The Coal Authority

Torfaen County Borough Council: Mine Water Heat Opportunities

July 2024

Making a **better future** for people and the environment **in mining areas**

Disclaimer

This report has been prepared by the Coal Authority for Welsh Government and compliments the open access mine water heat opportunity maps available from DataMap Wales.

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This report should only be used in the stated context.

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Executive Summary

The area covered in this section is the whole of the Torfaen County Borough Council (TCBC) administrative boundary. Assessment of mine workings and mine water status along with knowledge of the area are used to provide a very high level assessment of the potential for exploring the development of open loop mine water heat projects in the borough.

Only the western half of Torfaen is underlain by coal workings as the eastern outcrop of the coalfield bisects the borough.

The presence of mine workings combined with knowledge (where available) of recovered mine water levels are used to provide a very high level assessment of the potential for exploring the development of open loop mine water heat projects in the borough.

The workings tend to be relatively shallow as the area is close to the coal measures outcrop which runs in a north-south direction roughly following the B4246 highway. The strata and associated coal seams and workings dip to the west with the deepest seam workings in the Hafodyrynys locality. While there is no mine water level monitoring data available in the Torfaen CBC area, monitoring in adjacent Blaenau Gwent, and the presence of numerous 'gravity discharges' together with the long period since the mines closed suggests that mine water has recovered.

The potential for accessing the mine workings by drilling and recovering the 'warm' mine water is assessed by reference to criteria set out in the overarching report and classified as having 'good', 'possible' or 'challenging' potential. Good potential for borehole schemes exists in three populated areas highlighted as **1, 2** and **3** in **Table 1.1** below based on a combination of viable drilling depths and mine water recovery, that suggest that further detailed assessment would be beneficial.

There is one mine water treatment scheme in Torfaen at **Blaenavon** detailed at **4** in **Table 1.1** below. The mine water flow here suggests a heat capacity of MWth. It is not implied that connecting a heat scheme to the mine water scheme is guaranteed and should this option be considered an early dialogue with the Coal Authority Permitting Team should be commenced.

There are many 'gravity discharges', where mine water is emitting at surface within the borough. This mine water may offer potential for mine water heat without the cost and risk of drilling and pumping. A selection of the larger discharges having a heat potential of over 0.5MWth is covered in **Section 5.3**. The largest discharge, **Trosnant Brook** near **Pontypool**, may have a heat capacity of up to 4 MW_{th} and has community sector heat demand nearby. The site is highlighted as **5** in **Table 1.1** below.

It is recommended that the opportunities listed above are considered against surface heat demands to highlight those which may be served by mine water heat technologies. A subsequent, more detailed study of the mining and hydrogeology would add further information to firm up the case to take a number of mine water heat projects forward.

Table 1.1. Highlighted mine water heat opportunities

No./ Area	Opportunity name	Opportunity type	Category	Potential MW_{th}
1	Blaenavon west	Borehole scheme	Good	Subject to further testing
2	West of Abersychan	Borehole scheme	Good	Subject to further testing
3	West of Pontypool (Tranch)	Borehole scheme	Good	Subject to further testing
4	Blaenavon	Mine water treatment scheme	Possible	Subject to further testing
5	Trosnant Brook	Gravity discharge	Possible	4.5

1 Geographic area

Torfaen CBC covers an approximately 126 km^2, and runs roughly 20 km north-south along the Afon Lwyd between north of Blaenavon and south of Cwmbran, with an west-east extent of about 6km. Major urban areas include: Blaenavon, Abersychan, Pontypool, and Cwmbran. The north and western parts of Torfaen comprised Coal Measures strata, which form the hills and higher ground west of the Afon Lwyd. Elevation in Torfaen ranges from approximately 20 mAOD along the Afon Lwyd south of Cwmbran to 580 mAOD west of Blaenavon. The Afon Lwyd runs from its upper reaches around Blaenavon and flows south through the centre parts of Torfaen.

2 Geological summary

The solid and superficial geology has been ascertained by consultation of the available British Geological Survey records including:

- Online GeoIndex viewer;
- Online geological memoirs;
- Online geology maps (Sheet 232 and Sheet 249 for Torfaen area); and
- Borehole and mine shaft scans across the area of interest.

2.1 Bedrock geology

Torfaen contains bedrock geology (at surface) from the Carboniferous, Devonian, and Silurian periods.

The Carboniferous includes the South Wales Coal Measures (coal mine workings), Millstone Grit, and Dinantian rocks, and covers the northern and western parts of Torfaen (**Figure 2.1** and **Figure 2.2**). The Carboniferous rocks in Torfaen are generally dipping from east to west.

The Coal Measures outcrop within parts of Torfaen and include the South Wales Upper Coal Measures; South Wales Middle Coal Measures; and South Wales Lower Coal Measures formations. The Coal Measures in Torfaen comprises sequences of interbedded mudstone, siltstone, sandstone and coal seams. North of Pontypool the base of the Coal Measure runs generally north-south and approximately follows the course of the Afon Lwyd. South of Pontypool the base of the Coal Measures runs generally northeast-southwest and to the west of Cwmbran.

Up to 28 individual coal seams have been worked to varying extents in the area. The seams can be grouped into those in the South Wales Upper Coal Measures unit and those in a South Wales Middle and Lower Coal Measures units. Often during mining these two units were not connected and can be two vertical units above each other.

Regional solid geology and selected structural geology is shown in **Figure 2.2**.

The stratigraphic sequence, approximate depths and noted shaft sections are shown in

Figure 2.4..

2.1.1 Structural geology

Major faults are shown in **Figure 2.2,** the main faults in terms of the Coal Measures in Torfaen are the Trevethin Fault and Glyn Fault, both trend roughly west-southwest to east across the middle of Torfaen. The Glyn Fault, downthrows strata to the north/northwest by approximately 80 m. The Trevethin Fault downthrows to the south, between the Trevethin and Glyn Faults there is the Trevethin – Llanhilleth Syncline.

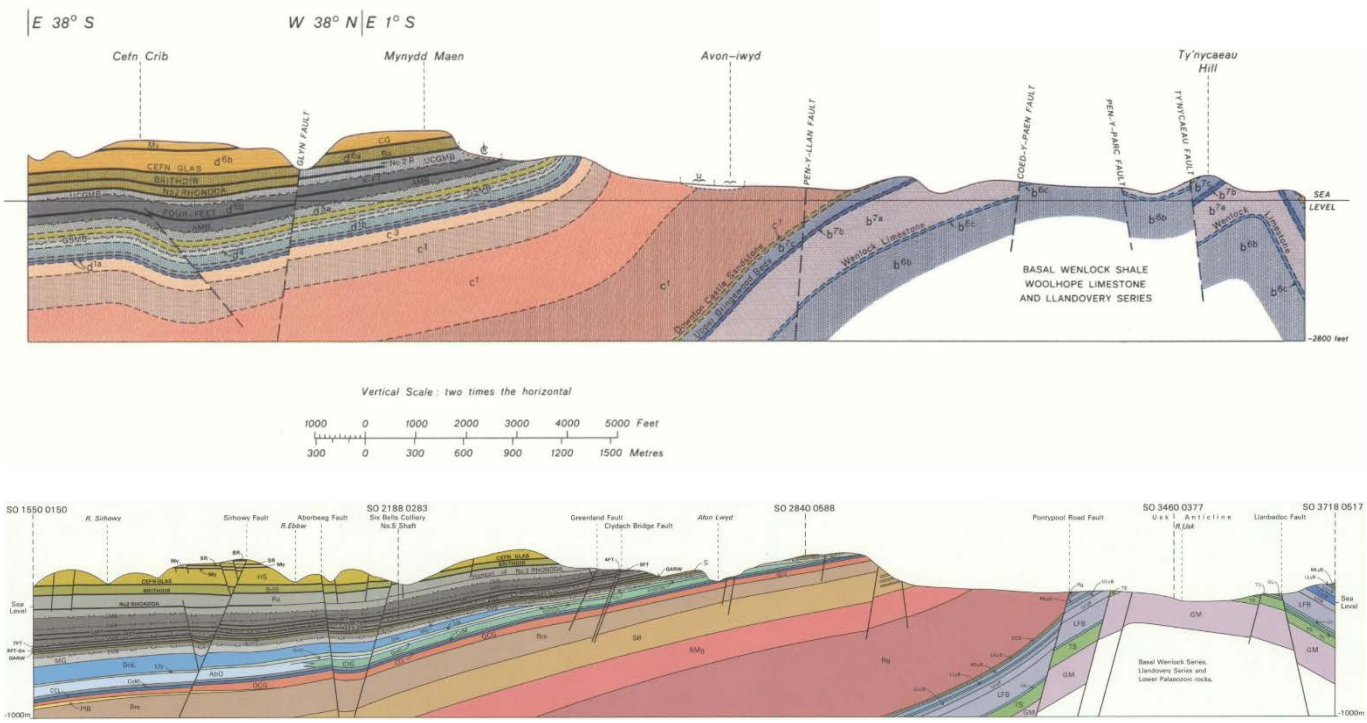

Figure 2.1. Regional geological cross sections approximately west-east (top section through Abersychan, bottom section through Pontypool). Source Geological Sheet 249 (top) and Sheet 232 (bottom).

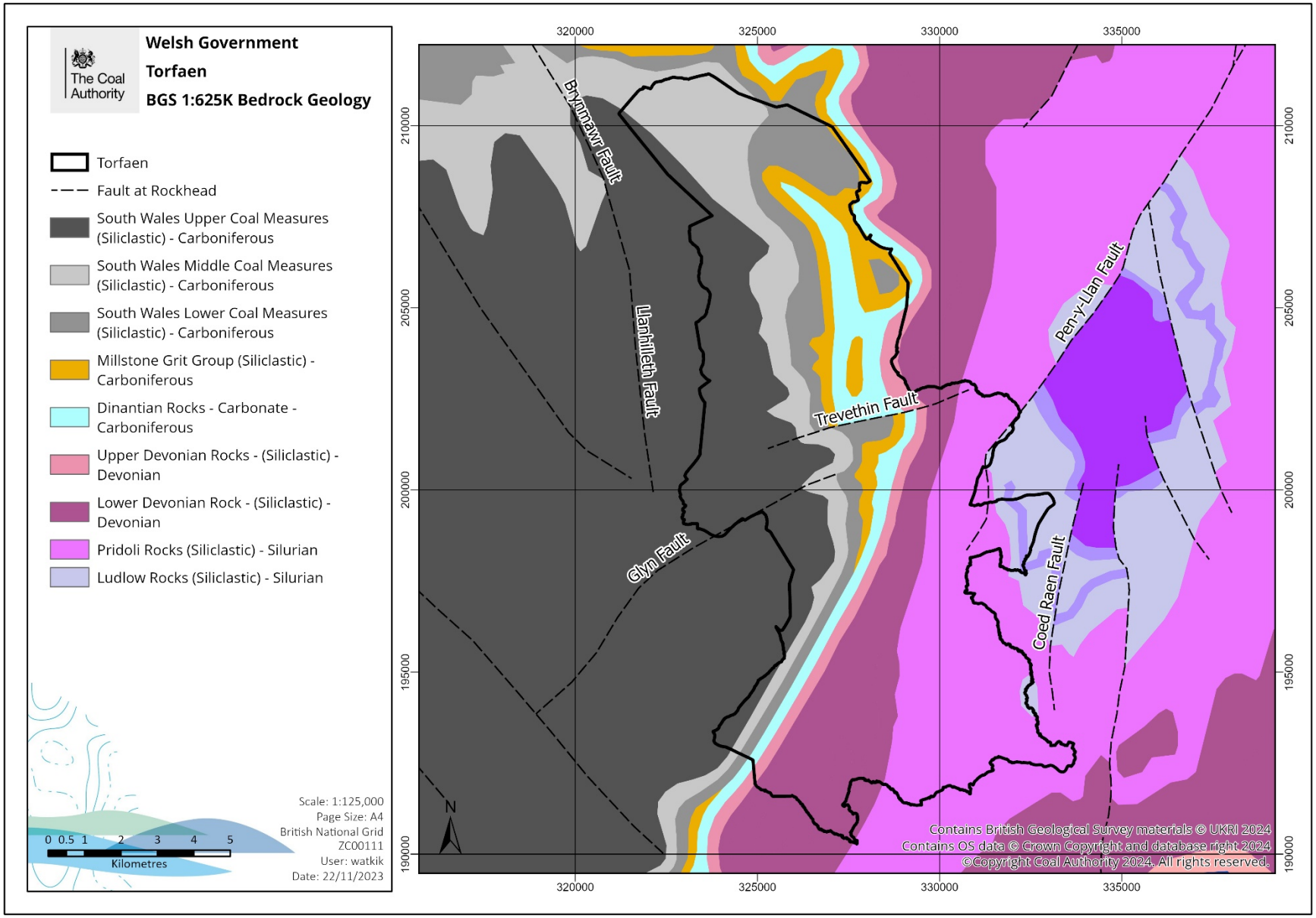

Figure 2.2. Bedrock geology in the Torfaen locality (Contains British Geological Survey materials © UKRI 2024)

Period	Series	Stage	Formations
Upper Carboniferous (Silesian)	Upper Coal Measures	Westphalian D, Westphalian C (part)	Grovesand, Hughes, Brithdir, Rhondda, Llynfi
	Middle Coal Measures	Westphalian C, Westphalian B (part)	-
	Lower Coal Measures	Westphalian B (part), Westphalian A	-
	Namurian	Yeadonian	Millstone Grit
		Marsdenian	
Lower Carboniferous (Dinantian)	Visean	Holkerian	Dowlais Limestone
	Tournaisian	Arundian	Garn Gaws Sandstone, Llanelly Fm
		Chadian	Gilwern Oolite
		Gourceyan	Coed Ffyddlwn, Blaen Onnen, Pantydarren, Pwll-y-Cwm, Sychnant, Cwmyniscoy, Castell Coch
Upper Devonian		Frasnian-Famennian	Quartz Conglomerate Group
Lower Devonian		Emsian	Brownstones, Senni, Pontypool Limestone
		Pragian	St Maughans
		Lochkovian	St Maughans (part) Psammosteus Limestone, Raglan Mudstone (part)
Upper Silurian	Pridoli Series	-	Raglan (part)
			Downton Castle Sandstone
	Ludlow Series	Ludfordian	Upper Llangibby, Middle Llangibby, Lower Llangibby, Upper Llanbadoc
		Gorstian	Lower Llanbadoc, Upper Forest, Lower Forest

Figure 2.3. Stratigraphy of Torfaen area between the Upper Carboniferous and Upper Silurian

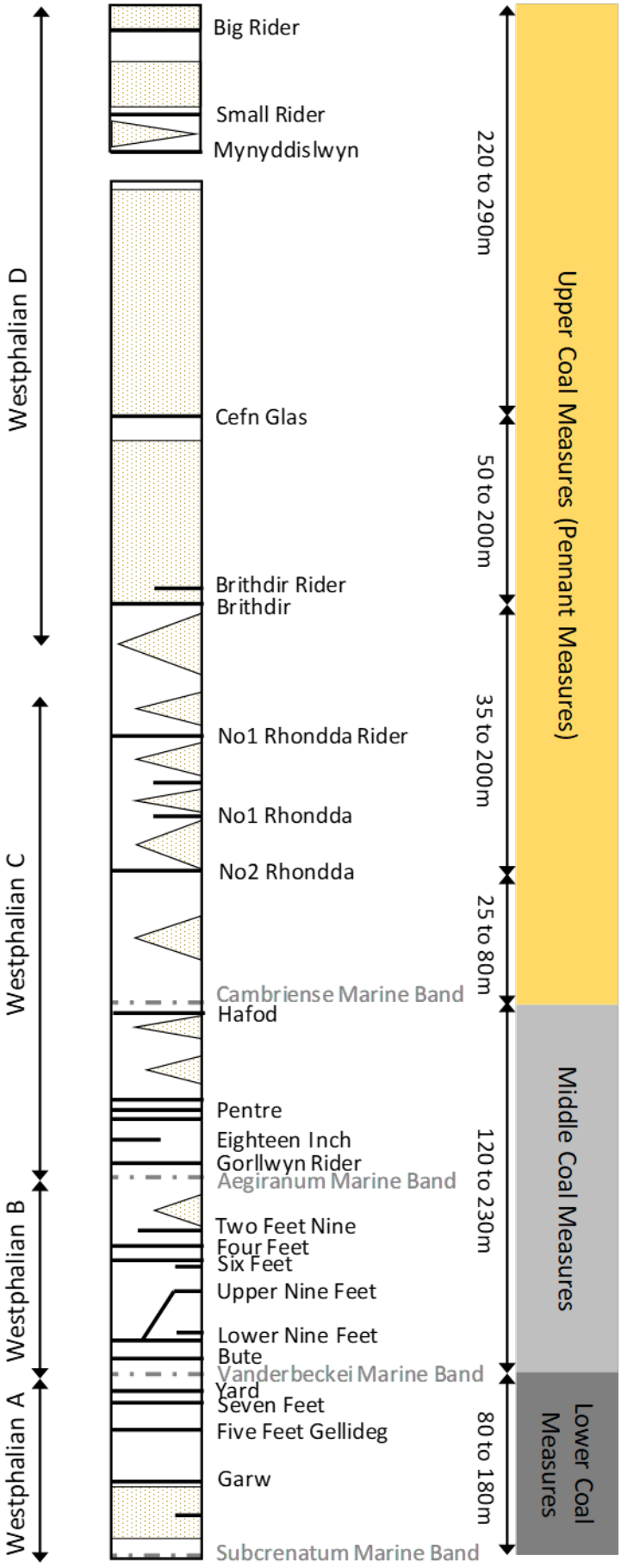

Figure 2.4. General section of strata for the Coal Measures Group for Torfaen

3 Mining situation

Coal mining has taken place in South Wales for several centuries with shallow seams being worked near to outcrop by means of roadways driven from the surface. These workings were often gravity drained by means of water levels or soughs.

From the mid 1800's, the industrial revolution and concomitant increase in demand for coal led to the sinking of many collieries into the deeper seams. The mine workings in the South Wales Upper Coal Measures were often not connected during mining to those in the South Wales Middle and Lower Coal Measures.

Torfaen includes the eastern extent (and outcrop) of the South Wales Coal Measures. Parts of the coal mining areas also includes ironstone mine workings (e.g. Blaenavon). The shallow nature of the coal and ironstone results in early mining in the area, with a mixture of small scale and larger scale collieries. Some coal mines were connected during mining for aspects such as coal preparation, efficiency improvements, and water managements. These underground mining connections have a great bearing on the underground mine water regime by interconnecting considerable areas of mine workings. The final collieries (most of which had merged to become complexes) to close are shown in **Table 3.1.**

Following colliery closures and end of mines in the 1980/90s, several mines were lost due to flooding. The final collieries (some of which had merged to become complexes) to close are set out in **Table 3.1** below.

Table 3.1. List of most recent colliery closures (surface location of mine in Torfaen)

Colliery	Closure date	Connected underground to
Big Pit / Blaenavon	1980	Big Pit and Blaenavon merged in 1960
Blaenserchan	1985	Merged with Six Bells (in Blaenau Gwent), connected to Plas-y-Coed, Tirpentwys and Llanerch
Glyntillery	1959	Merged with Hafodyrynys
Hafodyrynys	1968	
Varteg	1964	
Note: Mines at Blaentillery continued working on a small scale A detailed assessment of underground mining connections is required to confirm the mining hydrogeological conceptual model(s)		

Following these closures pumping ceased and the mines started to fill with mine water.

Up to 28 individual coal / ironstone seams have been worked in the area with the easternmost extremity of working being those in the South Wales Lower Coal Measures. The outcrop of the South Wales Coal Measures roughly follows the Afon Lwyd between Pontypool and Blaenavon. South of Pontypool the line of outcrop for the South Wales Coal Measures runs south-southwest. In general terms, workings in multiple seams are present north of the Glyn Fault / A472 and to the west of a line from approximately Pontypool to Blaenavon.

4 Mine water regime

4.1 Description of mine water blocks

Torfaen contains part of the South Wales Mine Water blocks 12 and 12a. Block 12 is to the north of the Glyn Fault / A472; and block 12a is to the south of the Glyn Fault / A472 (**Figure 4.1**).

Mine water block 12 covers a very large area extending from Torfaen across Blaenau Gwent and into Caerphilly CBC areas. The block is considered to be recovered with several mine water discharges being present. Mine water discharges within block 12 in Torfaen are monitored at Blaenavon (Coal Authority mine water treatment scheme) and at Abersychan. There is no mine water level monitoring within block 12 in Torfaen, although mine water monitoring does exist in block 12, albeit in Blaenau Gwent CBC. Mine water pumping is also undertaken in block 12 at Vivian Six Bells (in Blaenau Gwent CBC) to hold the mine water level below a historic surface outbreak on the bank of the Ebbw River.

Mine water block 12a extends into Caerphilly to the west and is also considered to be recovered with some mine water discharges being present. The discharge at Trosnant Brook is monitored by the Coal Authority, although data may be limited to chemistry and flow estimates.

There is no mine water level monitoring within block 12a in Torfaen, although monitoring does exist within neighbouring Caerphilly.

4.1.1 Mine water levels

There are no Coal Authority mine water level monitoring points within Torfaen. Mine water monitoring points that can be used as a proxy for block 12 and block 12a are shown in **Table 4.1**. The degree of connection between workings is unclear. The connectivity between workings in the South Wales Upper Coal Measures and the South Wales Middle / Lower Coal Measures is also unclear and will require further more detailed site specific study.

4.1.2 Mine water discharges

Mine water discharges are places where mine water reaches the surface and can discharge often via a mine entry or where workings breach the surface. Mine water levels in mine workings connected to a discharge should be elevated above the surface elevation of the discharge to create a head to drive the flow. There are three monitored mine water discharges (monitored by the Coal Authority) in Torfaen (**Table 4.1**). It is unclear how representative the gravity discharges are of the mine water levels within the wider mine workings.

Table 4.1. Mine water level monitoring points in Torfaen and adjacent areas

Monitoring point name	Mine water block	Average water level (mAOD)	Comments
Abersychan Discharge	12	N/A	Monitoring location includes mine water and stream water mixed. Surface level 207mAOD
Blaenavon Discharge	12	N/A	Surface decant 325mAOD
Trosnant Brook Discharge	12a	N/A	Surface decant 118mAOD
Celynen South Four Foot Seam Borehole	12a	90	Artesian
Cross Keys Six Feet (Black Vein?) Seam Borehole	12a	65	In Risca
Six Bells Shaft	12	144	Near Six Bells. Controlled by shaft drain
Vivian Six Bells Borehole	12	163	In Abertillery. Pumped

4.1.3 Mine water temperature

A study into mine water temperatures at various depths around the Britain's coalfields was published in 2020 (Farr et al, 2020). This study used historic underground water and strata temperatures along with data from mine water pumping where available.

Temperature typically increases with depth and data published in the study is shown in **Table 4.2** and **Table 4.3**.

Table 4.2. Anticipated underground mine water temperatures north of Glyn Fault

Depth (m BGL)	Mean(°C)	Max. (°C)	Min. (°C)
100	11.7	12.9	11
200	14.3	16.2	12.9
300	17	19.6	14.9
400	18.9	22.5	16.4
500	22.3	26.3	18.9

Table 4.3. Anticipated underground mine water temperatures south of Glyn Fault

Depth (m BGL)	Mean (°C)	Max. (°C)	Min. (°C)
100	11.0	11.1	10.9
200	13.0	13.2	12.9
300	15.1	15.3	15.0
400	17.2	17.4	17.0
500	19.3	19.4	19.1

4.1.4 Mine water chemistry

Mine water chemistry can be highly variable depending on specific location and would not normally form part of any initial high level opportunity scoping considerations guided by this study. The matter would be included in any more detailed, site specific, studies which may be commissioned in future.

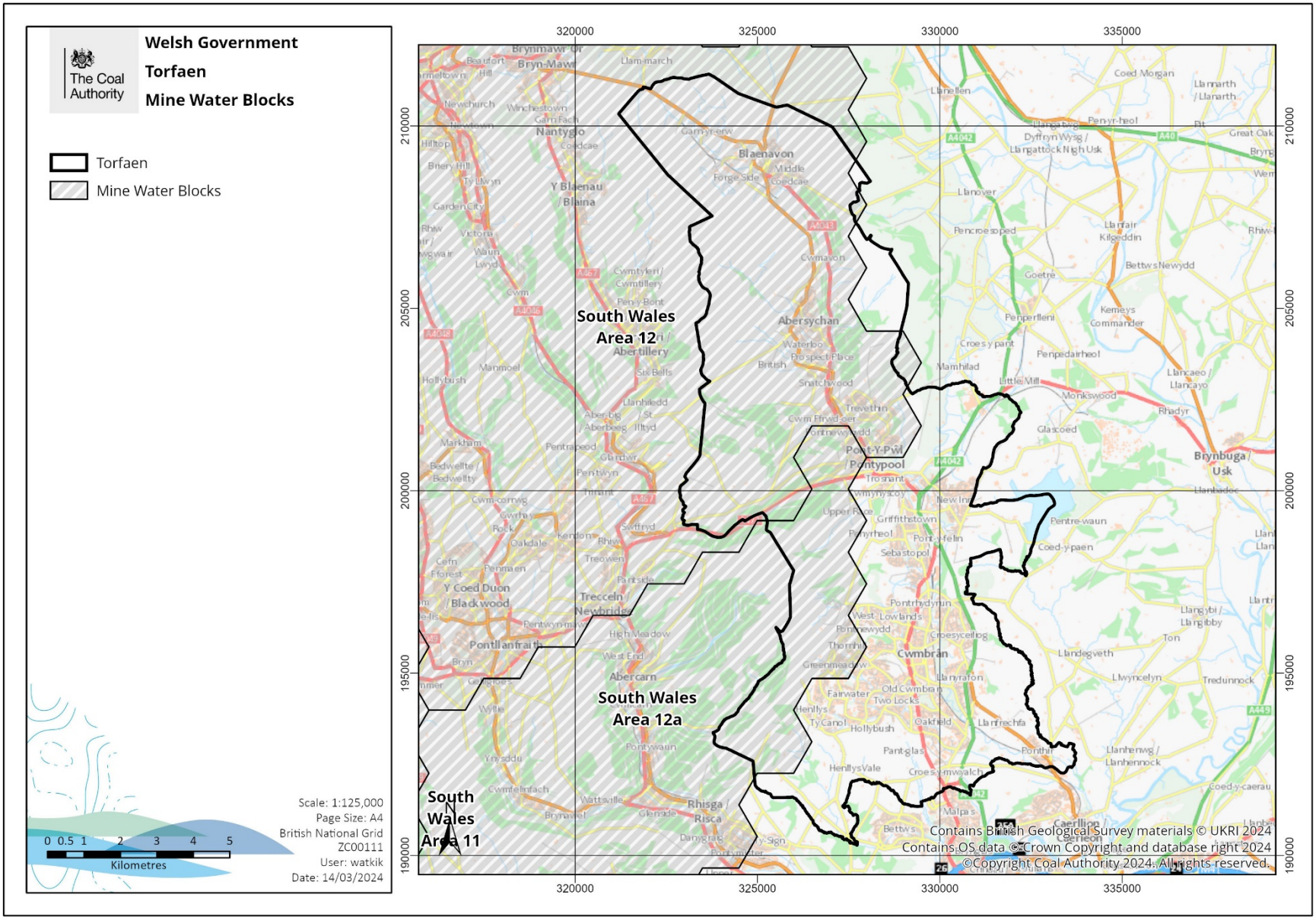

Figure 4.1. Mine water bocks in Torfaen

5 Mine water heat opportunities

5.1 Borehole schemes

The prospects for progressing a mine water heat scheme based on drilling boreholes to access and return the mine water are assessed on a 'tier' basis.

Three tiers have been adopted for the purposes of this study, the methodology and assessment criteria being set out in the over-arching report for Welsh Government.

The tiers are:

Good opportunities – shown coloured dark orange

Possible opportunities – shown coloured mid orange

Challenging opportunities – shown coloured light orange

Any areas where no opportunity exists, mainly due to absence of mine workings are shown uncoloured.

The tier areas within Torfaen CBC boundary are outlined below and are illustrated in **Figure 5.1**.

Any areas where no opportunity exists, mainly due to absence of mine workings are shown uncoloured.

Opportunities for heat schemes based on utilising discharges or mine water treatment schemes may exist but may differ in classification from that for borehole based schemes. These are covered in **5.2 and 5.3** below.

5.1.1 Good borehole scheme opportunities

North of the Glyn Fault / A472, good opportunities area includes the western part of Torfaen, from south of the B4248 to A472. The vast majority of this area is not developed with urbanised areas being limited to:

- **West Blaenavon** – mainly industrial estate area with mine workings in the range of 30 to 300m. The mine water in these workings is likely to be controlled by the discharge at **Blaenavon** mine water treatment scheme (see Section **5.2** below for heat potential)
- **West of Abersychan** – mainly limited areas such as **Golynos** and **British**. The mine water in these workings is likely to be controlled by a gravity discharge at Abersychan (see Section 6.3 below for heat potential). Potential unrecorded mine workings further east may offer some heat potential. Lack of surface development may limit potential.
- **West of Pontypool** – mainly limited areas such as **Tranch**. The mine water in these workings may be controlled by discharges at Pontypool and / or Abersychan (see Section 6.3 below for heat potential). Potential unrecorded mine workings further east may offer some heat potential.

South of the Glyn Fault / A472. While classified as a good opportunity area in respect of the mining and hydrogeology, this area does not include any urban areas with any significant potential heat demand.

5.1.2 Possible borehole scheme opportunities

While areas are present classed as possible opportunities in respect of mining and hydrogeology, they are beneath remote rural areas with little or no surface urbanisation and associated potential heat demand.

5.1.3 Challenging borehole opportunities

Challenging borehole opportunity areas exist within Torfaen but are limited and mainly include non-urban areas with the exception of **North Blaenavon**. In this area the mine workings are <30 mBGL and could potentially include unrecorded coal workings and ironstone workings.

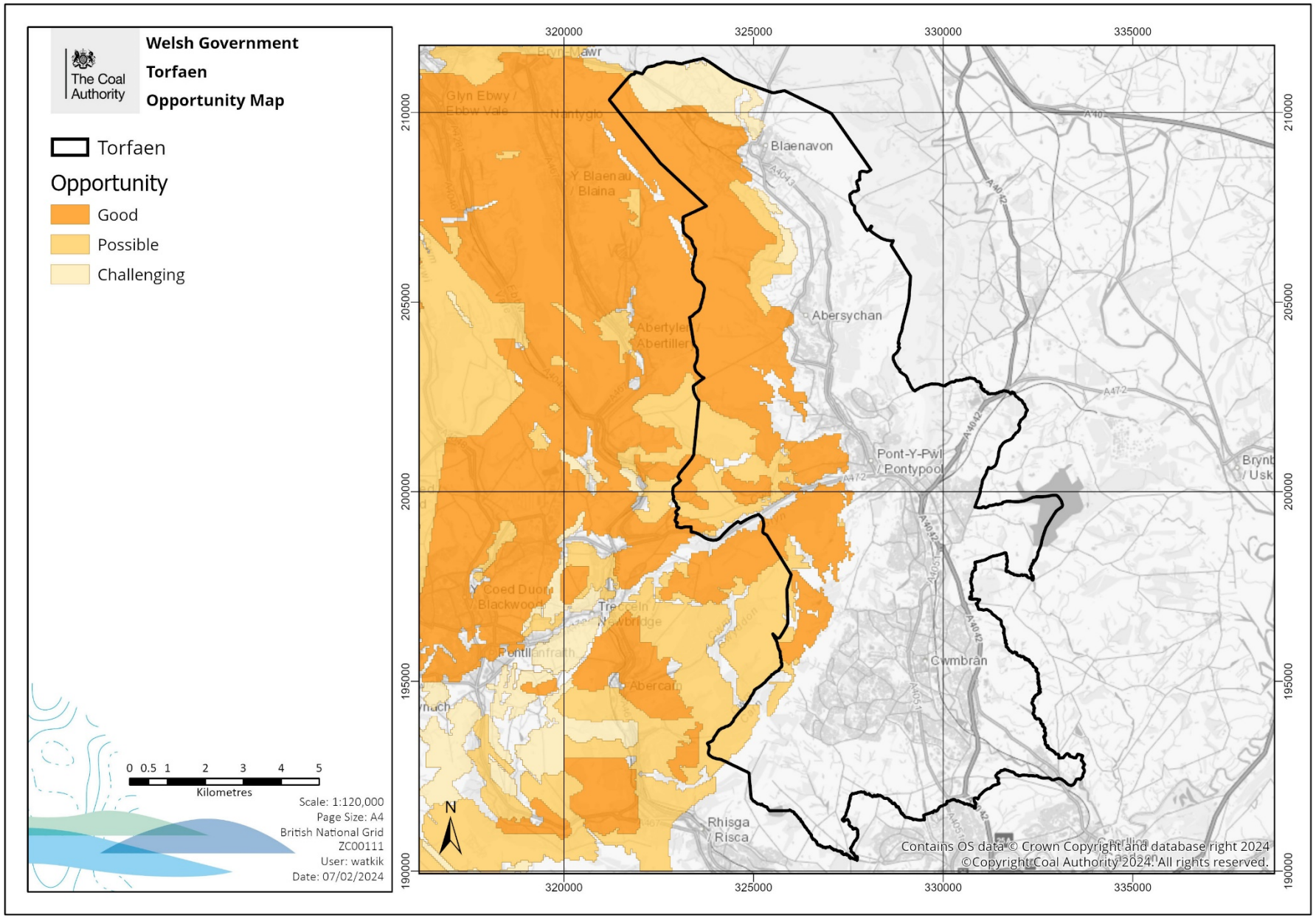

Figure 5.1: Mine water heat opportunities – borehole schemes

5.2 Mine water treatment schemes

Existing Coal Authority mine water treatment schemes where mine water is already either pumped or flowing may in some circumstances potentially offer a lower risk approach to developing mine water heat projects as new drilling and testing of boreholes would not be required.

Within Torfaen, one scheme exists, namely the **Blaenavon** mine water treatment scheme, located close to the Afon Lwyd at **Blaenavon.** The mine water discharges in to a culverted section of the River Arch from which it exits at the bottom of a fairly steep sided valley. Heat could be recovered from the discharge via a heat exchanger, allowing heat to be circulated to other parts of Blaenavon as needed. Mine water temperature data is available from the inflow and outflow of the mine water treatment scheme. Mine water flow rate is monitored at the outflow from the treatment scheme. A summary of temperature and flow for Blaenavon is shown in **Table 5.1**.

5.3 Gravity-fed discharge schemes

Numerous gravity mine water discharges exist in the Torfaen area. Many are not monitored for flow rate, water quality or temperature, some of these may offer heat potential not presented in this report. Gravity-fed discharges generally occur when mine workings connect with the surface, typically via mine entries and boreholes.

The nature of gravity-fed discharges (flow, temperature and quality) will be dependent upon a number of factors including mining type and geometry, the hydrogeological system of the mine workings and rainfall.

Some discharges are likely to be more variable in flow rate and temperature than others but as many of the discharges are not currently monitored for flow rate, water quality or temperature and it is difficult to evaluate with any degree of confidence.

Those discharges that do have some monitoring data (albeit in some cases relatively limited) and are likely to have a heat potential of >0.5 MW_{th} are described in the sections below supported by data in **Table 5.1** and illustrated on the plans in **Figure 5.4.**

Should a potential heat demand be identified close to one of these discharges (shown in **Table 5.1**) or any other discharge in the area, then a more detailed study would be required. Additional investigation and data gathering will likely be required to establish its potential

Table 5.1: Summary of selected gravity-fed discharges for mine water heat potential

Name	Average flow rate (L/s)	Flow range (L/s)	Typical temperature (°C)	Estimated potential heat (MWth)
Abersychan+	82	>20 to >150	11.5	2.1
Blaenavon MWTS	15	<5 to 50	11	0.4
Nant Ffrwd-oer SE	12	Spot reading	11	0.3
Pontnewydd	91	Spot reading	11.7	2.4
Trosnant Brook$	171	<50 to >200	10.1	4.5

Note: Potential heat is based on spot readings and / or average flow rate. Potential heat will vary with flow rate, which varies with rainfall. Potential heat at a site may be above or below the estimated value at different stages of the year

+ Abersychan discharge includes mine water and culverted stream. Mine water flow rate is based on base-flow of the discharge (e.g. lower flow rates measured)

$ It is uncertain if Trosnant Brook includes surface water or not, flow rates need to be confirmed

Potential heat is based on average flow rate, ΔT of 5°C and COP of 4

5.3.1 Abersychan (Golynos Level) Discharge

The discharge is from a culverted section of Cwmsychan Brook south of Abersychan. The actual source of the mine water discharge is thought to be the Golynos Water Level (drainage adit), it is likely to be an adit to the brook that is now buried by a playing field. There is a manhole within the playing field to the discharge. Capturing the mine water discharge would need investigating. The discharge in on the priority list for remediation of existing discharges, however, it is uncertain if any scheme is likely to be implemented. This could be a technically challenging heat opportunity for mine water capture.

An initial broad estimate suggests a potential of around 2.1 MW_{th} may be available but a more detailed site specific study will be needed to assess flow rate and temperature with more certainty and confirm feasibility for a heat scheme(s). Further investigation will need to be undertaken to confirm potential heat users.

5.3.2 Pontnewydd and Nant Ffrwd-oer SE discharges

The source needs to be confirmed as it is unclear if there is one discharge (with two names and locations), or if there are multiple discharges. The discharges are not monitored by the Coal Authority, and data is very limited to a few estimates of flow rate and spot temperature measurements. An initial estimate of 2.4 MW_{th} for Pontnewydd is based on this very limited data, and further monitoring data will be required to confirm the potential. The Nant-Ffrwd-oer SE discharge has a lower flow rate, albeit there is limited data; mine heat potential for this discharge is estimated at 0.3 MW_{th}. Further investigation will need to be undertaken to confirm potential heat users. This could be a technically challenging heat opportunity for mine water capture.

Figure 5.2: Abersychan discharge and Cwmsychan steam culvert discharge

Figure 5.3: Nant Ffwdd-oer SE discharge

5.3.3 Trosnant Brook

There is likely mine water entering a culverted section of Trosnant Brook. It is uncertain if the reported flow rates are mine water or the brook itself. Further investigation will be required to confirm actual mine water flow rates. The heat potential of 4.5 MW_{th} is based on moderate – high flow rates that may not be solely mine water. The actual source of the discharge will also need to be confirmed, the nearest mine entries upstream of the confluence of Trosnant Brook and Afon Lwyd are around Pontypool AFC football pitch. Further investigation will need to be undertaken to confirm potential heat users. This could be a technically challenging heat opportunity for mine water capture.

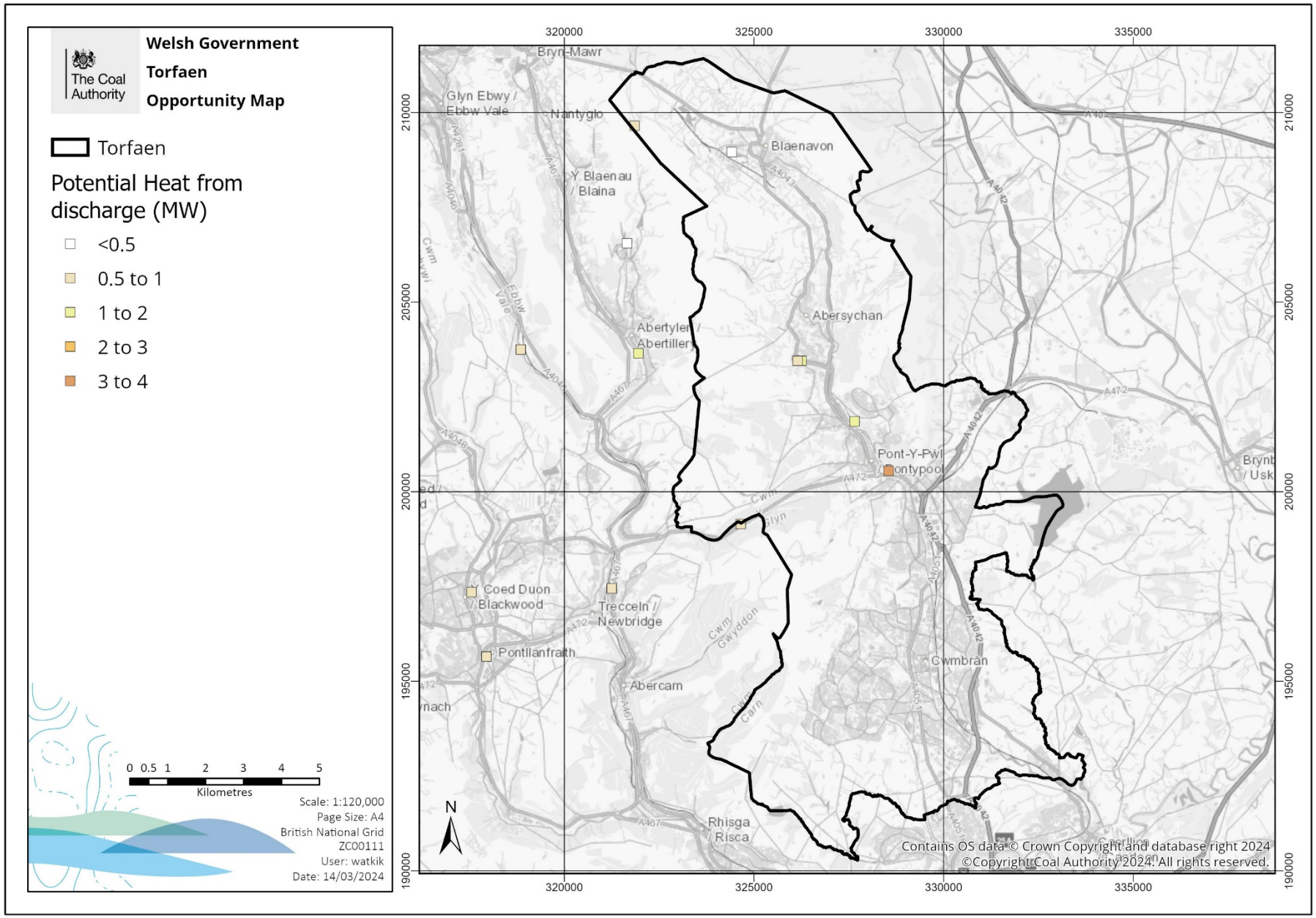

Figure 5.4. Gravity mine water discharges in Torfaen

6 Highlighted Opportunities and Summary

The previous sections of the report consider the mining and mine water parameters across the whole borough to rank areas by reference to a tiered opportunity classification system which sets out quality of opportunities on an areal basis.

This section overlays the tiers on populated settlement areas to provide a steer on localities where mining aspects and surface development may present the most likely places to further investigate mine water heat utilising boreholes. In addition any opportunities related to mine water treatment schemes or surface discharges which may offer good potential for development are also highlighted. The locations are illustrated at **Figure 6.1.**

Table 6.1. Highlighted opportunities in Torfaen

No./ Area	Opportunity name	Opportunity type	Category	Potential MW_{th}
1	Blaenavon west	Borehole scheme	Good	Subject to further testing
2	West of Abersychan	Borehole scheme	Good	Subject to further testing
3	West of Pontypool (Tranch)	Borehole scheme	Good	Subject to further testing
4	Blaenavon	Mine water treatment scheme	Possible	Subject to further testing
5	Trosnant Brook	Gravity discharge	Possible	Subject to further testing

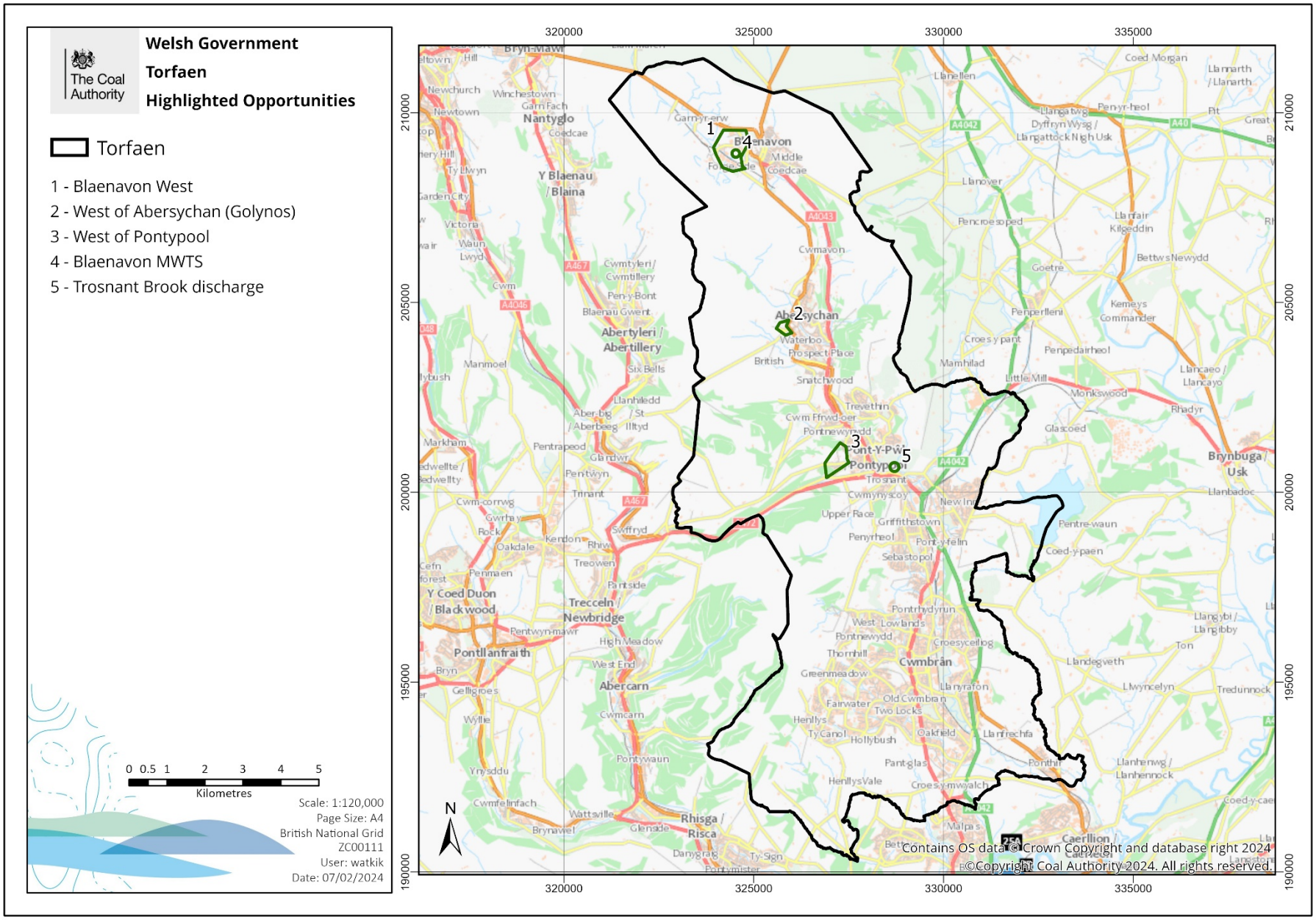

Figure 6.1. Highlighted good opportunities

6.1 Borehole schemes

Considerable areas of the western half of the Torfaen CBC administrative area are underlain by abandoned coal mine workings at a depth and with a mine water recovery status offering varying degrees of potential for delivery of a borehole based mine water heat scheme.

It should be recognised that most of the worked areas in Torfaen are under open countryside with little in the way of surface development. Notwithstanding this there are limited areas which are worthy of further more detailed investigation based on them being in a 'good opportunity' tier classification (**Section 5.1** above) and being populated / urban areas. This project defines three different types of opportunity, however, it should be noted that this does not guarantee a successful heat scheme.

An area of east Blaenavon shown as area **1** on **Figure 6.1** is underlain by workings in multiple seams shallower than 300 m. The area is bounded by the B4248 (Garn Road) highway to the north and takes in developed areas to the west of the B4246 including the Gilchrist Thomas Industrial Estate and Forgeside. These developments may have a significant aggregate heat demand. The Blaenavon mine water treatment scheme is also very close by in this area.

6.2 Mine water treatment schemes

This section is only to record that the treatment schemes are there and provide information on the potential and does not imply any guarantee that a heat scheme may be connected to the mine water treatment scheme. Should there be a desire to investigate the potential it is recommended that an early dialogue is opened with the Coal Authority as owners and operators of the mine water treatment schemes.

Only one scheme is present in Torfaen, namely the **Blaenavon** Mine Water treatment scheme which is situated to the south of the Gilchrist Thomas Industrial Estate as shown as location **4** on **Figure 6.1**. The scheme sits in a steeply sided valley at a level of some 40m to 50m below the estate. Any heat scheme involving the treatment scheme would therefore require pumping.

6.3 Mine water discharges

Many mine water discharges are known to exist in the area, currently 6 of these have been considered as offering potential for a mine water heat scheme and are detailed in **Section 5.3**. Many of these do present significant challenges in collecting the mine water but individually they offer heat potential of 0.3 MW_{th} to 4.5 MW_{th} without the need for boreholes and associated deep pumping.

The highlight discharge is **Trosnant Brook** in the eastern part of Pontypool which is shown as location **5** on **Figure 6.1** and may have a heat capacity of up to 4.5 $MW_{th.}$ Further investigation is needed to confirm flows, challenges in collecting the mine water and surface heat loads. The discharge is however relatively close (<100 m) to the Pontypool Active Living Centre.

As outlined earlier this report only records the presence of the mine water treatment scheme and it does not imply any guarantee that a heat scheme can be connected to the mine water treatment scheme.

6.4 Summary and next steps

A number of good, possible and challenging mine water heat opportunity areas have been identified across the western half of the Torfaen CBC region as illustrated in **Figure 6.1**.

However, much of the Torfaen CBC area is rural with little or no surface development, and potential users in those areas will be limited compared to urban areas. The opportunity areas have been considered against the major developed areas (which may have a significant heat demand) in the borough to seek to identify places where good heat supply opportunities may coincide with significant heat demand. It is suggested that the opportunities covered in this section and listed in **Table 6.1** and shown in **Figure 6.1** are further considered for more detailed study.

The heat potential of the borehole schemes cannot be estimated to any degree of certainty until more detailed and localised study is undertaken. Localised studies or more in-depth studies for boreholes are required to confirm available flow rates and other factors that are used to determine heat potential. This may involve exploratory drilling. However, within this report, there are borehole opportunity areas marked as good on the basis that it is considered the workings in these areas are substantial and likely to have significant heat potential >3 MWth.

It is recommended that a survey of the main heat loads, particularly potential large 'anchor' loads such as hospitals or larger public buildings are undertaken in the highlighted opportunity areas in **Figure 6.1** to establish synergies between potential heat supply and heat demand. Potential cooling demands should also be considered. This may identify good opportunities to further investigate pilot mine water heat projects through more detailed feasibility work, initially involving desktop studies and subsequent investigative drilling should the potential be attractive.

7 References

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