Surface mining (opencast workings)		X	Low risk	None recorded.

A summary of the risk posed by these features is summarised after thorough analysis of the information sources. Comment on each specific coal mining issue follows below:

5.2 RISKS FROM ABANDONED MINeworkings

Coal mining at depths shallower than 30m beneath ground level can pose constraints to development in the form of ground stability at the surface. The magnitude of this effect depends upon the exact depth of any workings, the thickness of competent rock cover and the extraction thickness of any coal mine workings.

The drilling works undertaken has shown that shallow coal seams are located across the site with an area of shallow coal mining workings encountered in the south western and western area.

To ensure that structures constructed over mine workings are not affected by subsidence associated with past mining, a rock head cover of ten times the maximum void depth of the workings is generally required.

Garrard and Taylor (1988) presented the results of a study of abandoned workings found at British opencast sites and concluded, by a combination of theoretical and empirical analysis, that the upper limit of migration was controlled by the formation of stable arches, not choking by bulked collapse debris. Height of migration was generally limited to less than $3W$, where W is the width of the void. It would be comforting if a deterministic upper bound to crownhole formation could be derived. However, there will be cases where no stable arch can form, e.g. in shattered or faulted zones with groundwater ingress and where no bulking occurs. Further, in these cases washing away of collapse debris by water moving through the mine, or by slipping to a greater depth down steeply inclined workings, may occur. The height of migration in these worst cases is indeterminate and could greatly exceed the limits derived from deterministic models. It follows that there is no 'safe limit', merely a decreasing probability of subsidence as cover to workings increases. In practice, for gently dipping strata in South Wales the effective upper bound of migration of crown holes appears to be in the range $6T$ to $8T$, where T is the height of the original void. However, in more than 75% of cases, the height of void migration was less than $2T$.

5.2 RISKS FROM ABANDONED MINEWORKINGS (CONTINUED)

Drift deposits also appear to have a mitigating effect on the process. Very few examples of crown holing in South Wales have been found where the chimney has migrated up through more than 5.0m of drift cover.

Based on the above, the mining risk by area at the site can be determined. The areas for which the mining risk has been determined is illustrated on Figure 8.

Western/South Western Area

Within the south western and western area of the site, shallow coal seams including old workings were encountered during the drilling of the rotary boreholes.

The coal seams were encountered at depths of between 16m and 23.2m below existing ground level and typically at a thickness of 1.3/1.4m.

Evidence of mine workings were encountered within one borehole (PH4) at a depth of 17.9m below existing ground level, within a recorded thickness of 1.6m. Within borehole PH5, soft drill conditions with poor returns were noted below an intact coal seam at a depth of 17.3m below existing ground level.

These coal seams and mine workings noted above are thought to be associated with the Four Feet Seam.

Abandonment plans obtained from the Coal Authority show the workings of the Four Feet Seam below the south western area of the site. These abandonment plans indicated that these workings of the Four Feet were located at a depth of 20m.

The abandonment plans for the Four Feet seam also indicate a sudden stopping of the workings and no further advancement of the workings much beyond the site area. This indicates that a possible fault or faults run to the east of the site and prevented further advancement of mine workings of the Four Feet Seam.

Within the area, rockhead was encountered at depths of between 10.2m and 16.8m. Based on the 10:1 ratio for the thickness of rock cover to void height required to prevent potential subsidence migrating up from workings to the surface as previously discussed, and based on the 1.6m thick workings encountered within the borehole, a minimum 16m of rock cover would be required above the recorded workings.

Therefore, based on the site investigation works undertaken to date, there is insufficient rock cover.

5.2 RISKS FROM ABANDONED MINeworkINGS (CONTINUED)

Further to the above, the Coal Authority Abandonment Plans indicate that there are associated roadways recorded below the area which potentially, may be wider or taller than the workings, and therefore a greater thickness in rock cover would be required.

Given the presence of shallow coal seams, shallow coal mine workings and insufficient rock cover identified, it is recommended that specific proof drilling is undertaken along the line of the proposed drainage channel and based upon these results, a specific drilling and grouting exercise is completed across the area to stabilise the mine workings identified.

Northern Area

Within the northern area, shallow coal seams were encountered within the boreholes at depths of between 14.9m and 21m below existing ground level. These seams were encountered as intact and either considered of a seam at a typical thickness 0.8m/1.2m or a series of thinner seams at a typical thickness of 0.2/0.3m.

These seams are possibly associated with the Six Feet seams, that are thought to underlie the northern and central areas of the site at shallow depths. The Coal Authority has no records of workings within the Six Feet seams. However, the coal seams encountered in the northern area of the site are of a workable thickness and located at shallow depths and therefore there may be unrecorded shallow workings located in this area.

It is recommended that further rotary open boreholes are drilled in the northern area of the site to provide a further understanding of the depth to rock head, the presence of shallow seams and any associated workings.

The Coal Mining Risk Assessment undertaken for the larger Dragon Parc area identified that the Nine Feet Seam and Seven Feet Seam may underlie the northern site area at shallow depths and therefore there is the possibility of shallow unrecorded workings.

The Nine Feet seam and the underlying Seven Feet seam were not encountered within the 30m depth of the boreholes in the vicinity of the northern site area. This indicates that the Nine Feet seam and the Seven Feet seam do not underlie the site within shallow depths.

South Eastern Area

The boreholes drilled in the vicinity of the area, encountered coal seams at depths of between 19.7m and 21.8m below existing ground level, with typical seam thickness of 0.7m/1.4m. The coal seams were encountered as intact. Rockhead was encountered at depths of between 16.9m and 17.8m.

5.2 RISKS FROM ABANDONED MINeworkINGS (CONTINUED)

As previously stated, the Nine Feet seam and Seven Feet seam were historically mined in the southern area of the site. The Coal Authority abandonment plans indicated that the Nine Feet seam recorded mine workings were typically at a depth of 76m below the site and the recorded workings of the Seven Feet seam at typically depths of 122m below ground level. At these depths the mine workings do not pose a risk to the proposed drainage channel.

The Two Feet Nine Seam is also suspected to outcrop just to the north of the southern area of the site. However, although recorded workings in the Two Feet Nine seam are indicated on the Coal Authority abandoned plans for the Four Feet Seam, no Two Feet Nine seam workings are indicated to be present below the site.

Further to the above, previous site investigations undertaken by Intégral Géotechnique to the south of the site, indicated that the Two Feet Nine seam is likely to outcrop further south than indicated on the geological map, possibly beneath the southern tip of the site.

However, there could be further unrecorded workings of the Four Feet Seam located in the southern area of the site. Therefore, due to the potential for unrecorded shallow mine workings, it is recommended that further rotary open boreholes are drilled along the line of the drainage channel in this area, to provide a further understanding of the depth to rock head, the presence of shallow seams and any associated unrecorded mine workings.

5.3 RISKS FROM THE ABANDONED MINE ENTRIES - SHAFTS

A cluster of shafts are indicated on the southwest boundary of the site and another shaft is indicated off site to the south. The presence of the mine entries recorded by the Coal Authority may have the potential to cause localised instability.

The shafts in their current state will require accurate identification during site preparation. An inspection of the adequacy of the structural cap by a Qualified Structural Engineer should be carried out with remedial works executed as required.

Until recently, shafts were rarely treated on abandonment to any significant engineering standard. They were typically loosely backfilled, or with inferior capping constructed over them. With time, backfills may settle and caps fail, resulting in significant ground loss. Therefore, if a shaft lies partly or wholly within the site, or within a 20m buffer zone drawn outside the site boundary, then its effect should be considered in the site development. The size of buffer or no development zone, will depend on the diameter of the shaft, the depth to rockhead and an assessment of the shaft's condition.

5.3 RISKS FROM THE ABANDONED MINE ENTRIES – SHAFTS (CONTINUED)

After the validation of the shaft caps, and, depending on their condition, an approximately 17m radius exclusion zone for structures should be applied based on the rockhead depths recorded at PH1, PH4, PH5 and PH10. However, this radius should be reviewed during the reporting of the validation works.

Three shafts are indicated on the south western boundary of the site. All three shafts are indicated to have been filled, grouted and capped in 1975. Based on the available information two of the shafts could lie just off site, but could still be within the 17m exclusion zone. Shaft 305204-038 is likely to be located on site, adjacent to, or on the proposed route of the drainage channel.

Works would be required to accurately locate these shafts prior to development. As well as determining their exact location, a validation of the shaft caps would also be required.

The development site sits within a historical mining area and therefore there is a residual risk of unrecorded mine entries to be present on site. All site operatives should be made aware of this potential risk and a watching brief should be maintained during site works.

5.4 RISKS FROM THE ABANDONED MINE ENTRIES - ADITS

Two adits are indicated either on site or adjacent to the boundary. Adits are inclined mine entrances which typically vary in diameter between 2m and 4m.

Until recently, adits were rarely treated on abandonment to any significant engineering standard. It is likely that the entrance has been treated beneath the site but the remainder of the adit roadway may be left intact. They may be loosely backfilled, or partially collapsed. Therefore, if the adit is located within influencing distance of the surface then treatment may be required. Normal procedure would be a 20m buffer zone drawn parallel to the feature within a development site. The size of buffer or no development zone, will depend on the diameter of the adit, the depth to rockhead and an assessment of the adit's condition.

One adit (Ref. 305204-069) is located adjacent to the eastern boundary of the central area of the site and not likely to be located within an influencing distance of the drainage channel. A further mine adit (305204-060) is located on the south western site boundary and trending away from the site to the southwest. Coal Authority records indicates this mine adit was uncovered treated by K Wardell and Partners Consultant Mining Engineers during road improvement works, as such this feature should not be a risk to the drainage channel

Provisions should be made to accurately locate adit ref. 305204-069 and to deal with any roadways associated with the adit, if it is found to encroach into the drainage channel area.

5.4 RISKS FROM THE ABANDONED MINE ENTRIES – ADITS (CONTINUED)

The development site sits within a historical mining area and therefore there is a residual risk of unrecorded mine entries to be present on site. All site operatives should be made aware of this potential risk and a watching brief should be maintained during site works.

5.5 COAL MINING GEOLOGY (FAULTS AND FISSURES)

No known fissures or break lines are known to affect the development site.

No seam mentioned in this report is recorded as being prone to spontaneous combustion.

5.6 RECORD OF PAST MINE GAS EMISSIONS OR POTENTIAL

There are no recorded past gas emissions recorded in the surrounding area. It should be noted that coal seams and coal mine workings pose a potential gas risk which should be considered in any future investigations and development.

At development sites with shallow coal workings, probable shallow coal mine workings, or pathway features such as mine entries and geological disturbances on or nearby the site, the Coal Authority recommends that a more detailed gas risk assessment to be undertaken in accordance with relevant guidance.

5.7 RECORDED COAL MINING SURFACE HAZARD

None recorded.

5.8 SURFACE MINING (OPENCAST WORKINGS)

None recorded.

5.9 DEVELOPMENT RISK PLAN

Based on the available information, the western and south/south western area is underlain by underground mine workings. It is proposed that a proof drilling and grouting stabilisation works are undertaken along the route of the proposed drainage channel.

Further rotary boreholes are recommended along the route of the drainage channel, to supplement the existing information, to confirm the potential risk from underground mine workings.

5.9 DEVELOPMENT RISK PLAN (CONTINUED)

The mine entries located on site, or on the site boundaries, particularly the shaft located on the south western boundary of the site, present a risk that would require further investigation to determine their exact location and condition.

Allowances may also become required to reroute the proposed drainage channel to avoid any exclusion zone that is determined following the accurate location of the mine entry.

5.10 DEVELOPMENT PRECAUTIONS

Site Investigation and/or Remediation

Due to the presence of recorded mine workings at shallow depths additional intrusive site investigation will be required. The extent, depth and condition of any seams should be proved along the route of the drainage channel by drilling a series of boreholes.

In addition, the location of the adits and shafts should be proven, taking into account the likely discrepancies in their location as well as the depth to rockhead and the extent of the roadways extending from these adits, in order to allow for an appropriate remedial strategy and development standoff to be accounted for.

The site investigations will need to be carried out by a competent contractor, taking into account the findings of this report. The results should be interpreted by a qualified and competent person so that an appropriate remedial strategy can be developed.

If any of these recommended boreholes should encounter significant voids, localised drilling and grouting stabilisation measures, or more proof drilling may become required. Bearing in mind the nature of the shallow workings, the most likely ground remediation/stabilisation strategy would be grout injection to fill any mine void spaces that could lead to ground instability in or around the proposed development. This strategy would have to be designed by a qualified and competent engineer and carried out by a qualified and competent contractor. It is anticipated that drilling and grouting is likely to be required within parts of the site based on the available existing information.

The mine entries located on site will require locating and investigating to confirm their current state.

The investigation works should take into consideration that the adit portals or shafts may be a greater distance from their plotted position than the Coal Authority's maximum 10m departure distance.

5.10 DEVELOPMENT PRECAUTIONS (CONTINUED)

The occurrence of unrecorded mine entries across the whole of the site cannot be discounted and consequently in areas of new build development a watching brief should be maintained throughout the site works to identify this risk. As a result, all site operatives should be made aware of this potential risk.

Coal Authority Permit

Any intrusive activities, including initial site investigation boreholes and any subsequent treatment of coal mine workings/coal mine entries for ground stability purposes require the prior written permission of the Coal Authority.

6.0 ENVIRONMENTAL RISK ASSESSMENT

There are several environmental hazards associated with the grouting of mine workings and a hazard assessment is presented in Table 3 below.

Risk mitigation measures will need to be implemented to manage groundwater and mine gasses that may be encountered during the works. Consideration will also need to be given to the impact of PFA grouts on groundwater quality. A CIRIA 552 risk assessment table is presented below and demonstrates how these risks can be addressed.

6.0 ENVIRONMENTAL RISK ASSESSMENT (CONTINUED)

Table 3: Preliminary Conceptual Site Model / Conceptual Exposure Model

Source	Pathway	Receptor	Consequence of risk being realised	Probability of risk being realised	Risk Classification	Potential risk management requirements / options
Displacement of groundwater by grout or fill	Mineworkings and fractures / discontinuities	Secondary aquifer	Minor	Unlikely	Very Low risk	Research suggests groundwater constituent monitoring in the Coal Measures has not indicated the presence of contamination. An assessment of groundwater constituent fate and transport may be required. Unlikely that the site is impacting off site receptors. It may be necessary to undertake a programme of physical and chemical groundwater monitoring of voids during and after any grouting works.
		Culverts	Minor	Unlikely	Very Low risk	Research suggests groundwater constituent monitoring in the Coal Measures has not indicated the presence of contamination. An assessment of groundwater constituent fate and transport may be required. Unlikely that the site is impacting off site receptors. It may be necessary to undertake a programme of physical and chemical groundwater monitoring of voids during and after any grouting works.

6.0 ENVIRONMENTAL RISK ASSESSMENT (CONTINUED)

Source	Pathway	Receptor	Consequence of risk being realised	Probability of risk being realised	Risk Classification	Potential risk management requirements / options
PFA based grout	Groundwater	Secondary Aquifer	Minor	Unlikely	Very Low risk	Check quality of proposed PFA sources. Prevent break out to River Taff through superfcials. Care taken near existing sewer pipes to avoid damage
	Break out through superfcials	River Taff	Medium	Low Likelihood		
Sediment laden drilling flush	Surface water run-off, overland flow	Drains and water courses	Medium	Likely	Moderate risk	The drilling contractor must have a methodology to reduce the risk of overland flow developing to a practical minimum and if overland flow does develop a procedure to stop and or mitigate any harmful impacts
Displacement and or release of mine gases	Boreholes, mineworkings, discontinuities in the rock mass and superficial deposits. Accumulation in enclosed spaces of future buildings on site, or migration to buildings off site, leading to asphyxiation, or risk of explosion Inhalation	Future site residents/ neighbouring residents	Severe	Unlikely	Moderate / Low risk	CIRIA 665 assessment may be necessary to include instrumentation, and gas monitoring programme and risk assessment
		Construction workers	Severe	Low likelihood	Moderate risk	Personal monitoring to be implemented by site operatives during the investigation and drilling and grouting works. Boundary monitoring in boreholes containing monitoring standpipes.
Shallow soil and groundwater contamination	Dermal contact, ingestion and inhalation hazardous soil constituents	Construction workers	Medium	Likely around shafts	Moderate risk	Gross contamination unlikely on site but precautions in line with those set out in HSG66 and in accordance with a yellow site under BDA guidelines should be followed. All construction workers should be provided with appropriate levels of PPE to mitigate the risk of contact with potentially contaminated soils.

APPENDIX A

AVAILABLE SITE INVESTIGATION DATA

		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc				Project No.: 12392		Borehole No.: PH1 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Huntley Wood Investments				Coordinates: 305481.00mE 204058.00mN		Hole Type: RO	
Equipment: Klemm 802				Diameter of Casing: 150mm				Level: 153.00mAOD		Scale 1:200	
Diameter of Boring: 142mm				Depth of Casing: 10.00m				Dates 25/03/2019 - 26/03/2019		Logged By: DT	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD	FI						
											MADE GROUND (Driller's Description)	1
												2
												3
												4
												5
							5.60	147.40			TILL (Driller's Description)	6
												7
												8
												9
												10
							10.20	142.80			SANDSTONE (Driller's Description)	11
												12
												13
												14
												15
												16
							17.00	136.00			COAL (Driller's Description)	17
							18.40	134.60			SANDSTONE with mudstone bands (Driller's Description)	18
												19
												20
												21
												22
												23
												24
												25
												26
												27
												28
												29
							30.00	123.00			End of Borehole at 30.00 m	30
											31	
											32	
											33	
											34	
											35	
											36	
											37	
											38	
											39	
											40	

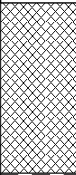
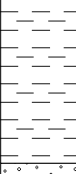
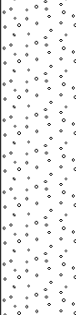
Remarks: 1. Rotary open probehole from GL to 30.0m 2. Probehole noted as wet 3. Gas monitoring well installed				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc				Project No.: 12392		Borehole No.: PH2 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Huntley Wood Investments				Coordinates: 305534.00mE 204125.00mN		Hole Type: RO	
Equipment: Klemm 802				Diameter of Casing: 150mm				Level: 155.00m AOD		Scale 1:200	
Diameter of Boring: 142mm				Depth of Casing: 18.00m				Dates 25/03/2019 - 25/03/2019		Logged By: DT	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description		
		Depth (m)	TCR	SCR	RQD	FI							
											FILL (Driller's Description)	1	
												2	
												3	
												4	
												5	
												6	
												7	
								7.30	147.70			TILL (Driller's Description)	8
								9.70	145.30			SAND and GRAVEL (wet)(Driller's Description)	9
													10
													11
													12
													13
													14
													15
						16.90	138.10			Weathered MUDSTONE (Broken) (Driller's Description)	16		
											17		
											18		
											19		
											20		
											21		
						21.80	133.20			COAL (Driller's Description)	22		
						22.50	132.50			MUDSTONE (Driller's Description)	23		
						23.00	132.00			Dark MUDSTONE with coal traces (Driller's Description)	24		
						24.00	131.00			MUDSTONE with sandstone bands (Driller's Description)	25		
											26		
											27		
											28		
											29		
						30.00	125.00			End of Borehole at 30.00 m		30	
											31		
											32		
											33		
											34		
											35		
											36		
											37		
											38		
											39		
											40		

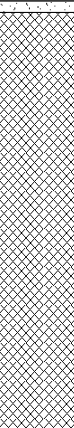
Remarks: 1. Rotary open probehole from GL to 30.0m 2. Probehole noted as wet				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc			Project No.: 12392		Borehole No.: PH3 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Huntley Wood Investments			Coordinates: 305492.00mE 204121.00mN		Hole Type: RO	
Equipment: Klemm 802				Diameter of Casing: 150mm			Level: 157.00mAOD		Scale 1:200	
Diameter of Boring: 142mm				Depth of Casing: 30.00m			Dates 22/03/2019 - 25/03/2019		Logged By: ND	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description		
		Depth (m)	TCR	SCR	RQD	FI							
							4.50	152.50			FILL (Driller's Description)	1	
												2	
												3	
												4	
								9.00	148.00			CLAY (Driller's Description)	5
												6	
												7	
												8	
								17.80	139.20			GRAVELS (Driller's Description)	9
												10	
												11	
												12	
												13	
												14	
												15	
												16	
												17	
								19.70	137.30			MUDSTONE (Driller's Description)	18
												19	
								21.10	135.90			COAL (Driller's Description)	20
												21	
								26.40	130.60			MUDSTONE (Driller's Description)	22
												23	
												24	
												25	
												26	
								30.00	127.00			SANDSTONE (Driller's Description)	27
												28	
												29	
											End of Borehole at 30.00 m		30
										31			
										32			
										33			
										34			
										35			
										36			
										37			
										38			
										39			
										40			

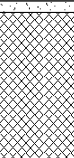
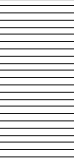
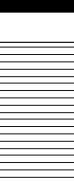
Remarks: 1. Rotary open probehole from GL to 30.0m 2. Probehole noted as wet		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc				Project No.: 12392		Borehole No.: PH4 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Huntley Wood Investments				Coordinates: 305411.00mE 204122.00mN		Hole Type: RO	
Equipment: Klemm 802				Diameter of Casing: 150mm				Level: 157.00mAOD		Scale 1:200	
Diameter of Boring: 142mm				Depth of Casing: 12.00m				Dates 21/03/2019 - 21/03/2019		Logged By: ND	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description										
		Depth (m)	TCR	SCR	RQD	FI															
						0.30	156.70			TARMAC and CONCRETE (Driller's Description)	1										
																		2			
																		3			
																		4			
																		5			
																		6			
																		7			
																		8			
																		9			
																		10			
														11.50	145.50		MUDSTONE (Driller's Description)	11			
																			12		
																			13		
																			14		
																			15		
																			16		
																			17		
														17.50	139.50			OLD WORKINGS (Driller's Description)	18		
																				19	
																				20	
																				21	
																				22	
																				23	
																				24	
														19.10	137.90				MUDSTONE (Driller's Description)	19	
																					20
																					21
																					22
																					23
																					24
										25											
										26											
										27											
										28											
										29											
						24.10	132.90		SANDSTONE (Driller's Description)	24											
											25										
											26										
											27										
											28										
											29										
											30										
											31										
											32										
											33										
											34										
											35										
											36										
											37										
											38										
											39										
											40										
						30.00	127.00		End of Borehole at 30.00 m												

Remarks: 1. Rotary open probehole from GL to 30.0m 2. Probehole noted as wet at 12m				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc			Project No.: 12392		Borehole No.: PH5 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Huntley Wood Investments			Coordinates: 305402.00mE 204157.00mN		Hole Type: RO	
Equipment: Klemm 802				Diameter of Casing: 150mm			Level: 158.00mAOD		Scale 1:200	
Diameter of Boring: 142mm				Depth of Casing: 12.00m			Dates 22/03/2019 - 22/03/2019		Logged By: ND	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description		
		Depth (m)	TCR	SCR	RQD	FI							
							0.30	157.70			TARMAC and CONCRETE (Driller's Description)	1	
											FILL (Driller's Description)	2	
												3	
												4	
								4.20	153.80			CLAY (Driller's Description)	5
												6	
												7	
								7.40	150.60			GRAVELS (Driller's Description)	8
												9	
												10	
								11.60	146.40			MUDSTONE (Driller's Description)	11
												12	
												13	
								16.00	142.00			COAL (Driller's Description)	14
												15	
								17.30	140.70			Soft drill poor returns (Driller's Description)	16
								18.10	139.90			MUDSTONE (Driller's Description)	17
												18	
									19				
						22.00	136.00			SANDSTONE (Driller's Description)	20		
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
						30.00	128.00			End of Borehole at 30.00 m	30		
											31		
											32		
											33		
											34		
											35		
											36		
											37		
											38		
											39		
											40		

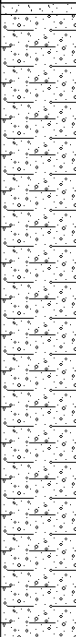
Remarks: 1. Rotary open probehole from GL to 30.0m 2. Probehole noted as wet at 16.0m				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc				Project No.: 12392		Borehole No.: PH6 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Huntley Wood Investments				Coordinates: 305497.00mE 204204.00mN		Hole Type: RO	
Equipment: Klemm 802				Diameter of Casing: 150mm				Level: 159.00mAOD		Scale 1:200	
Diameter of Boring: 142mm				Depth of Casing: 27.00m				Dates 02/04/2019 - 02/04/2019		Logged By: ND	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description		
		Depth (m)	TCR	SCR	RQD	FI							
											FILL (Driller's Description)	1	
												2	
												3	
												4	
												5	
												6	
												7	
								7.40	151.60			SILTY SANDY GRAVEL (Driller's Description)	8
												9	
												10	
												11	
												12	
												13	
												14	
												15	
												16	
												17	
												18	
												19	
												20	
												21	
												22	
												23	
								23.40	135.60			MUDSTONE (Driller's Description)	24
												25	
												26	
												27	
												28	
												29	
								30.00	129.00				30
End of Borehole at 30.00 m											31		
											32		
											33		
											34		
											35		
											36		
											37		
											38		
											39		
											40		

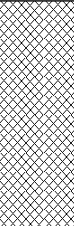
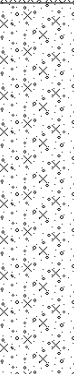
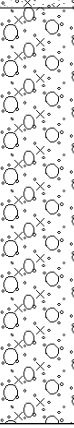
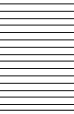
Remarks: 1. Rotary open probehole from GL to 30.0m 2. Excessive water within the sands and gravels below 7.4m.				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation				
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 Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc		Project No.: 12392		Borehole No.: PH7 Sheet 1 of 1	
Location: Merthyr Tydfil		Client: Huntley Wood Investments		Coordinates: 305393.00mE 204204.00mN		Hole Type: RO	
Equipment: Klemm 802		Diameter of Casing: 150mm		Level: 157.00mAOD		Scale 1:200	
Diameter of Boring: 142mm		Depth of Casing: 17.00m		Dates 22/03/2019 - 22/03/2019		Logged By: ND	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD	FI						
							0.30	156.70			TARMAC and CONCRETE (Driller's Description)	1
							CLAY, SAND and GRAVELS (Driller's Description)	2				
								3				
								4				
								5				
								6				
								7				
								8				
								9				
								10				
								11				
								12				
								13				
								14				
								15				
							16.80	140.20				MUDSTONE and SANDSTONE (Driller's Description)
										17		
										18		
										19		
										20		
										21		
										22		
										23		
										24		
										25		
										26		
										27		
										28		
										29		
							30.00	127.00				
									31			
									32			
									33			
									34			
									35			
									36			
									37			
									38			
									39			
									40			

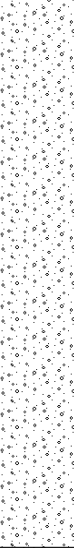
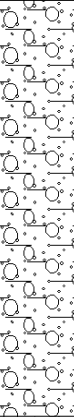
Remarks: 1. Rotary open probehole from GL to 30.0m 2. Probehole noted as wet at 16.0m		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc				Project No.: 12392		Borehole No.: PH8 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Huntley Wood Investments				Coordinates: 305528.00mE 204103.00mN		Hole Type: RO	
Equipment: Klem 802				Diameter of Casing: 150mm				Level: 156.00mAOD		Scale 1:200	
Diameter of Boring: 142mm				Depth of Casing: 27.00m				Dates 04/04/2019 - 04/04/2019		Logged By: ND	

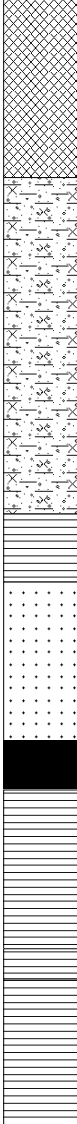
Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description		
		Depth (m)	TCR	SCR	RQD	FI							
							6.00	150.00			FILL (Driller's Description)	1	
											2		
											3		
											4		
											5		
											6		
												SILTY SANDY GRAVELS (Driller's Description)	7
										8			
										9			
										10			
										11			
										12			
										13			
										14			
										15			
										16			
												SILTY GRAVEL with BOULDERS (Driller's Description)	17
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
												MUDSTONE (Driller's Description)	27
										28			
										29			
										30			
										End of Borehole at 30.00 m		31	
											32		
											33		
											34		
											35		
											36		
											37		
											38		
											39		
											40		

Remarks: 1. Rotary open probehole from GL to 30.0m 2. Excessive water within the silt and sands below 6.0m depth				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc				Project No.: 12392		Borehole No.: PH9 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Huntley Wood Investments				Coordinates: 305537.00mE 204233.00mN		Hole Type: RO	
Equipment: Klemm 802				Diameter of Casing: 150mm				Level: 158.00mAOD		Scale 1:200	
Diameter of Boring: 142mm				Depth of Casing: 15.00m				Dates 03/04/2019 - 03/04/2019		Logged By: ND	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD	FI						
							2.50	155.50			FILL (Driller's Description)	1
											TILL (Driller's Description)	2
							4.50	153.50				3
											SANDY GRAVEL (Driller's Description)	4
											5	
											6	
											7	
											8	
											9	
											10	
											11	
											12	
											13	
											14	
											15	
											16	
											17	
											18	
								19.00	139.00			
									20			
									21			
									22			
									23			
									24			
									25			
									26			
									27			
									28			
									29			
						30.00	128.00			End of Borehole at 30.00 m	30	
										31		
										32		
										33		
										34		
										35		
										36		
										37		
										38		
										39		
										40		

Remarks: 1. Rotary open probehole from GL to 30.0m 2. Groundwater at 10.0m.				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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Intégral Géotechnique		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc					Project No.: 12392		Borehole No.: PH10 Sheet 1 of 1		
Location: Merthyr Tydfil				Client: Huntley Wood Investments					Coordinates: 305351.00mE 204233.00mN		Hole Type: RO		
Equipment: Klemm 802				Diameter of Casing: 150mm					Level: 157.00mAOD		Scale 1:200		
Diameter of Boring: 142mm				Depth of Casing: 13.50m					Dates 26/03/2019 - 26/03/2019		Logged By: DT		
Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description		
		Depth (m)	TCR	SCR	RQD	FI							
											MADE GROUND (Driller's Description)	1	
												2	
												3	
												4	
							4.80	152.20				TILL (wet) (Driller's Description)	5
													6
													7
													8
													9
													10
													11
													12
							13.70	143.30					13
													14
							15.50	141.50					15
													16
										17			
										18			
										19			
					19.70	137.30				COAL (Driller's Description)	20		
											21		
					21.00	136.00				MUDSTONE (Driller's Description)	22		
											23		
											24		
											25		
					25.20	131.80				Dark MUDSTONE with coal bands (Driller's Description)	26		
					26.00	131.00				MUDSTONE (Driller's Description)	27		
											28		
											29		
											30		
					30.00	127.00				End of Borehole at 30.00 m	31		
											32		
											33		
											34		
											35		
											36		
											37		
											38		
											39		
											40		

Remarks: 1. Rotary open probehole from GL to 30.0m 2. Probehole noted as wet 3. Gas monitoring well installed			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone) W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation			

		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc				Project No.: 12392		Borehole No.: PH11 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Huntley Wood Investments				Coordinates: 305420.00mE 204231.00mN		Hole Type: RO	
Equipment: Klemm 802				Diameter of Casing: 150mm				Level: 157.00mAOD		Scale 1:200	
Diameter of Boring: 142mm				Depth of Casing: 15.00m				Dates 26/03/2019 - 27/03/2019		Logged By: DT	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD	FI						
							7.10	149.90			MADE GROUND (Driller's Description)	1
												2
												3
												4
												5
												6
												7
												8
												9
												10
												11
												12
												13
												14
												15
						14.40	142.60			CLAY/MUDSTONE (Driller's Description)	16	
						15.00	142.00			SANDSTONE (Driller's Description)	17	
											18	
						18.90	138.10			BROKEN GROUND (wet) (Driller's Description)	19	
						19.90	137.10			SANDSTONE (Driller's Description)	20	
											21	
											22	
						23.20	133.80			COAL (Driller's Description)	23	
						24.40	132.60			MUDSTONE (Driller's Description)	24	
											25	
											26	
											27	
						28.00	129.00			SANDSTONE (Driller's Description)	28	
											29	
						30.00	127.00			End of Borehole at 30.00 m	30	
											31	
											32	
											33	
											34	
											35	
											36	
											37	
											38	
											39	
											40	

Remarks: 1. Rotary open probehole from GL to 30.0m 2. Probehole noted as wet				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc				Project No.: 12392		Borehole No.: PH12 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Huntley Wood Investments				Coordinates: 305507.00mE 204231.00mN		Hole Type: RO	
Equipment: Klemm 802				Diameter of Casing: 150mm				Level: 157.00mAOD		Scale 1:200	
Diameter of Boring: 142mm				Depth of Casing: 18.00m				Dates 03/04/2019 - 03/04/2019		Logged By: DT	

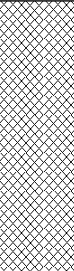
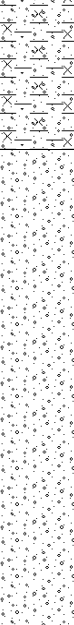
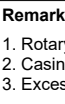
Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD	FI						
							3.80	153.20			FILL (Driller's Description)	1
												2
												3
												4
												5
												6
												7
												8
												9
												10
												11
												12
												13
												14
												15
												16
												17
												18
												19
												20
												21
												22
												23
												24
												25
												26
												27
												28
												29
									30.00		127.00	
											31	
											32	
											33	
											34	
											35	
											36	
											37	
											38	
											39	
											40	

Remarks: 1. Rotary open probehole from GL to 30.0m 2. Groundwater at 9.0m		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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Intégral Géotechnique Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc				Project No.: 12392		Borehole No.: PH13 Sheet 1 of 1				
Location: Merthyr Tydfil		Client: Huntley Wood Investments				Coordinates: 305405.00mE 204329.00mN		Hole Type: RO				
Equipment: Klemm 802		Diameter of Casing: 150mm				Level: 157.00m AOD		Scale 1:200				
Diameter of Boring: 142mm		Depth of Casing: 30.00m				Dates 27/03/2019 - 27/03/2019		Logged By: DT				
Well	Water Strikes	Rotary Coring				Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description		
		Depth (m)	TCR	SCR	RQD							FI
										MADE GROUND (Driller's Description)	1	
												2
												3
												4
												5
							6.40	150.60				6
							8.00	149.00			TILL (Driller's Description)	7
											SANDS and GRAVEL (wet) (Driller's Description)	8
												9
												10
												11
												12
							13.20	143.80			MUDSTONE (Driller's Description)	13
												14
												15
							16.70	140.30				16
					17.90	139.10			COAL (Driller's Description)	17		
									MUDSTONE (Driller's Description)	18		
										19		
										20		
										21		
					21.70	135.30			Dark MUDSTONE with coal traces (Driller's Description)	22		
					22.50	134.50			MUDSTONE with sandstone bands (Driller's Description)	23		
										24		
										25		
										26		
										27		
										28		
										29		
					30.00	127.00			End of Borehole at 30.00 m	30		
										31		
										32		
										33		
										34		
										35		
										36		
										37		
										38		
										39		
										40		

Remarks: 1. Rotary open probehole from GL to 30.0m 2. Probehole noted as wet 3. Gas monitoring well installed		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone) W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc				Project No.: 12392		Borehole No.: PH14 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Huntley Wood Investments				Coordinates: 305480.00mE 204377.00mN		Hole Type: RO	
Equipment: Klemm 802				Diameter of Casing: 150mm				Level: 157.00mAOD		Scale 1:200	
Diameter of Boring: 142mm				Depth of Casing: 22.00m				Dates 28/03/2019 - 28/03/2019		Logged By: DT	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD	FI						
							7.20	149.80			MADE GROUND (Driller's Description)	1
											2	
											3	
											4	
											5	
											6	
											7	
											8	
											9	
											10	
							11.20	145.80			TILL (Driller's Description)	11
											12	
											13	
											14	
											15	
											16	
											17	
											18	
											19	
											20	
							24.00	133.00			SANDS and GRAVEL (Driller's Description)	21
											22	
											23	
											24	
											25	
											26	
											27	
											28	
											29	
											30	
							26.50	130.50			SILT, SAND and GRAVEL (Driller's Description)	31
											32	
											33	
											34	
											35	
											36	
											37	
											38	
											39	
											40	

Remarks: 1. Rotary open probehole from GL to 30.0m 2. Casing parted when advancing between 22.0m and 24.0m depth 3. Excessive water at 24.0m depth				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc				Project No.: 12392		Borehole No.: PH16 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Huntley Wood Investments				Coordinates: 305472.00mE 204413.00mN		Hole Type: RO	
Equipment: Klemm 802				Diameter of Casing: 150mm				Level: 157.00mAOD		Scale 1:200	
Diameter of Boring: 142mm				Depth of Casing: 25.50m				Dates 28/03/2019 - 29/03/2019		Logged By: DT	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description		
		Depth (m)	TCR	SCR	RQD	FI							
											MADE GROUND (Driller's Description)	1	
												2	
												3	
												4	
												5	
												6	
		7.00						150.00				TILL (Driller's Description)	7
												8	
												9	
												10	
												11	
												12	
		12.50						144.50				SANDS and GRAVEL (silt) (wet) (Driller's Description)	13
												14	
												15	
												16	
												17	
												18	
												19	
												20	
												21	
												22	
												23	
												24	
												25	
		25.50						131.50				SILT and SAND (excessive water) (Driller's Description)	26
												27	
												28	
												29	
		30.00						127.00				End of Borehole at 30.00 m	30
										31			
										32			
										33			
										34			
										35			
										36			
										37			
										38			
										39			
										40			

Remarks: 1. Rotary open probehole from GL to 30.0m 2. Probehole noted as wet from 12.5m and excessive water from 22.5m.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc				Project No.: 12392		Borehole No.: PH17 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Huntley Wood Investments				Coordinates: 305399.00mE 204456.00mN		Hole Type: RO	
Equipment: Klemm 802				Diameter of Casing: 150mm				Level: 159.00mAOD		Scale 1:200	
Diameter of Boring: 142mm				Depth of Casing: 15.00m				Dates 01/04/2019 - 01/04/2019		Logged By: DT	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description			
		Depth (m)	TCR	SCR	RQD	FI								
											Fill (Driller's Description)	1		
											2			
											3			
											4			
											4.90	154.10	SILTY SANDY GRAVEL (Driller's Description)	5
											6			
											7			
											8			
											9			
											10			
											11			
											12			
											13			
											14			
											14.80	144.20	MUDSTONE (Driller's Description)	15
											16			
											17			
											18			
											19			
											20			
											21.00	138.00	COAL with MUDSTONE bands (Driller's Description)	21
											21.80	137.20	SANDSTONE and MUDSTONE (Driller's Description)	22
											23			
											24			
											25			
											26			
											27			
											28			
											29			
											30.00	129.00	End of Borehole at 30.00 m	30
31														
32														
33														
34														
35														
36														
37														
38														
39														
40														

Remarks: 1. Rotary open probehole from GL to 30.0m				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
--	--	--	--	---	--	--	--	--	--	--	--	---	--

		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc				Project No.: 12392		Borehole No.: PH18 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Huntley Wood Investments				Coordinates: 305350.00mE 204451.00mN		Hole Type: RO	
Equipment: Klemm 802				Diameter of Casing: 150mm				Level: 157.00mAOD		Scale 1:200	
Diameter of Boring: 142mm				Depth of Casing: 10.00m				Dates 01/04/2019 - 01/04/2019		Logged By: DT	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD	FI						
											FILL (Driller's Description)	1
												2
												3
												4
							5.00	152.00				5
												6
												7
												8
												9
							10.00	147.00				10
												11
												12
												13
												14
												15
												16
												17
												18
												19
							20.50	136.50				20
						21.10	135.90				21	
											DARK MUDSTONE with COAL TRACES (Driller's Description)	21
											SANDSTONE with MUDSTONE BANDS (Driller's Description)	22
												23
												24
												25
												26
												27
												28
												29
						30.00	127.00					30
											End of Borehole at 30.00 m	30
												31
												32
												33
												34
												35
												36
												37
												38
												39
												40

Remarks: 1. Rotary open probehole from GL to 30.0m 2. Probehole noted as wet 3. Gas monitoring well installed				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
---	--	--	--	---	--	--	--	--	--	--	--	---	--

		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc				Project No.: 12392		Borehole No.: PH19 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Huntley Wood Investments				Coordinates: 305416.00mE 204477.00mN		Hole Type: RO	
Equipment: Klemm 802				Diameter of Casing: 150mm				Level: 160.00mAOD		Scale 1:200	
Diameter of Boring: 142mm				Depth of Casing: 15.00m				Dates 29/03/2019 - 29/03/2019		Logged By: DT	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description			
		Depth (m)	TCR	SCR	RQD	FI								
											MADE GROUND (Driller's Description)	1		
												2		
												3		
												4		
												5		
												6		
		7.00						153.00				TILL (Driller's Description)	7	
												8		
												9		
												10		
		11.00						149.00				SANDS and GRAVEL (Driller's Description)	11	
												12		
												13		
												14		
												15		
												16		
												17		
												18		
												19		
												20		
												21		
												22		
												23		
												24		
												25		
												26		
												27		
												28		
		30.00						130.00					End of Borehole at 30.00 m	29
													30	
											31			
											32			
											33			
											34			
											35			
											36			
											37			
											38			
											39			
											40			

Remarks: 1. Rotary open probehole from GL to 30.0m 2. Probehole noted as wet		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
---	--	---	--	--	--	---

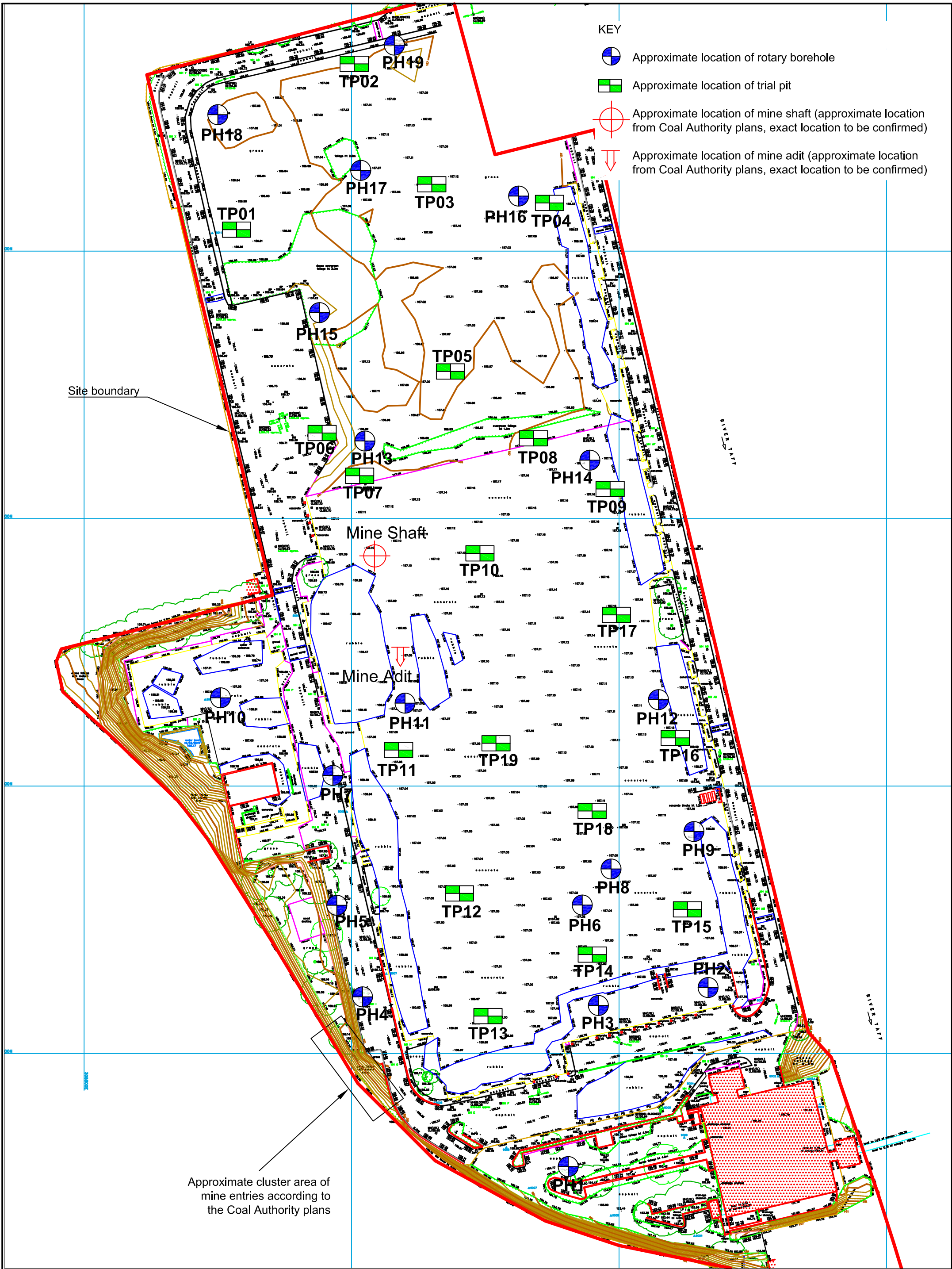


Figure 2: Site Plan

Project: Dragon Parc, Methyr Tydfil

Client: Huntley Wood Investments

Job No.: 12392

Scale: 1:1250 at A3

Intégral
Géotechnique

Integral House,
7 Beddau Way,
Castlegate Business Park,
Caerphilly,
CF83 2AX.
Tel: 029 2080 7991

APPENDIX B

COAL AUTHORITY MINING REPORT



The Coal
Authority

CON29M

coal mining report

UNIT A, DRAGON PARC, ABERCANAID, MERTHYR TYDFIL, CF48 1PQ



Known or potential coal mining risks

Past underground coal mining	Page 4
Future underground coal mining	Page 4
Mine entries	Page 5



Further action

These additional reports can give further detail on the risks identified:

- Mine entry interpretive report
- Mine entry plan and data sheets

For more information please see our [Further action reports](#) on page 10



Professional opinion

According to the official mining information records held by the Coal Authority at the time of this search, evidence of, or the potential for, coal mining related features have been identified. In view of the coal mining circumstances we would recommend that any planned or future development should follow detailed technical advice before beginning work on site. Please see [page 3](#) for further details on [Future development](#).

Your reference: **12392/LP**
Our reference: **51002224248001**
Date: **13 January 2020**

Client name:
**INTEGRAL GEOTECHNIQUE
(WALES) LTD.**

If you require any further assistance please
contact our experts on:
0345 762 6848
groundstability@coal.gov.uk



The Law
Society

Enquiry boundary

Key

Approximate position of enquiry boundary shown



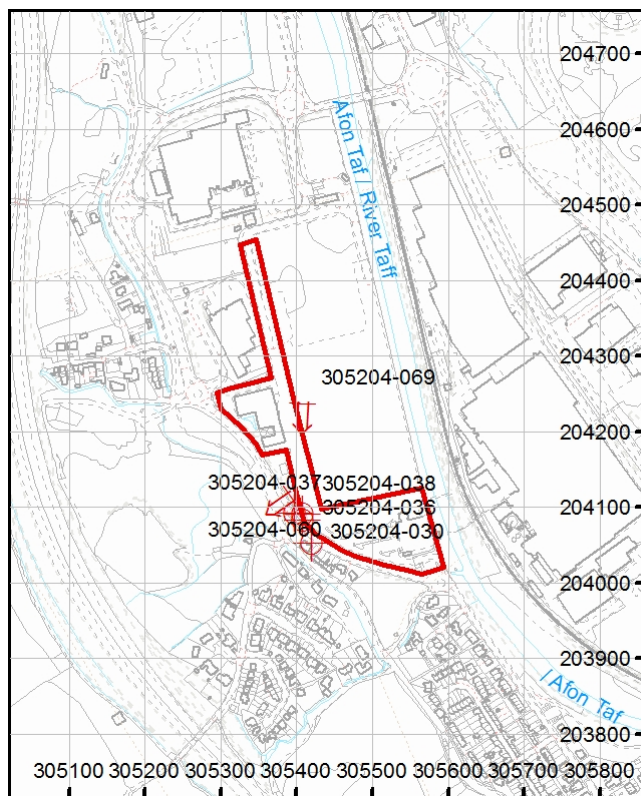
Disused adit



Disused mineshaft



We can confirm that the location is
on the coalfield



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This report is prepared in accordance with the latest Law Society's Guidance Notes 2018, the User Guide 2018 and the Coal Authority's Terms and Conditions applicable at the time the report was produced.



Accessibility

If you would like this information in an alternative format, please contact our communications team on 0345 762 6848 or email communications@coal.gov.uk.

Professional opinion



Mine entries

The enquiry boundary shows the approximate location of the disused mine entry/entries referred to in this report. Property owners have the benefit of statutory protection (under the Coal Mining Subsidence Act 1991). This contains provision for the making good, to the reasonable satisfaction of the owner, of physical damage caused by disused coal mine workings including disused coal mine entries. A leaflet setting out the rights and obligations of either the Coal Authority or other responsible persons under the 1991 Act can be obtained by visiting www.coal.gov.uk. Please note this Act is not valid where coal was worked or extracted by virtue of the grant of a gale in the Forest of Dean, or any other part of the Hundred of St. Briavels in the county of Gloucester.

If you wish to discuss the relevance of any of the information contained in this report, you should seek the advice of a qualified mining engineer or surveyor. If you or your advisor wishes to examine the source plans from which the information has been taken, these are available to view, at our Coal Authority head office in Mansfield. To book an appointment please call **01623 637 225**. Should you or your advisor wish to carry out a physical investigation that may enter, disturb or interfere with any disused mine entry, prior permission must be sought from the owner. For coal mine entries, the owner will normally be the Coal Authority.

The Coal Authority, regardless of responsibility and in conjunction with other public bodies, provide an emergency, 24 hour call out facility in coalfield areas to assess the public safety implications of mining features (including disused mine entries). To report an emergency you can call **01623 646 333**.



Future development

If development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply specialist engineering practice required for former mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or coal mines without first obtaining the permission of the Coal Authority. Developers should be aware that the investigation of coal seams, mine workings or mine entries may have the potential to generate and/or displace underground gases. Associated risks both to the development site and any neighbouring land or properties should be fully considered when undertaking any ground works. The need for effective measures to prevent gases migrating onto any land or into any properties, either during investigation or remediation work, or after development must also be assessed and properly addressed.

If you are looking to develop, or undertake works, within a coal mining development high risk area your Local Authority planning department may require a Coal Mining Risk Assessment to be undertaken by a qualified mining geologist or engineer. Should you require any additional information then please contact the Coal Authority on **0345 762 6848** or email cmra@coal.gov.uk.

Detailed findings

Information provided by the Coal Authority in this report is compiled in response to the Law Society's CON29M Coal Mining enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL.

The Coal Authority owns the copyright in this report and the information used to produce this report is protected by our database rights. All rights are reserved and unauthorised use is prohibited. If we provide a report for you, this does not mean that copyright and any other rights will pass to you. However, you can use the report for your own purposes.

1 Past underground coal mining

The property is in a surface area that could be affected by underground mining in 3 seams of coal at shallow to 140m depth, and last worked in 1950.

2 Present underground coal mining

The property is not within a surface area that could be affected by present underground mining.

3 Future underground coal mining

The property is not in an area where the Coal Authority has received an application for, and is currently considering whether to grant a licence to remove or work coal by underground methods.

The property is not in an area where a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area likely to be affected from any planned future underground coal mining.

However, reserves of coal exist in the local area which could be worked at some time in the future.

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

4 Mine entries

Within, or within 20 metres of, the boundary of the property there are 6 mine entries, the approximate positions of which are shown on the enquiry boundary plot. For reasons of clarity, mine entry symbols may not be drawn to the same scale as the plan.

Our records disclose the following information:

305204-036. This shaft was filled grouted and capped in 1975.

305204-038. This shaft was filled grouted and capped in 1975.

305204-069. No treatment details.

305204-030. Information provided to the Coal Authority by British Coal indicates this shaft is filled.

305204-060. Uncovered during road improvements we understand this adit was treated by K Wardell and Partners Consultant Mining Engineers.

305204-037. This shaft was filled grouted and capped in 1975.

This information is based on the information that the Coal Authority has at the time of this enquiry.

Based on the Coal Authority's knowledge of the mining circumstances at the time of this enquiry, there may be unrecorded mine entries in the local area that do not appear on Coal Authority records.

For an additional fee, the Coal Authority can provide a Mine Entry Interpretive Report. The report will provide a separate assessment for the mine entry/entries referred to in this report. It gives an opinion on the likelihood of mining subsidence damage caused from ground movement as a consequence of the mine entry/entries. It also gives details of the remedies available for subsidence damage where the mine entry was sunk in connection with coal mining.

Please note that it may not be possible to produce a report if the main building to the property cannot be identified from Coal Authority plans (ie for development sites and new build).

For further advice on how to order this additional information please visit www.groundstability.com.

5 Coal mining geology

The Coal Authority is not aware of any damage due to geological faults or other lines of weakness that have been affected by coal mining.

6 Past opencast coal mining

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

7 Present opencast coal mining

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

8 Future opencast coal mining

There are no licence requests outstanding to remove coal by opencast methods within 800 metres of the boundary.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

9 Coal mining subsidence

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

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

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

10 Mine gas

The Coal Authority has no record of a mine gas emission requiring action.

11 Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Coal Authority, under its Emergency Surface Hazard Call Out procedures.

12 Withdrawal of support

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

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

13 Working facilities order

The property is not in an area where an order has been made, under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

14 Payments to owners of former copyhold land

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

Statutory cover



Coal mining subsidence

In the unlikely event of any coal mining related subsidence damage, the Coal Authority or the mine operator has a duty to take remedial action in respect of subsidence caused by the withdrawal of support from land or property in connection with lawful coal mining operations.

When the works are the responsibility of the Coal Authority, our dedicated public safety and subsidence team will manage the claim. The house or land owner ("the owner") is covered for these works under the terms of the Coal Mining Subsidence Act 1991 (as amended by the Coal Industry Act 1994). Please note, this Act does not apply where coal was worked or gotten by virtue of the grant of a gale in the Forest of Dean, or any other part of the Hundred of St. Briavels in the county of Gloucester.

If you believe your land or property is suffering from coal mining subsidence damage and you need more information on what to do next, please use the following link to our website which sets out what your rights are and what you need to consider before making a claim.

www.gov.uk/government/publications/coal-mining-subsidence-damage-notice-form



Coal mining hazards

Our public safety and subsidence team provide a 24 hour a day, 7 days a week hazard reporting service, to help protect the public from hazards caused by past coal workings, such as a mine shaft or shallow working collapse. To report any hazards please call **01623 646 333**. Further information can be found on our website: www.gov.uk/coalauthority.

Glossary



Key terms

adit - horizontal or sloped entrance to a mine

coal mining subsidence - ground movement caused by the removal of coal by underground mining

Coal Mining Subsidence Act 1991 - the Act setting out the duties of the Coal Authority to repair damage caused by coal mining subsidence

coal mining subsidence damage - damage to land, buildings or structures caused by the removal of coal by underground mining

coal seams - bed of coal of varying thickness

future opencast coal mining - a licence granted, or licence application received, by the Coal Authority to excavate coal from the surface

future underground coal mining - a licence granted, or licence application received, by the Coal Authority to excavate coal underground. Although it is unlikely, remaining coal reserves could create a possibility for future mining, which would be licensed by the Coal Authority

mine entries - collective name for shafts and adits

payments to owners of former copyhold land - historically, copyhold land gave rights to coal to the copyholder. Legislation was set up to allow others to work this coal, but they had to issue a notice and pay compensation if a copyholder came forward

shaft - vertical entry into a mine

site investigation - investigations of coal mining risks carried out with the Coal Authority's permission

stop notice - a delay to repairs because further coal mining subsidence damage may occur and it would be unwise to carry out permanent repairs

subsidence claim - a formal notice of subsidence damage to the Coal Authority since it was established on 31 October 1994

withdrawal of support - a historic notice informing landowners that the coal beneath their property was going to be worked

working facilities orders - a court order which gave permission, restricted or prevented coal mine workings



Further action reports

Mine entry interpretive report - assesses the risk of ground movement from mine entries in, or within 20 metres of, the property boundary. To order this report, use the same boundary as the CON29M report, then draw the building on the additional map screen.

For more information and to order this report please visit:

<https://www2.groundstability.com/interpretive-report>

Mine entry plan and data sheets - give additional information on mine entries recorded on a piece of land. To order this report use the same boundary as the CON29M report and a member of our team will contact you to confirm the mine entries to include in this bespoke report.

For more information and to order this report please visit:

<https://www2.groundstability.com/plan-and-data-sheets>

APPENDIX C

SHAFT PLAN AND DATA SHEETS

Issued by:

The Coal Authority, Property Search Services, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG
Website: www.groundstability.com Phone: 0345 762 6848

**INTEGRAL GEOTECHNIQUE (WALES)
LTD.
INTEGRAL HOUSE
7 BEDDAU WAY
CAERPHILLY
MID GLAMORGAN
CF83 2AX**

Our reference:	51002124685001
Your reference:	12392/LW
Date of your enquiry:	09 May 2019
Date we received your enquiry:	09 May 2019
Date of issue:	10 May 2019

This report is for the property described in the address below and the attached plan.

Shaft Plan and Data Sheets

UNIT A, DRAGON PARC, ABERCANAID, MERTHYR TYDFIL, CF48 1PQ

I refer to the enquiry dated 09 May 2019, received 09 May 2019, in connection with the above.

As requested I enclose the mine entry data sheet(s) held for the mine entry/entries referred to.

Mine Entry Data

Shaft/adit:	Shaft
Reference:	305204-038
Source:	1/2500 O.S Sheet 1870 1920 Ed Ab plans 4357 SW478 SW479 SWR2059 SWR1879 SWR1882 SWR1880 SWR1881 Geological Sheet Other: 49M 55A 60Q 62C (Y)
Colliery name:	Unknown
Entry name:	Upper Abercanaid No.1 (East)
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	Not Applicable
Treatment details:	This shaft was filled grouted and capped in 1975.
Conveyance:	Not Applicable
Easting:	305409
Northing:	204091
Other information:	None

Mine Entry Data (continued)

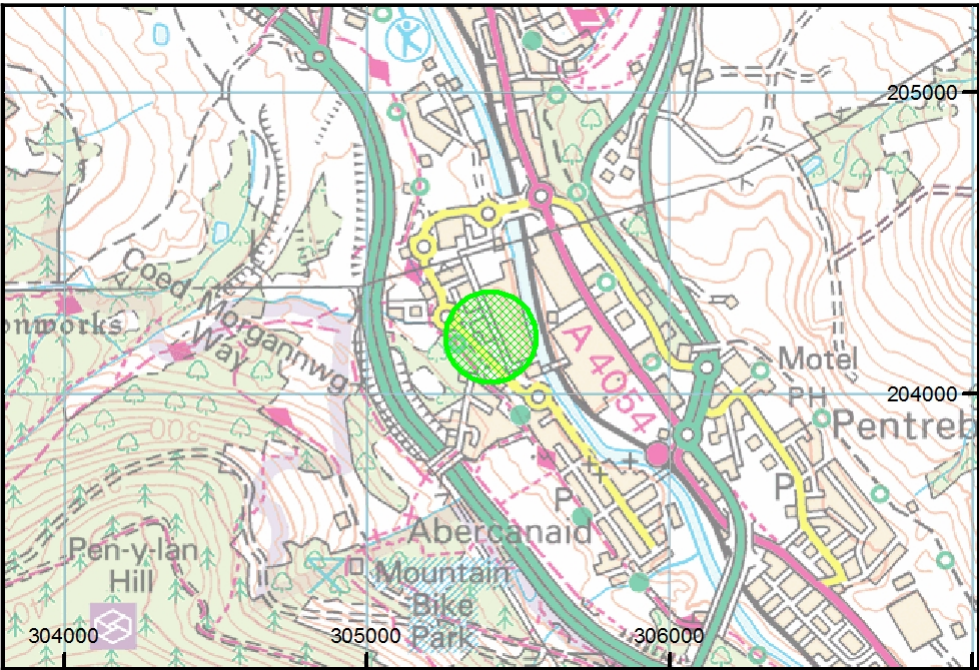
Shaft/adit:	Adit
Reference:	305204-069
Source:	Ab plan SWR1882
Colliery name:	Unknown
Entry name:	Unknown
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	183
Treatment details:	Unknown
Conveyance:	Not Applicable
Easting:	305409
Northing:	204237
Other information:	None

Mine Entry Data (continued)

Shaft/adit:	Shaft
Reference:	305204-031
Source:	1/2500 O.S Sheet 1870 1920 Ed Ab plans 3596 3595 3653 4357 SW479 SWR2059 SWR1879 SWR1882 SWR1880 Geological Sheet Other: 55A 60Q 62C(Y)
Colliery name:	Unknown
Entry name:	Willows Shaft
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	Not Applicable
Treatment details:	This shaft was grouted and capped in 1977.
Conveyance:	Not Applicable
Easting:	305409
Northing:	204288
Other information:	None

Location map

Approximate position of enquiry



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This plan shows the approximate location of the disused mine entry / entries referred to in the attached mining report. For reasons of clarity, mine entry symbols may not be drawn to the same scale as the plan.

Property owners have the benefit of statutory protection (under the Coal Mining Subsidence Act 1991). This contains provision for the making good, to the reasonable satisfaction of the owner, of physical damage from disused coal mine workings including disused coal mine entries. A leaflet setting out the rights and obligations of either the Coal Authority or other responsible persons under the 1991 Act can be obtained by visiting www.groundstability.com.

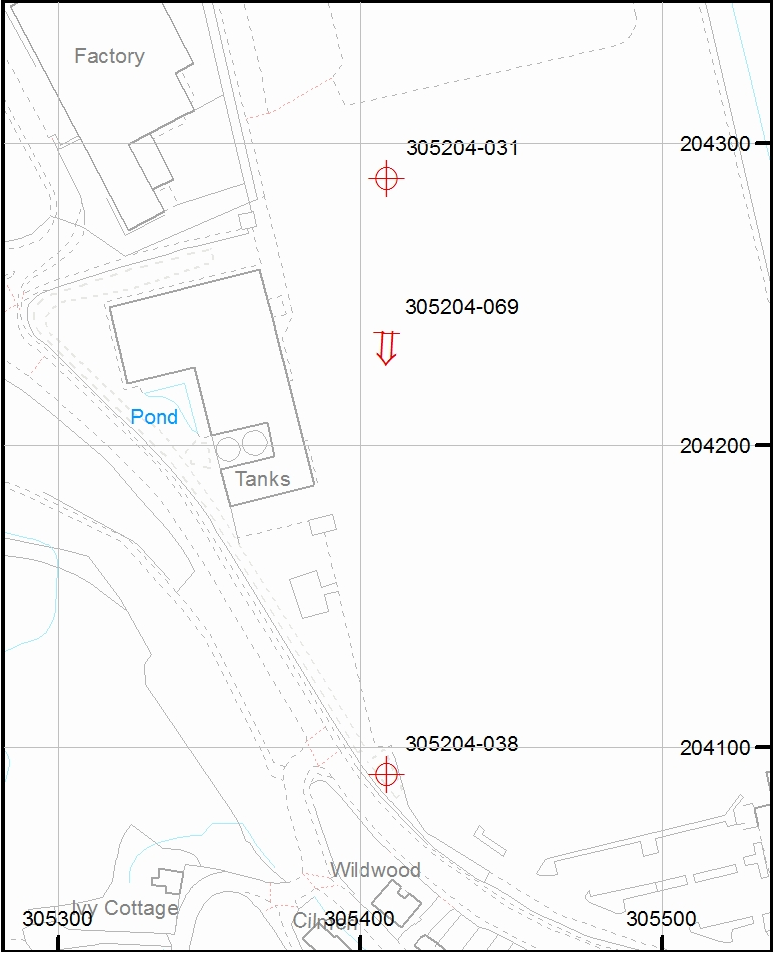
If you wish to discuss the relevance of any of the information contained in this report, you should seek the advice of a qualified mining engineer or surveyor. If you or your advisor wish to examine the source plans from which the information has been taken, these are available to view, free of charge, at our Head Office in Mansfield. To book an appointment please ring 01623 637225. Should you or your advisor wish to carry out a physical investigation that may enter, disturb or interfere with any disused mine entry, prior permission of the owner must be sought. For coal mine entries, the owner will normally be the Coal Authority.

The Coal Authority, regardless of responsibility and in conjunction with other public bodies, provide an emergency call out facility in coalfield areas to assess the public safety implications of mining features (including disused mine entries).

Our emergency telephone number is 01623 646333.

Key

Disused Adit or Mineshaft



Issued by:

The Coal Authority, Property Search Services, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG
Website: www.groundstability.com Phone: 0345 762 6848

INTEGRAL GEOTECHNIQUE (WALES)	Our reference:	51002234227001
LTD.	Your reference:	12392/LP
INTEGRAL HOUSE	Date of your enquiry:	14 January 2020
7 BEDDAU WAY	Date we received your enquiry:	14 January 2020
CAERPHILLY	Date of issue:	14 January 2020
MID GLAMORGAN		
CF83 2AX		

This report is for the property described in the address below and the attached plan.

Shaft Plan and Data Sheets

UNIT A, DRAGON PARC, ABERCANAID, MERTHYR TYDFIL, CF48 1PQ

I refer to the enquiry dated 14 January 2020, received 14 January 2020, in connection with the above.

As requested I enclose the mine entry data sheet(s) held for the mine entry/entries referred to.

Mine Entry Data

Shaft/adit:	Shaft
Reference:	305204-036
Source:	1/2500 O.S Sheet 1920 Ed Ab plans 4357 SW478 SW479 SWR2059 SWR1879 WR1882 SWR1880 SWR1881 Geological Sheet Other: 49M 55A 60Q 62C (Y)
Colliery name:	Unknown
Entry name:	Upper Abercanaid South
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	Not Applicable
Treatment details:	This shaft was filled grouted and capped in 1975.
Conveyance:	Not Applicable
Easting:	305409
Northing:	204083
Other information:	None

Mine Entry Data (continued)

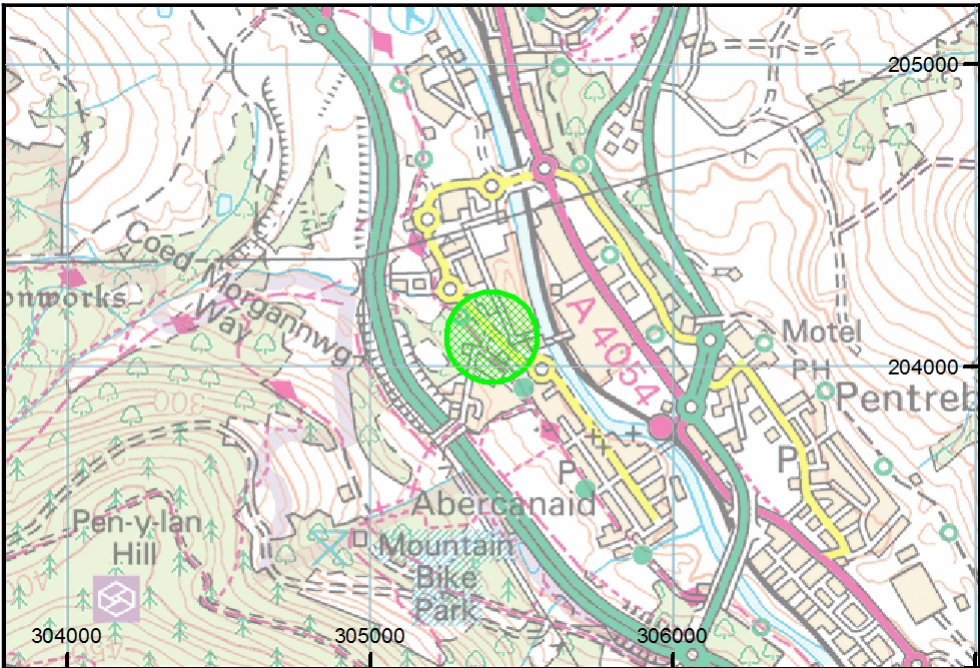
Shaft/adit:	Adit
Reference:	305204-060
Source:	Other: 46E 50A(Y)
Colliery name:	Unknown
Entry name:	No.2 Level
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	235
Treatment details:	Uncovered during road improvements we understand this adit was treated by K Wardell and Partners Consultant Mining Engineers.
Conveyance:	Not Applicable
Easting:	305393
Northing:	204114
Other information:	None

Mine Entry Data (continued)

Shaft/adit:	Shaft
Reference:	305204-037
Source:	1/2500 O.S Sheet 1870 1920 Ed Ab plans 3596 3595 3653 4357 SW478 SW479 SWR2059 SWR1879 SWR1882 SWR1880 Geological Sheet Other: 49M 55A 60Q 62C (Y)
Colliery name:	Unknown
Entry name:	Upper Abercanaid No.2 (West)
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	Not Applicable
Treatment details:	This shaft was filled grouted and capped in 1975.
Conveyance:	Not Applicable
Easting:	305398
Northing:	204093
Other information:	None

Location map

Approximate position of enquiry



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This plan shows the approximate location of the disused mine entry / entries referred to in the attached mining report. For reasons of clarity, mine entry symbols may not be drawn to the same scale as the plan.

Property owners have the benefit of statutory protection (under the Coal Mining Subsidence Act 1991). This contains provision for the making good, to the reasonable satisfaction of the owner, of physical damage from disused coal mine workings including disused coal mine entries. A leaflet setting out the rights and obligations of either the Coal Authority or other responsible persons under the 1991 Act can be obtained by visiting www.groundstability.com.

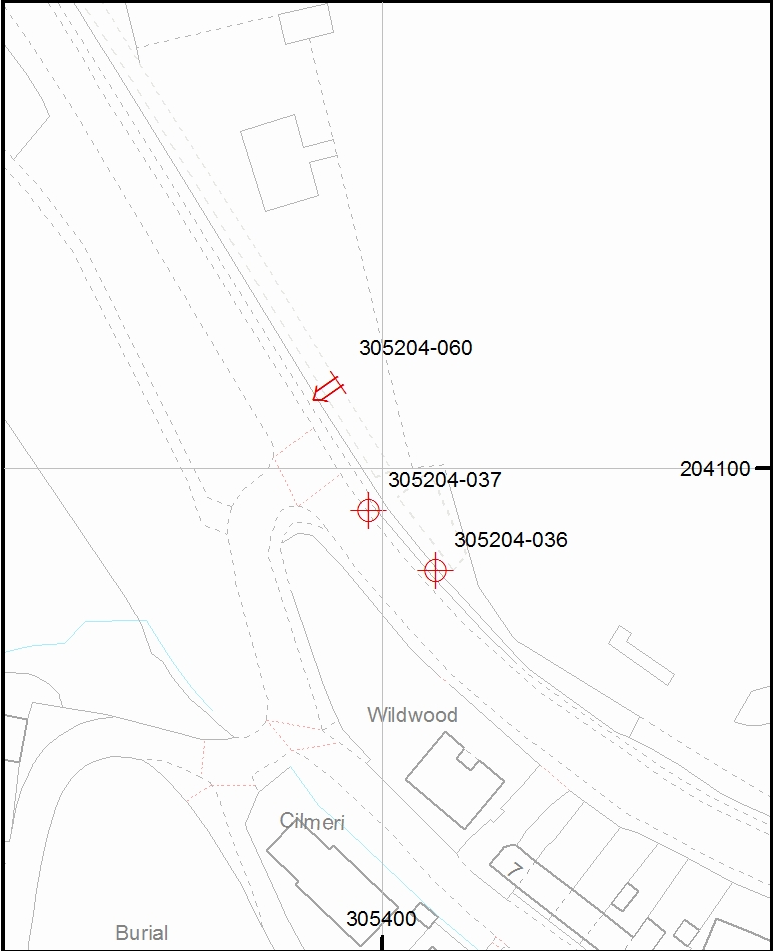
If you wish to discuss the relevance of any of the information contained in this report, you should seek the advice of a qualified mining engineer or surveyor. If you or your advisor wish to examine the source plans from which the information has been taken, these are available to view, free of charge, at our Head Office in Mansfield. To book an appointment please ring 01623 637225. Should you or your advisor wish to carry out a physical investigation that may enter, disturb or interfere with any disused mine entry, prior permission of the owner must be sought. For coal mine entries, the owner will normally be the Coal Authority.

The Coal Authority, regardless of responsibility and in conjunction with other public bodies, provide an emergency call out facility in coalfield areas to assess the public safety implications of mining features (including disused mine entries).

Our emergency telephone number is 01623 646333.

Key

Disused Adit or Mineshaft



FIGURES



NORTH

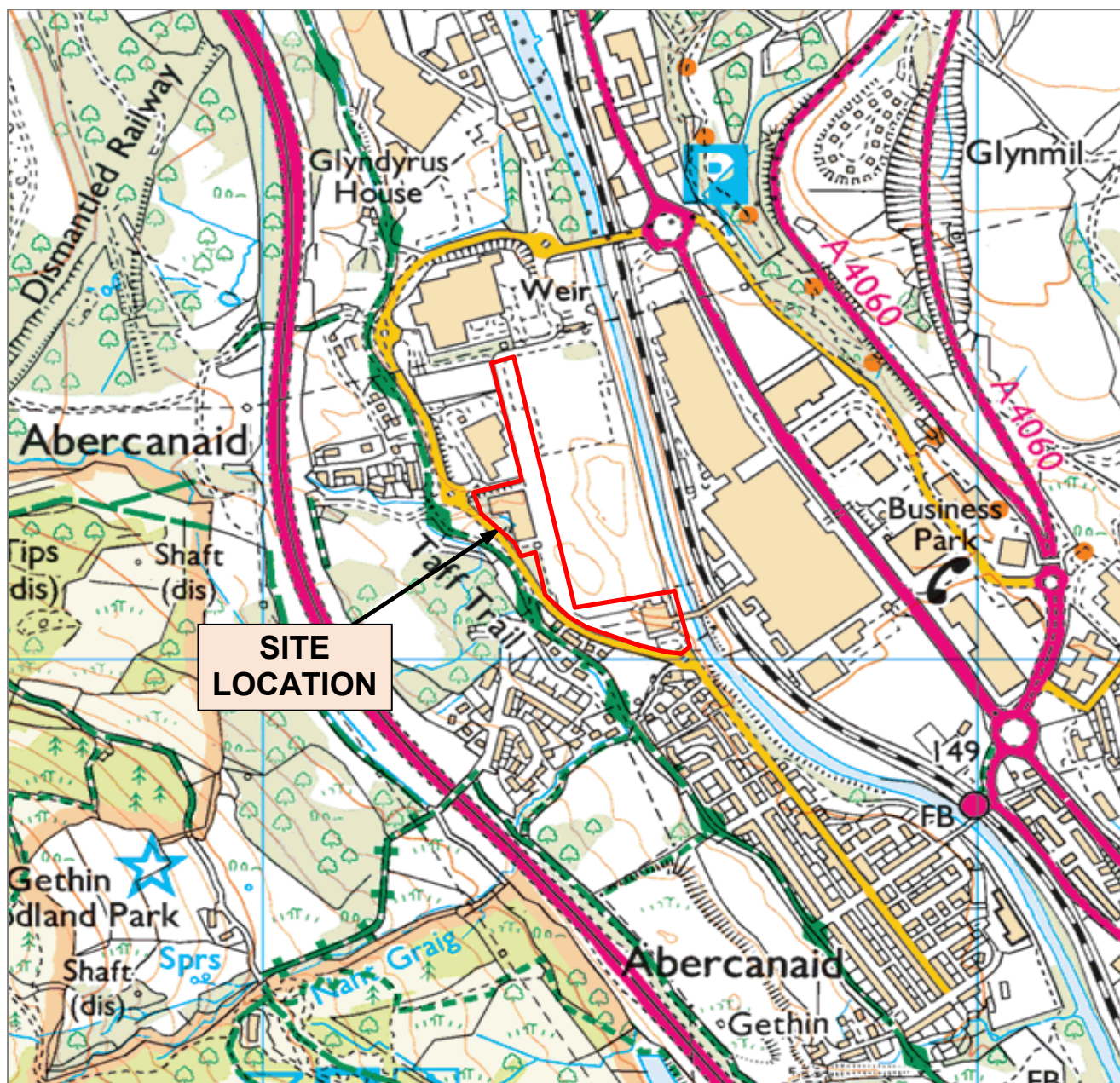


FIGURE 1: SITE LOCATION

Drainage Channel, Dragon Parc

Intégral
Géotechnique

Intégral House
7 Beddau Way
Castlegate Business Park
Caerphilly
CF83 2AX
Tel: 029 2080 7991
Fax: 029 2086 2176

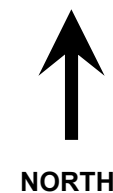
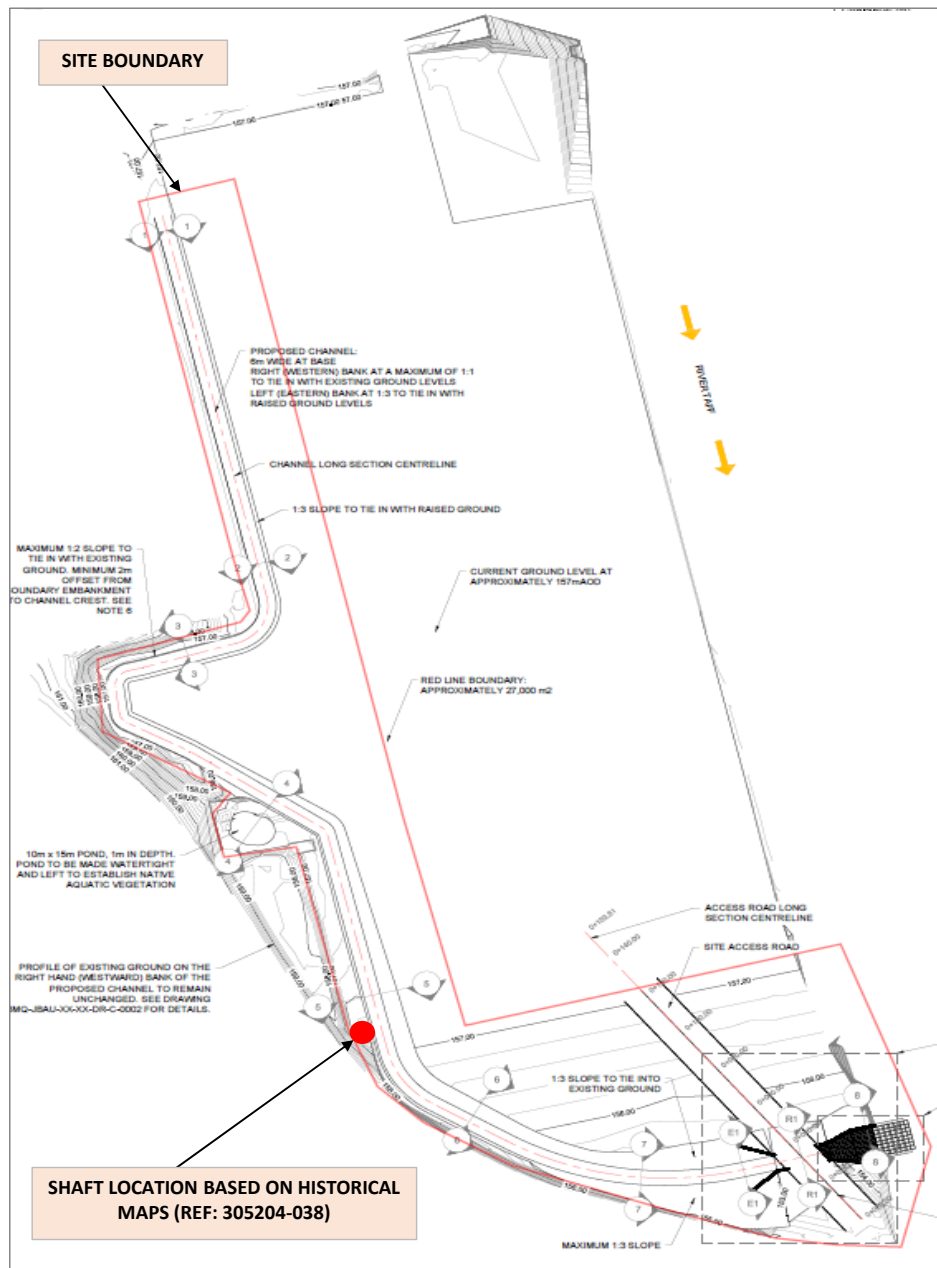
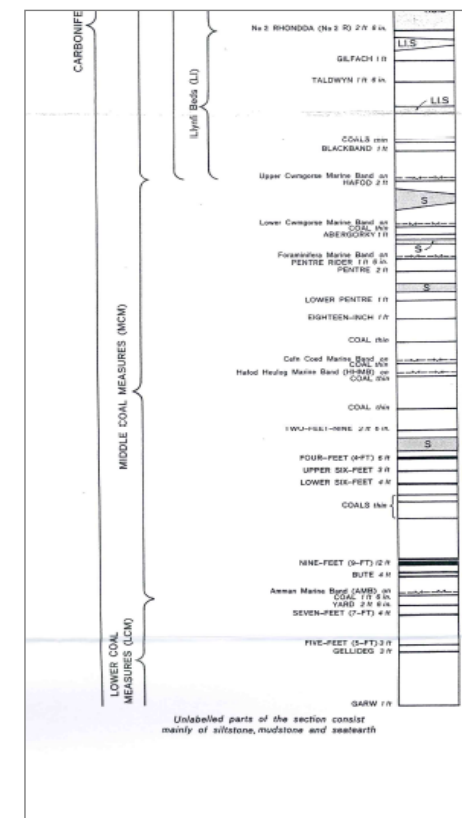
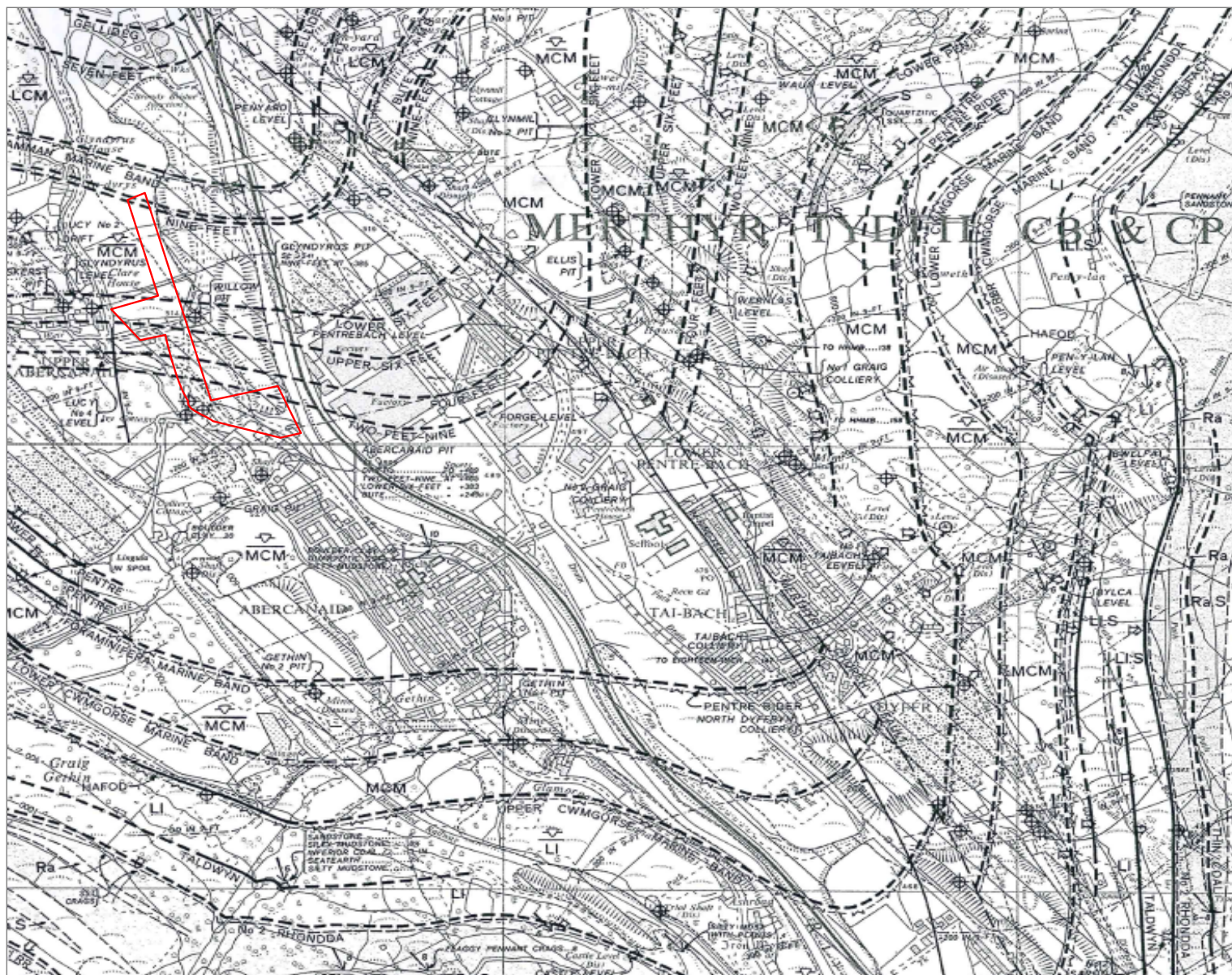


FIGURE 2: SITE PLAN

Drainage Channel, Dragon Parc

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Géotechnique

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Caerphilly
CF83 2AX
Tel: 029 2080 7991
Fax: 029 2086 2176



Drainage Channel, Dragon Parc

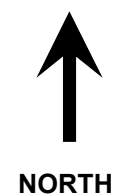
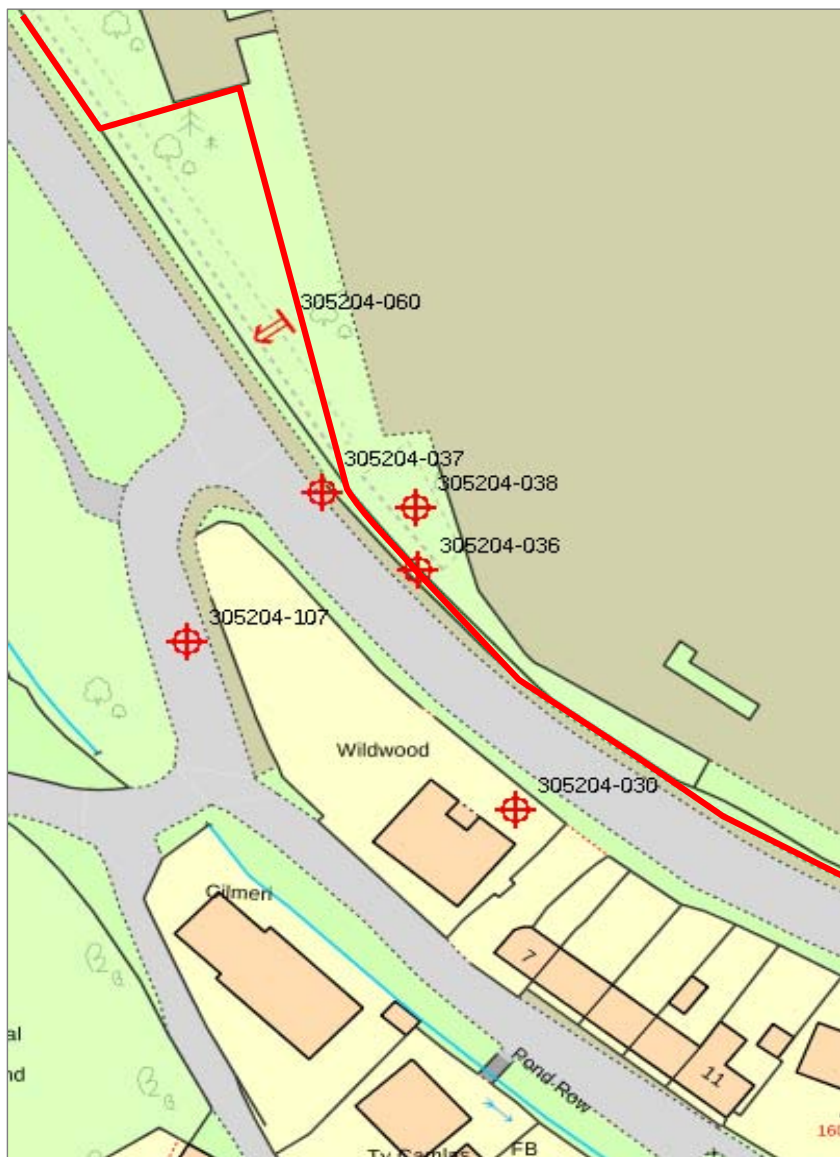


FIGURE 4: MINE ENTRY LOCATION PLAN

Drainage Channel, Dragon Park



Intégral House
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Castlegate Business Park
Caerphilly
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Tel: 029 2080 7991
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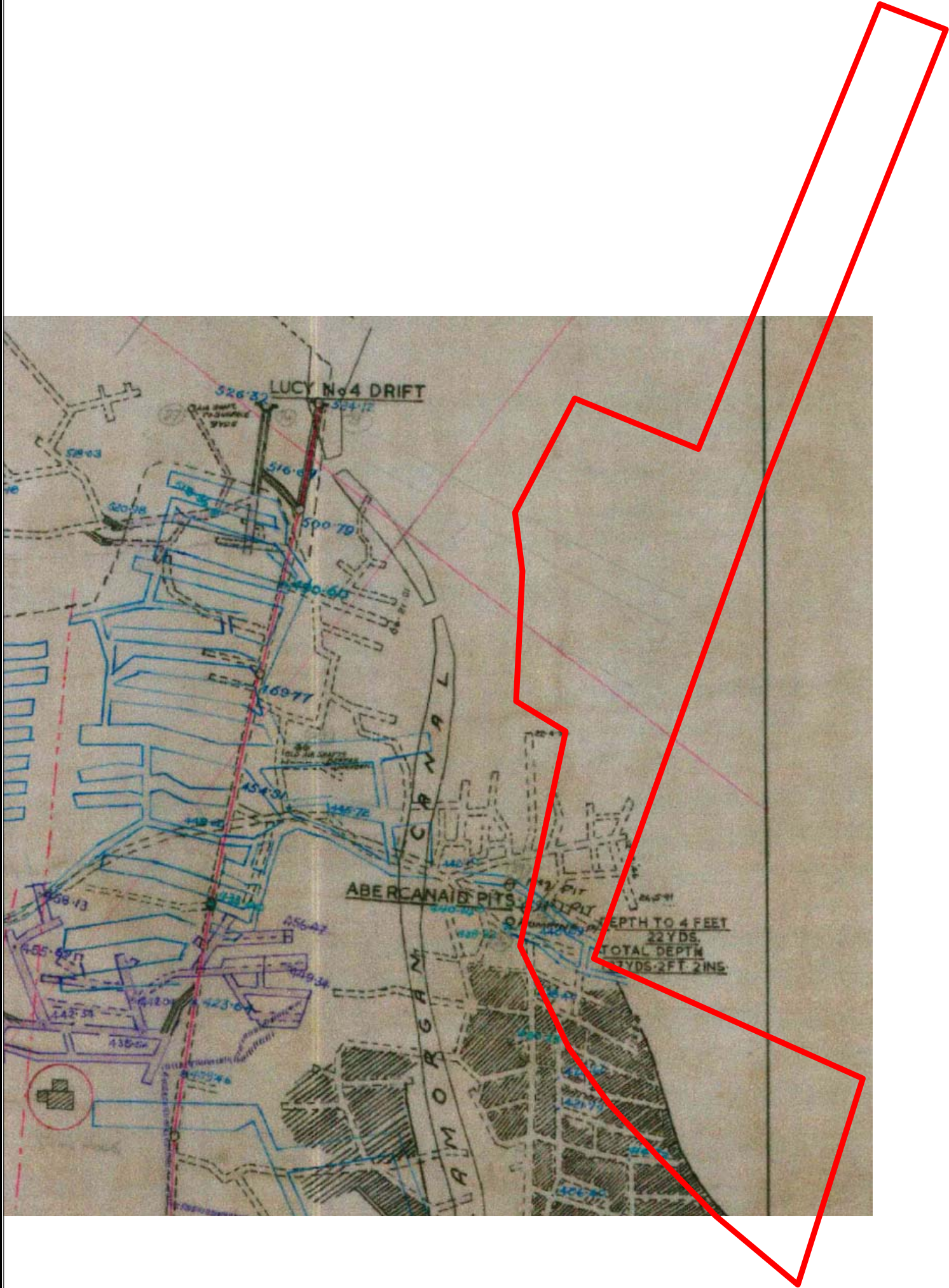


Figure 5: Abandonment Plan - Four Feet Seam

Project: Ardagh Metal Packaging, Abercanaid, Merthyr Tydfil	Job No.: 12392	Intégral Géotechnique	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991
Client: Huntley Wood Investments Limited	Scale: 1:2,000 at A3		

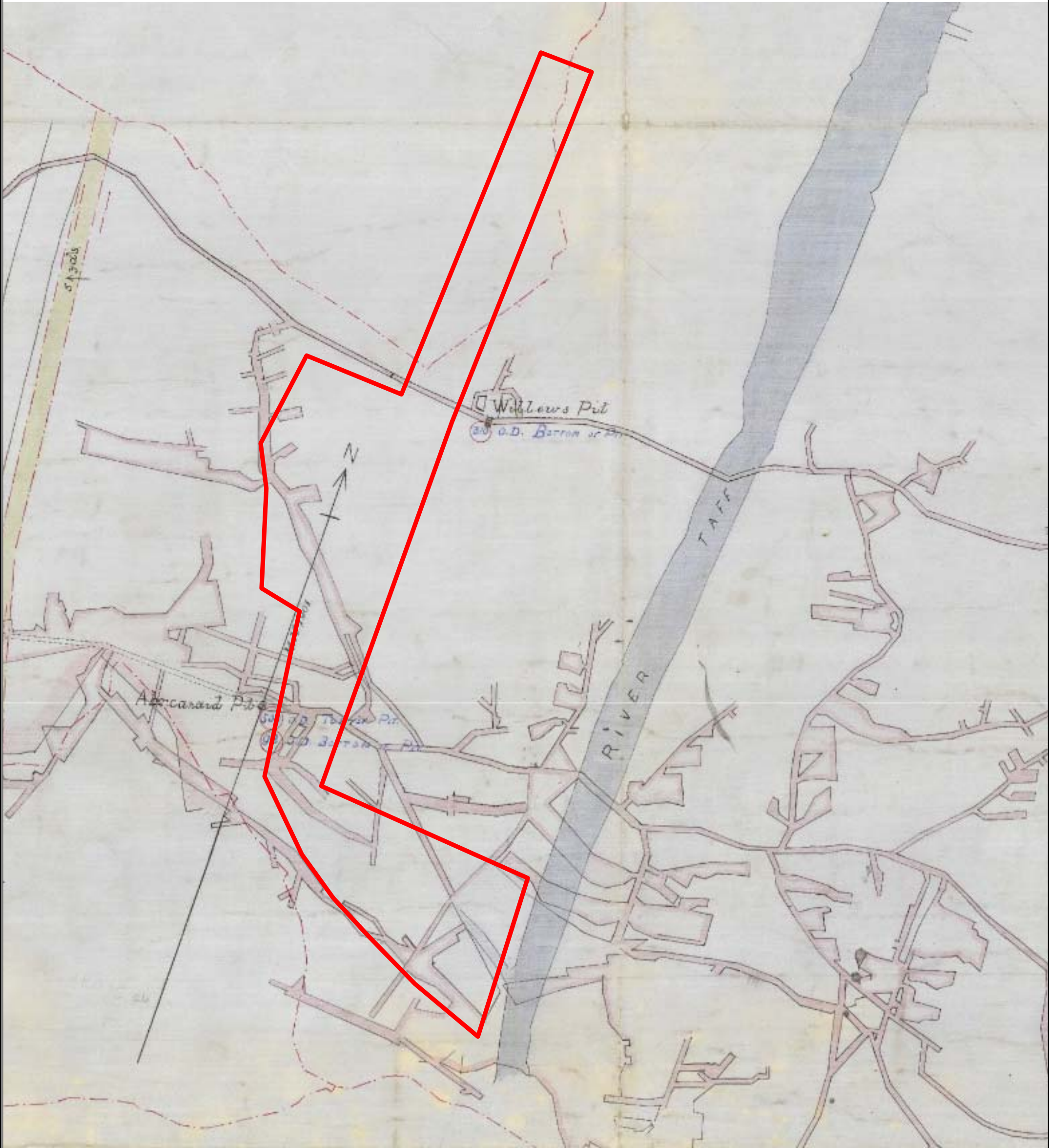


Figure 6: Abandonment Plan - Nine Feet Seam

Project: Ardagh Metal Packaging, Abercanaid, Merthyr Tydfil	Job No.: 12392	Intégral Géotechnique	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991
Client: Huntley Wood Investments Limited	Scale: 1:2,000 at A3		

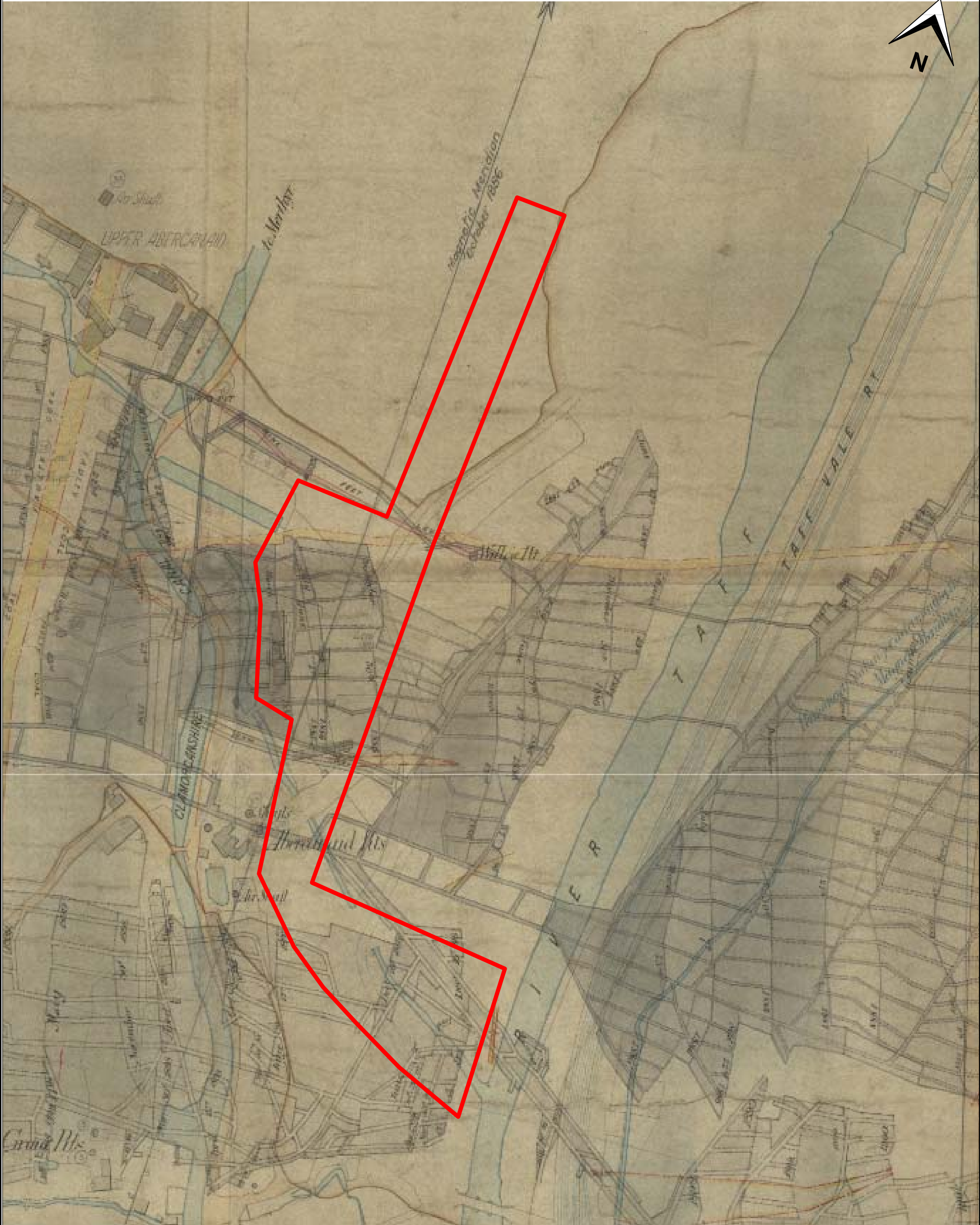


Figure 7: Abandonment Plan - Seven Feet Seam

Project: Ardagh Metal Packaging, Abercanaid, Merthyr Tydfil	Job No.: 12392	Intégral Géotechnique	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991
Client: Huntley Wood Investments Limited	Scale: 1:2000 at A3		

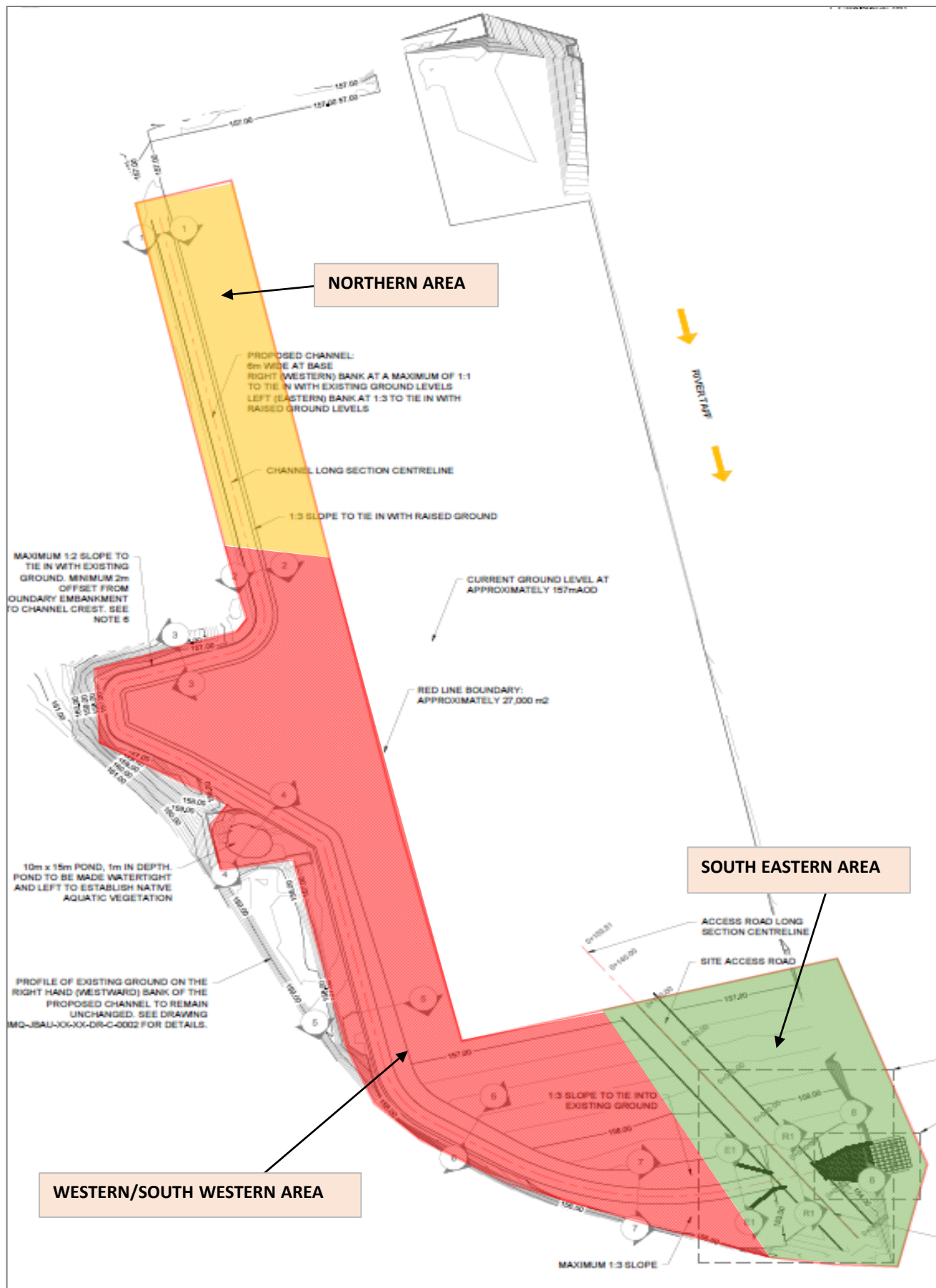


FIGURE 8: MINING RISK ZONES

Drainage Channel, Dragon Parc

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