



# 2009 Air Quality Updating and Screening Assessment for *Gwynedd Council*

In fulfillment of Part IV of the Environment Act 1995  
Local Air Quality Management

September 2009

<b>Local Authority Officer</b>	<a href="#">David Anthony Williams</a>
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<b>Department</b>	<a href="#">Regulatory – Public Protection</a>
<b>Address</b>	<a href="#">Arfon Area Offices, Penrallt, Caernarfon, LL55 1BN</a>
<b>Telephone</b>	<a href="#">01286 602 894</a>
<b>e-mail</b>	<a href="mailto:davidawilliams@gwynedd.gov.uk">davidawilliams@gwynedd.gov.uk</a>

<b>Report Reference number</b>	
<b>Date</b>	9 <sup>th</sup> October 2009

# **Executive Summary**

Gwynedd Council has carried out a review and assessment of air quality within its boundary which fulfils the requirements of the Local Air Quality Management process in Part IV of the Environment Act (1995) and the Air Quality (Wales) Regulations 2000 and the Air Quality (Amendment) (Wales) Regulations 2002.

This Updating and Screening Assessment (USA) begins the fourth round of the Review and Assessment process which began in 1999. This document includes the latest data from 2008 but also considers the years 2006 and 2007 since the last USA was submitted and the previous rounds of Review and Assessment. Any changes that have occurred and how they would affect air quality since the last round will be investigated.

During 2008 Gwynedd Council has conducted monitoring for Nitrogen Dioxide at various roadside locations, Sulphur Dioxide monitoring near steam locomotive sources and a particulate (PM<sub>10</sub>) monitoring study also near a steam locomotive station.

Results from monitoring and the conclusions of this document say it is possible that the Air Quality Objective for Sulphur Dioxide may be exceeded at one location, therefore a Detailed Assessment for this pollutant will be required in Gwynedd.

# Table of contents

<b>1</b>	<b>Introduction</b>	<b>4</b>
1.1	Description of Local Authority Area	4
1.2	Purpose of Report	4
1.3	Air Quality Objectives	4
1.4	Summary of Previous Review and Assessments	6
<b>2</b>	<b>New Monitoring Data</b>	<b>7</b>
2.1	Summary of Monitoring Undertaken	7
2.2	Comparison of Monitoring Results with AQ Objectives	9
<b>3</b>	<b>Road Traffic Sources</b>	<b>12</b>
3.1	Narrow congested streets with residential properties close to the kerb	12
3.2	Busy streets where people may spend 1-hour or more close to traffic	12
3.3	Roads with high flow of buses and/or HGVs.	12
3.4	Junctions and busy roads	13
3.5	New roads constructed or proposed since the last round of review and assessment	13
3.6	All roads with significantly changed traffic flows.	13
3.7	Bus and coach stations	13
<b>4</b>	<b>Other Transport Sources</b>	<b>14</b>
4.1	Airports	14
4.2	Railways (diesel and steam trains)	14
4.3	Ports (shipping)	14
<b>5</b>	<b>Industrial Sources</b>	<b>15</b>
5.1	New or Proposed Industrial Installations	15
5.2	Major fuel (petrol) storage depots	15
5.3	Petrol stations	16
5.4	Poultry farms	16
<b>6</b>	<b>Commercial and Domestic Sources</b>	<b>17</b>
6.1	Biomass combustion – Individual Installations	17
6.2	Biomass combustion – Combined Impacts	17
6.3	Domestic Solid-Fuel Burning	17
<b>7</b>	<b>Fugitive or Uncontrolled Sources</b>	<b>18</b>
<b>8</b>	<b>Conclusions and Proposed Actions</b>	<b>19</b>
8.1	Conclusions from New Monitoring Data	19
8.2	Conclusions from Assessment of Sources	19
8.3	Proposed Actions	19
<b>9</b>	<b>References</b>	<b>20</b>



## ***Gwynedd Council - Wales***

### **Appendices**

Appendix A	QA/QC Data
Appendix B	Part A1, A2 and B Authorized/ Permitted Processes
Appendix C	Diffusion Tube Location Maps
Appendix D	Details of PM <sub>10</sub> Investigation at Maes Padarn

# **1 Introduction**

## **1.1 Description of Local Authority Area**

The County of Gwynedd lies between the area from Abergwyngregyn in the north to Aberdyfi in the south, and from the Llyn Peninsula in the west to Glan yr Afon in the east. Gwynedd covers an area of 225 000 hectares and has a population of approximately 120, 000. The county shares it's inland boundary with four other counties; Conwy, Denbighshire, Powys and Ceredigion.

Gwynedd is predominantly rural, with a low population density. The main areas of population concentration are the University City of Bangor and Gwynedd Administration centre, Caernarfon, both on the south shore of the Menai Strait to the north west of the county. Other small towns include, Pwllheli, Porthmadog, Blaeanau Ffestiniog and Dolgellau.

The largest and busiest road within the county is the A55 connecting the port of Holyhead on Anglesey to the north west of England along the north Wales coast. It stretches approximately 20km through Gwynedd from Abergwyngregyn, around Bangor to the Britannia Bridge. The A470 which is the primary route between north and south Wales traverses Gwynedd from Blaenau Ffestiniog to Mallwyd in the south. Another important road is the A487 which links Caernarfon and Bangor with the south of the County before merging with the A470 at Llan Ffestiniog, then continuing from the south of Dolgellau towards, Machynlleth and beyond.

Road traffic sources are the main concern with regard to air quality in Gwynedd. The dependence of the car and an increase in the influx of traffic from tourism has increased road traffic pollution in the past but newer greener cars on our roads seem not have caused levels of nitrogen dioxide to level off in the last few years.

## **1.2 Purpose of Report**

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

## **1.3 Air Quality Objectives**

The air quality objectives applicable to LAQM in Wales are set out in the Air Quality (Wales) Regulations 2000, No. 1940 (Wales 138), Air Quality (Amendment) (Wales) Regulations 2002, No 3182 (Wales 298), and are shown in Table 1.1. This table shows the objectives in units of micrograms per cubic metre  $\mu\text{g}/\text{m}^3$  (milligrams per cubic metre,  $\text{mg}/\text{m}^3$  for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

**Table 1.1 Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in Wales.**

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
<b>Benzene</b>	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	5.00 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2010
<b>1,3-Butadiene</b>	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
<b>Carbon monoxide</b>	10.0 $\text{mg}/\text{m}^3$	Running 8-hour mean	31.12.2003
<b>Lead</b>	0.5 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
<b>Nitrogen dioxide</b>	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2005
<b>Particles (PM<sub>10</sub>) (gravimetric)</b>	50 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
<b>Sulphur dioxide</b>	350 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

## 1.4 Summary of Previous Review and Assessments

Table 1.2 Summarises the previous rounds of Review and Assessment and their outcome. No detailed assessments have been carried out and therefore no Air Quality Management Areas Declared.

**Table 1.2**

**Title Of Report**

Gwynedd Council, Housing and Public Protection Department (1999): *Review and Assessment of Air Quality – First Stage*

**Outcomes**

No need for second stage review and assessment for:

- Carbon Monoxide
- Benzene
- 1,3-Butadiene
- Lead
- Sulphur Dioxide

Need second stage review and assessment for

- Nitrogen Dioxide
- PM<sub>10</sub>

Gwynedd Council, Housing and Public Protection Department (2000): *Review and Assessment of Air Quality – Second Stage*

Risk of Nitrogen Dioxide objective being exceeded by the end of 2005 negligible.

Risk of PM<sub>10</sub> objectives being exceeded by the end of 2005 negligible.

Gwynedd Council, Housing and Public Protection Department (2003): *Review and Assessment of Air Quality – Updating and Screening Assessment*

No need to progress to a Detailed Assessment for any pollutant.

Gwynedd Council, Administrative and Public Protection Services, Resources Directorate (2004): *Progress report for 2003*

No exceedences in air quality objectives from roadside Nitrogen Dioxide monitoring, therefore no need to progress to Detailed Assessment

Gwynedd Council, Administrative and Public Protection Services, Resources Directorate (2005): *Progress report for 2004*

No exceedences in air quality objectives from roadside Nitrogen Dioxide monitoring, therefore no need to progress to Detailed Assessment

Gwynedd Council, Administrative and Public Protection Services, Resources Directorate (2006): *Review and Assessment of Air Quality – Updating and Screening Assessment*

No need to progress to a Detailed Assessment for any pollutant

Gwynedd Council, Administrative and Public Protection Services, Resources Directorate (2007): *Progress Report for 2006*

No exceedences in air quality objectives from roadside Nitrogen Dioxide monitoring, therefore no need to progress to Detailed Assessment.

Short PM<sub>10</sub> Study at Maes Padarn, Llanberis indicates longer term monitoring is needed.

Gwynedd Council, Administrative and Public Protection Services, Resources Directorate (2008): *Progress Report for 2007*

No exceedences in air quality objectives from roadside Nitrogen Dioxide monitoring, therefore no need to progress to Detailed Assessment.

PM<sub>10</sub> study at Cibyn Industrial Estate showed no exceedences in 24 hour mean.

Intention to locate PM<sub>10</sub> monitor at Maes Padarn during 2008 as suggested in progress report for 2006

## 2 New Monitoring Data

### 2.1 Summary of Monitoring Undertaken

#### 2.1.1 Automatic Monitoring Sites

Gwynedd Council own and operate one OSIRIS dust monitor purchased from Turnkey Instruments Ltd. This monitor is unsuitable for conducting a Detailed Assessment of PM<sub>10</sub> according to the Review and Assessment helpdesk. Details of the QA/QC for this instrument are described in appendix Following on from a similar, short study carried out at the village of Llanberis in 2006 (as described in Gwynedd Council's Progress Report for 2006) another more detailed investigation of PM<sub>10</sub> was undertaken.

The monitor was placed in the rear garden of a property approximately 20m from where steam locomotives are stationary at the Snowdon Mountain Railway. It was at this location between the 13<sup>th</sup> of May and the 18<sup>th</sup> of November 2008 and set to take readings every 15 minutes. Due to a power cut no data was available between the 11<sup>th</sup> and 22<sup>nd</sup> of August.

During this period there was only one 24 hour mean exceedance of 56µg/m<sup>3</sup> on the 24<sup>th</sup> of June. To breach the Air Quality Objective 50µg/m<sup>3</sup> would have to be exceeded more than 35 times a year. Appendix D shows a graph of the results and a plan of the monitor's location.

**Table 2.1 Details of Automatic Monitoring Sites**

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA ?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location ?
86 Maes Padarn, Llanberis	Other	X 258188 Y 359759	PM <sub>10</sub>	N	5m	N/A	Y

#### 2.1.2 Non-Automatic Monitoring

During 2008 Gwynedd Council monitored nitrogen dioxide at 31 different locations close to traffic sources as indicated in table 2.2 below. Sulphur dioxide was monitored by diffusion tube as 4 sites close to steam locomotive stations within the county during 2008. SO<sub>2</sub> Diffusion Tubes are not suitable for use in LAQM, as stated in paragraph A1.52 of the Guidance but were deployed to give us a general idea of the SO<sub>2</sub> concentrations at these locations. Maps showing all tube locations can be found in Appendix C

**Table 2.2 Details of Non- Automatic Monitoring Sites**

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location?
GCC/001 Bro Helen, Caernarfon (C1)	Roadside	X 248273 Y 262132	NO <sub>2</sub>	N	2m	2m	N
GCC/002 Roundabout A470, Caernarfon (C2)	Kerbside	X 248147 Y 363456	NO <sub>2</sub>	N	10m	1m	Y

## Gwynedd Council - Wales

GCC/003 Lon Cambell, Caernarfon (C3)	Urban Background	X 248480 Y 363456	NO <sub>2</sub>	N	5m	N/A	N/A
GCC/004 Lllys Meirion, Caernarfon (C4)	Roadside	X 248537 Y 363670	NO <sub>2</sub>	N	5m	2m	N
GCC/005 Ffordd Bangor, Caernarfon (C5)	Kerbside	X 248892 Y 364120	NO <sub>2</sub>	N	7m	1m	Y
GCC/006 Ffordd Glynne, Bangor (B1)	Urban Background	X 258339 Y 372613	NO <sub>2</sub>	N	5m	N/A	N/A
GCC/007 Ffordd Gwynedd, Bangor (B2)	Urban Centre	X 258078 Y 372169	NO <sub>2</sub>	N	10m	N/A	N/A
GCC/008 A4087, Bangor (B3)	Kerbside	X 257587 Y 371543	NO <sub>2</sub>	N	2m	1m	Y
GCC/009 A55 Bangor (CO-LOC)	Kerbside	X 254990 Y 369727	NO <sub>2</sub>	N	Over 25m	2m	Y
GCC/010 A55 Bangor (B4)	Kerbside		NO <sub>2</sub>	N	Over 25m	2m	Y
GCC/011 A5122, Bangor (B5)	Kerbside	X 256292 Y 371663	NO <sub>2</sub>	N	Over 25m	1m	Y
GCC/012 Faenol Roundabout, Bangor (B6)	Kerbside	X 254286 Y 368835	NO <sub>2</sub>	N	Over 25m	1m	Y
GCC/013 Bethesda (BETH 1)	Kerbside	X 261529 Y 367380	NO <sub>2</sub>	N	10m	1m	Y
GCC/014 Llanberis (LLANBER 1)	Roadside	X 256669 Y 361192	NO <sub>2</sub>	N	10m	2m	N
GCC/015 Llanwnda (LL1)	Roadside	X 247770 Y 358663	NO <sub>2</sub>	N	5m	2m	Y
GCC/016 Penygroes (PEN 1)	Kerbside	X 247049 Y 353223	NO <sub>2</sub>	N	2m	1m	Y
GCC/017 Llanllyfni (PEN 2)	Kerbside	X 247011 Y 351838	NO <sub>2</sub>	N	1m	1m	Y
GCC/018 Nefyn (NEF 1)	Kerbside	X 230709 Y 340481	NO <sub>2</sub>	N	3m	1m	Y
GCC/019 Pwllheli (PW 1)	Roadside	X 237387 Y 334942	NO <sub>2</sub>	N	10m	3m	Y
GCC020 Tal y Bont (TAL 1)	Kerbside	X 242728 Y 336942	NO <sub>2</sub>	N	12m	1m	Y
GCC021 Cricieth (CR 1)	Roadside	X 249967 Y 338173	NO <sub>2</sub>	N	7m	3m	Y
GCC/022 Porthmadog (POR 1)	Roadside	X 256889 Y 338626	NO <sub>2</sub>	N	1m	3m	N
GCC/023 , Beddgelert (BEDD 1)	Kerbside	X 258956 Y 348159	NO <sub>2</sub>	N	4m	1m	Y
GCC/024 Maentwrog (MAEN 1)	Roadside	X 266354 Y 340919	NO <sub>2</sub>	N	Over 50m	2m	N
GCC/025 Blaenau Ffestiniog (BL 1)	Roadside	X 270200 Y 345935	NO <sub>2</sub>	N	10m	2m	N
GCC/026 Bala (BALA 1)	Roadside	X 292753 Y 336205	NO <sub>2</sub>	N	7m	2m	Y
GCC/027 Dolgellau (DOL 1)	Roadside	X 272770 Y 318062	NO <sub>2</sub>	N	10m	2m	Y
GCC/028 Llanbedr (LLAN 1)	Roadside	X 258548 Y 326802	NO <sub>2</sub>	N	7m	3m	N
GCC/029 Barmouth (AB 1)	Kerbside	X 261525 Y 315876	NO <sub>2</sub>	N	8m	1m	Y

## Gwynedd Council - Wales

GCC/030 Aberdyfi (ABDYF 1)	Kerbside	X 271067 Y 295952	NO <sub>2</sub>	N	8m	1m	Y
GCC/031 Trawsfynydd (TRAWS 1)	Roadside	X 271067 Y 335013	NO <sub>2</sub>	N	20m	2m	Y
GCC/032 Waunfawr (WAUN 1)	Rural	X 360790 Y 253140	SO <sub>2</sub>	N	15m	N/A	N/A
GCC/033 Rhyd Ddu (RHYD 1)	Other	X 352607 Y 257084	SO <sub>2</sub>	N	25m	N/A	N/A
GCCC/034 Llanberis (LLANBER 2)	Other	X 359760 Y 258190	SO <sub>2</sub>	N	5m	N/A	N/A
GCC/035 Caernarfon (CAER 6)	Other	X 362374 Y 248194	SO <sub>2</sub>	N	15m	N/A	N/A

## 2.2 Comparison of Monitoring Results with AQ Objectives

### 2.2.1 Nitrogen Dioxide

#### Automatic Monitoring Data

Gwynedd council do not carry out any automatic monitoring for Nitrogen Dioxide.

#### Diffusion Tube Monitoring Data

As shown in Table 2.4 below no site has exceeded the annual mean air quality objective of 40µg/m<sup>3</sup> for nitrogen dioxide. Sites PEN 2, AB 1 and LLAN 1 have less than 90% data for the year due to tube theft/vandalism. Sites NEF 1 and TRAWS 1 have less than 90% data as they are new sites opened in April of 2008. All results have been bias adjusted by a factor of 0.93, which is explained in Appendix A. As in previous years sites C2, B3 and B4 have shown the highest levels of NO<sub>2</sub> as shown in table 2.4b.

**Table 2.4a Results of Nitrogen Dioxide Diffusion Tubes**

Site ID	Location	Within AQMA?	Data Capture 2008 %	Annual mean concentrations
				2008 (µg/m <sup>3</sup> ) Adjusted for bias
A1	1 Example Site	N	95	
C 1	Bro Helen, Caernarfon	N	100	14.60
C 2	A470 Roundabout, Caernarfon	N	92	37.84
C3	Cambell Road, Carnarfon	N	92	10.95
C4	Llys Meirion, Caernarfon	N	100	19.86
C5	Bangor Road, A470, Caernarfon	N	92	25.74
B 1	Glynne Road, Bangor	N	92	16.75
B 2	Gwynedd Road, Bangor	N	100	18.10
B 3	A4087, Bangor	N	100	29.10
CO-LOC	A55, Penrhosgarnedd,	N	100	29.59

## Gwynedd Council - Wales

	Bangor			
B4	A55, Penrhosgarnedd, Bangor	N	92	30.74
B 5	A512, Holyhead Road, Bangor	N	100	22.65
B6	Faenol Roundabout, A487 Bangor	N	100	23.93
BETH 1	A5, Bethesda	N	100	19.23
LLANBER 1	A4086, Llanberis	N	100	18.34
LL 1	A487 Llanwnda	N	92	20.70
PEN 1	Old A487, High Street, Penygroes	N	100	13.85
PEN 2	Old A487, Rhedryw Road, Llanllyfni	N	83	10.62
NEF 1	A497, High Street, Nefyn	N	75	11.66
PW 1	The Maes, Pwllheli	N	92	10.16
TAL 1	A497, Tal Y Bont / Penychain	N	100	6.78
CR 1	Pont Cwrt, A497, Cricieth	N	83	8.67
POR 1	Bus Stop, A487, High Street, Porthmadog	N	100	13.09
BEDD 1	A4085, Beddgelert	N	92	7.25
MAEN 1	A487, Maentwrog	N	100	10.68
BL 1	Dolgaregddu, Blaenau Ffestiniog	N	100	7.96
BALA 1	A4212 Bala	N	100	13.33
DOL 1	Infant School, Dolgellau	N	100	10.83
LLAN 1	A496, Pont Llanbedr	N	25	8.08
AB 1	A496, High Street Abermaw	N	83	7.55
ABDYFI 1	A493 Aberdyfi	N	100	5.88
TRAWS 1	A470 Trawsfynydd	N	75	6.58

**Table 2.4b Results of Nitrogen Dioxide Diffusion Tubes**

Site ID	Location	Within AQMA?	Annual mean concentrations ( $\mu\text{g}/\text{m}^3$ ) Adjusted for bias		
			2006	2007	2008
C2	A470 Roundabout, Caernarfon	N	35.27	34.03	37.84
B3	A4087, Bangor	N	26.74	27.30	29.10
B4	A55, Penrhosgarnedd, Bangor	N	28.64	29.94	30.74

### 2.2.2 $\text{PM}_{10}$

As stated in paragraph 2.1.1 above the investigation carried out at Maes Padarn, Llanberis showed there was only one 24 hour mean exceedence of  $\text{PM}_{10}$  at  $56\mu\text{g}/\text{m}^3$  on the 24<sup>th</sup> of June. To breach the Air Quality Objective  $50\mu\text{g}/\text{m}^3$  would have to be exceeded more than 35 times a year. Appendix D shows a graph of the results and a plan of the monitor's location.



### **2.2.3 Sulphur Dioxide**

There is no annual mean air quality objective for Sulphur Dioxide, which is the only figure that can be obtained from passive diffusion tube studies as undertaken in Gwynedd. The tubes were put in place to give us a general idea of the levels of SO<sub>2</sub> close to steam locomotive stations. Results showed very low annual mean at all locations ranging from 1.91 to 2.77µg/m<sup>3</sup>.

### **2.2.4 Benzene**

The Local Authority does not carry out any monitoring for Benzene as part of LAQM. The pollutant has been monitored within private dwellings during 2008 following domestic heating fuel spills.

### **2.2.5 Other pollutants monitored**

No monitoring for 1,3 Butadiene, carbon monoxide or lead has been undertaken during the last round of Review and Assessment.

## **3 Road Traffic Sources**

### **3.1 Narrow Congested Streets with Residential Properties Close to the Kerb**

The most recent data on traffic flows was obtained from Gwynedd Council's Consultancy Services which covered all A-roads within the county. A 'canyon' type street was considered during previous round of Review and Assessment in the centre of Caernarfon but this road was neither narrow or had any residential properties.

Gwynedd Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

### **3.2 Busy Streets Where People May Spend 1- hour or More Close to Traffic**

The bus stops at Caernarfon and Bangor town centres were considered during previous rounds of review and assessment and it is was unlikely that people would spend an hour or more at these locations

Gwynedd Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

### **3.3 Roads with a High Flow of Buses and/or HGVs.**

No Roads with a high flow of buses/HGV's were identified during previous rounds of review and assessment.

Gwynedd Council confirms that there are no new/newly identified roads with high flows of buses/HDVs.

## **3.4 Junctions**

“Busy” junctions with more than 10,000 vehicles per day have not been identified during previous rounds of R&A

Gwynedd Council confirms that there are no new/newly identified busy junctions/busy roads.

## **3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment**

No new roads have been constructed since the last round of R&A only an improvement scheme to the A499 between Clynog Fawr and Llanalhaerarn.

There is a proposed by pass from Minffordd to Penmorfa on the A487, avoiding Porthmadog. At present no decision has been made as to whether the scheme will go ahead, no final plans have been submitted and no air quality assessment has been carried out which Gwynedd Council would require during the early planning stages.

Gwynedd Council has assessed new/proposed roads meeting the criteria in Section A.5 of Box 5.3 in TG(09), and concluded that it will not be necessary to proceed to a Detailed Assessment.

## **3.6 Roads with Significantly Changed Traffic Flows**

Gwynedd Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

## **3.7 Bus and Coach Stations**

There are no Bus Stations in Gwynedd. The 2 largest bus stops, Caernarfon (4 bays) and Bangor (7 bays) do not have movements exceeding 2,500 per day.

Gwynedd Council confirms that there are no relevant bus stations in the Local Authority area.

## 4 Other Transport Sources

### 4.1 Airports

The guidance asks to consider only airports with a throughput of greater than 10 million passengers per annum. No such airports exist in Gwynedd only small airfields.

Gwynedd Council confirms that there are no airports in the Local Authority area.

### 4.2 Railways (Diesel and Steam Trains)

#### 4.2.1 Stationary Trains

One location has been identified that fits the criteria within Section B.2 of Box 5.4 of the Technical Guidance. This location is at the Ffestiniog Highway Railway at Porthmadog at grid reference SH 570 384. It has been observed that steam locomotives are stationary for 15 minutes or more, that passengers remain on the station platform for 15 minutes or more during these periods and are within 15 meters of the locomotives. This can occur 3 times or more a day.

Gwynedd Council has identified locations not previously assessed where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m, and **will need to proceed to a Detailed Assessment for sulphur dioxide.**

#### 4.2.2 Moving Trains

Table 5.1 of the Technical Guidance lists rail routes which have a heavy traffic of diesel passenger trains. None of these routes passes through Gwynedd.

Gwynedd Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

### 4.3 Ports (Shipping)

The only small ports, quays and harbours exist within Gwynedd, mainly for recreational purposes

Gwynedd Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

## **5 Industrial Sources**

### **5.1 Industrial Installations**

Information on IPPC/PPC A1 processes was obtained from the environment agency Wales. Information regarding LA-IPPC Part A2 and LA-PPC Part B Authorized/Permitted Processes under Part 1 of the EPA 1990 and the PPC Regulations 2000 was obtained from Gwynedd council's Public Protection Service. A list of all Authorized Permitted Processes can be found in appendix 1.

#### **5.1.1 New or Proposed Installations for which an Air Quality Assessment has been Carried Out**

Gwynedd Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority which are likely to cause exceedences in the air quality objectives.

#### **5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced**

Gwynedd Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority which are likely to cause exceedences in the air quality objectives.

#### **5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment**

Gwynedd Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority which are likely to cause exceedences of the air quality objectives..

### **5.2 Major Fuel (Petrol) Storage Depots**

From information within Box 5.5, section C2 of TG (09) for assessing major fuel (petrol depots), the situation remains unchanged in Gwynedd from the previous round of Review and Assessment.

There are no major fuel (petrol) storage depots within the Local Authority area.

## **5.3 Petrol Stations**

Petrol Stations with an annual throughput of more than 2 million litres per year have been identified since the last round of review and Assessment but none have any relevant exposure within 10m of the pumps and with a busy road of more than 30, 000 vehicles a day.

Gwynedd Council confirms that there are no petrol stations meeting the specified criteria.

## **5.4 Poultry Farms**

Gwynedd Council confirms that there are no poultry farms meeting the criteria outlined in Section C.4 of Box 5.5 of TG(09).

## **6 Commercial and Domestic Sources**

### **6.1 Biomass Combustion – Individual Installations**

The Local Authority has received one planning application for a biomass combustion unit which was submitted during September 2008. The proposed unit would be located at Cibyn Industrial Estate, Caernarfon and would be fuelled by reclaimed timber manufactured at Gwynedd Skip Hire. It is proposed to construct a biomass gasification plant of up to 3MW with a stack height of 15m. To date no decision has been made by the Planning Service but the Public Protection service have stated that we require a detailed Dispersion Modelling Assessment prior to construction if the development is to be accepted.

Confirms that there are no current biomass combustion plant in the Local Authority area only one proposed which may need further consideration in the future.

### **6.2 Biomass Combustion – Combined Impacts**

The likelihood of areas off combined biomass exceeding the criteria outlined in section D.1b of Box 5.8 of TG (09) is considered highly unlikely.

Gwynedd Council confirms that the number and distribution of biomass combustion (commercial and domestic) in the area does not exceed the threshold for combined impacts.

### **6.3 Domestic Solid-Fuel Burning**

Areas of significant coal burning were considered during the previous rounds of Review and Assessment and concluded that it was unnecessary to proceed to a detailed assessment for SO<sub>2</sub> or PM<sub>10</sub>.

Gwynedd Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

## **7 Fugitive or Uncontrolled Sources**

Fugitive or uncontrolled sources which could give rise to elevated PM<sub>10</sub> were considered in the last Updating and Screening Assessment. No new locations set out in Section E1 of box 5.10 of the Guidance have been identified.

Gwynedd Council confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area.



## **8 Conclusions and Proposed Actions**

### **8.1 Conclusions from New Monitoring Data**

Data from monitoring during 2008 contained within this Updating and Screening Assessment shows that air quality in Gwynedd continues to meet the relevant objectives. Diffusion tube data from 31 locations showed no exceedence of the annual mean objective of  $40\mu\text{g}/\text{m}^3$ .

Continuous  $\text{PM}_{10}$  monitoring undertaken for a 6 month period at Maes Padarn, Llanberis close to a steam locomotive station showed only one 24 hour exceedence above  $50\mu\text{g}/\text{m}^3$ . This would have to occur more than 35 times annually to breach the air quality objective. The study took place over the summer holiday season when the station would have been at its busiest.

### **8.2 Conclusions from Assessment of Sources**

The assessment of road traffic sources did not identify any need to progress to a Detailed Assessment for nitrogen dioxide or  $\text{PM}_{10}$ . A new bypass will be considered in more detail the Progress Report for 2009 if the scheme goes ahead as described in section 3.5.

Gwynedd Council has identified a location at Ffestiniog Railway Station, Porthmadog not previously assessed where steam trains are regularly stationary for periods of 15 minutes or more, 3 times a day, with potential for relevant exposure within 15m, and will need to proceed to a Detailed Assessment for sulphur dioxide. Please see section 4.2.1

No issues were identified in relation to industrial sources.

As stated in section 6.1 a planning application for a biomass combustion plant at Cibyn Industrial Estate, Caernarfon was received at the end of 2008. If permission is given the Public Protection has requested a dispersion modelling assessment and this will form part of the assessment for our Progress Report for 2009.

No issues were identified in relation to fugitive and uncontrolled sources.

### **8.3 Proposed Actions**

This Updating and Screening Assessment has identified the need to progress to a Detailed Assessment of sulphur dioxide at one location as described above. To carry out this assessment Anglesey Council have kindly offered to lend Gwynedd Council an ultra-violet fluorescence analyser.

We will continue to monitor nitrogen dioxide from road traffic sources throughout the county.

A Progress Report for 2009 will be submitted at the end of April 2010.

## **9 References**

Gwynedd Council, Housing and Public Protection Department (1999): *Review and Assessment of Air Quality – First Stage*

Gwynedd Council, Housing and Public Protection Department (2000): *Review and Assessment of Air Quality – Second Stage*

Gwynedd Council, Housing and Public Protection Department (2003): *Review and Assessment of Air Quality – Updating and Screening Assessment*

Gwynedd Council, Administrative and Public Protection Services, Resources Directorate (2004): *Progress report for 2003*

Gwynedd Council, Administrative and Public Protection Services, Resources Directorate (2005): *Progress report for 2004*

Gwynedd Council, Administrative and Public Protection Services, Resources Directorate (2006): *Review and Assessment of Air Quality – Updating and Screening Assessment*

Gwynedd Council, Administrative and Public Protection Services, Resources Directorate (2007): *Progress Report for 2006*

Gwynedd Council, Administrative and Public Protection Services, Resources Directorate (2008): *Progress Report for 2007*

Defra and the devolved Administrations (2009), *Local Air Quality Management Technical guidance LAQM.TG (09)*

AEA Energy and Environment (2008), *Diffusion tubes for Ambient NO<sub>2</sub> Monitoring: Practical Guidance for Laboratories and Users*

Review and assessment helpdesk (2009), *Bias Adjustment Spreadsheet* version number 05/09 accessed at:

<http://www.uwe.ac.uk/aqm/review/R&Asupport/diffusiontube290909.xls>

AEA Energy and Environment (2009), *WASP – Annual Performance Criteria for NO<sub>2</sub> Diffusion Tubes used in Local Air Quality Management (LAQM), 2008 onwards, and Summary of Laboratory Performance in Rounds 100-104.*

Accessed at:

[http://www.laqmsupport.org.uk/Summary\\_of\\_Laboratory\\_Performance\\_in\\_WASP\\_R100-104.pdf](http://www.laqmsupport.org.uk/Summary_of_Laboratory_Performance_in_WASP_R100-104.pdf)

## **Appendices**

Appendix A: QA/QC Data

Appendix B: Part A1, A2 and B Authorized/ Permitted Processes

Appendix C: Diffusion Tube Location Maps

Appendix D: Details of PM<sub>10</sub> Investigation at Maes Padarn

## **Appendix A: QA:QC Data**

### **Diffusion Tube Bias Adjustment Factors**

Gwynedd Council has used Nitrogen Dioxide and Sulphur Dioxide Diffusion Tubes supplied by Bureau Veritas Uk Ltd. they are analysed by an accredited laboratory, Gradko International Ltd. NO<sub>2</sub> Are prepared using the 50% TEA in Acetone method and analysed using U.V Spectrophotometry. SO<sub>2</sub> tubes are analysed using Ion Chromatography. The annual mean for the NO<sub>2</sub> tube results has been bias adjusted by a factor of 0.93 calculated from the spreadsheet available on the review and assessment helpdesk website (spreadsheet version number 05/09). Bias adjustment factors for 2006 and 2007 were 0.93 ( spreadsheet version number 03/08) and 1.04 (spreadsheet number 02/070) respectively.

### **Discussion of Choice of Factor to Use**

As explained above with advice from spreadsheets on the Review and Assessment Help Desk Website.

### **PM Monitoring Adjustment**

No adjustment factors were used on the results of our PM<sub>10</sub> study at Maes Padarn, Llanberis in 2008.

### **QA/QC of automatic monitoring**

The OSIRIS PM<sub>10</sub> monitor used for the investigation at Maes Padarn, Llanberis is sent for an annual service and calibration to Turkey instruments Ltd. The monitor was sent for calibration and service one month before being located at the site. the Local authority undertakes filter changes every 3 months when the monitor is in use.

### **QA/QC of diffusion tube monitoring**

Gradko international Ltd Laboratory's performance was described as 'good' in both the old and new Rolling Performance Index (RPI) for rounds 100 – 104 in the WASP (Workplace Analysis Scheme for Proficiency) Scheme for laboratories that analyse NO<sub>2</sub> diffusion tubes for LAQM.

## Appendix B: Processes

List of LA - IPPC Part A2 and LA - PPC Part B Authorized/Permitted Processes, under the Pollution Prevention and Control Act 1999 and the Environmental Permitting (England and Wales) Regulations 2007 (updated December 2008).

### Arfon District:

Address	Type of Process	Grid Reference	Main Pollutants
Alfred McAlpine Slate Products Ltd. Penrhyn Quarry Bethesda LL57 4YG.	Quarry Processes  PG3/8	SH 620 650	Dust.
ARC Northern Premix Bangor Plant Port Penrhyn Bangor LL57 4HN.	Blending, packing, loading and the use of bulk cement.  PG3/1	SH 590 730	Particulates, cement and dust.
Bangor Crematorium Llandegai Road Bangor LL55 2YL.	Crematoria.  PG5/2	SH 592 716	Chlorides (expressed as hydrogen chloride), carbon monoxide and organic compounds.
Hanson Brick Ltd. Seiont Brickworks Caernarfon LL55 2YL.  (A2 Surrendered)	Manufacture of heavy clay goods and refractory goods.  PG3/2	SH 488 615	Chlorides (expressed as hydrogen chloride), fluorides (expressed as hydrogen fluorides, carbon dioxide, oxides of sulphur expressed as sulphur dioxide, nitrogen oxide and particulates.
Castle Cement Ltd, Bangor Depot, British Rail Goods Yard, Bangor, LL57 2YB.  (Cancelled)	Blending, packing, loading and use of bulk cement.  PG3/1	SH 570 710	Particulates, cement and dust.
Central Garage Pen-y-Bryn Road Bethesda LL57 3SD.  (Cancelled)	Waste oil burners, less than 0.4MW net rated thermal input  PG1/1	SH 625 668	Smoke
Dennis Ferranti Meters Ltd. Caernarfon Road Bangor LL57 4SP.	Coating of metal and plastic.  PG6/23	SH 569 708	Particulates, volatile organic compounds-aromatic hydrocarbons, xylene, toluene, butan-1-ol, butyl acetate, methyl ethyl ketone and formaldehyde.
Elias Garage, 347 High street Bangor LL57 1YH	Waste oil burners, less than 0.4MW net rated thermal input.	SH 582 722	Smoke

## Gwynedd Council - Wales

(Cancelled)	PG1/1		
Eryri Hospital, Caernarfon, Gwynedd LL55 2YE	Clinical waste incineration process under 1 tonne/hour.	SH 487 615	Particulate matter, carbon monoxide, grit and dust.
(Cancelled)	PG5/1		
Ferodo Caernarfon Ltd. Caernarfon LL55 1TR.	Asbestos process.  PG3/13	SH 498 653	Asbestos dust, solvent naptha (xylene), phenolic fume and formaldehyde.
(Cancelled)			
Ferodo Caernarfon Ltd., Caernarfon, LL55 1TR.	Rubber process  PG6/28	SH 498 653	Carbon black, toluene, phenolic fumes and formaldehyde.
Ferodo Caernarfon Ltd. Caernarfon LL55 1TR  (cancelled)	Adhesive process  PG6/32	SH 498 653	1.1.1.trichloroethyle- ne, methyl ethyl ketone (MEK), chlorobenzene, industrial methylated spirits (IMS) and isopropanol.
H.Marcel Guest (Wales Ltd.) Ogwen Valley Works Bethesda LL57 4YP.  (Surrendered)	Paint manufacturing process.  PG6/10	SH 615 664	Xylene, ethyl acetate, butyl acetate, methyl ethyl ketone, methyl iso butyl ketone, acetone, iso propanol, N-butanol, methoxy propyl acetate, ethoxy propanol, white spirit and hydrocarbons.
Hogan Brothers (Asphalt Ltd.) Cyttir Lane, Caernarfon Road, Bangor, LL57 4DA.	Quarry processes including road stone plant.  PG3/8	SH 563 698	Smoke, dust, sulphur, bitumen, fume and gases.
Hogan Brothers (Concrete Ltd.) Cyttir Lane Caernarfon Road Bangor LL57 4DA.	Blending, packing, loading and use of bulk cement.  PG3/1	SH 563 698	Particulatesand cement dust.
Dolydd Garage, Groeslon, Caernarfon, Gwynedd LL54 7EF	Waste oil burners, less than 0.4MW net rated thermal input.  PG1/1	SH 475 571	Smoke.
Pandy Motors Tregarth LL57 4AY.  (Surrendered)	Waste oil burners, less than 0.4 MW net rated thermal input.  PG1/1	SH 600 680	Smoke.
Purple Motors Station Road Bethesda LL57 3ND.	Waste oil burner, less than 0.4MW net rated thermal input.  PG1/1	SH 620 668	Smoke.

## Gwynedd Council - Wales

RMC Technical Services Ltd. Llandegai Industrial Estate Bangor LL57 4SP	Blending, packing, loading and use of bulk cement  PG3/1	SH 593 711	Particulates and cement dust.
Silver Star Service Bryn Awel Y Fron LL54 7BT.	Waste oil burners, less than 0.4MW net rated thermal input.  PG1/1	SH 505 550	Smoke.
Watkin Jones & Son Ltd. Llandegai Industrial Estate Bangor LL57 4SP.	Mobile crushing plant.  PG3/8	SH 593 711	Dust and particulate matter.
Ysbyty Gwynedd Penrhosgarnedd Bangor LL57 2PG  (Cancelled)	Clinical waste incineration process under 1 tonne/hour.  PG5/1	SH 558 701	Particulates, chloride (expressed as hydrogen chloride), carbon dioxide, carbon monoxide, sulphur dioxide, organic compounds, heavy metals (cadmium, mercury), polychlorinated dibenzo dioxins (PCDD's) and polychlorinated dibenzofurans (PCDF's).
Bill Smith Motors Cyttir Lane Caernarfon Road Bangor LL57 4DA	Waste oil burner, less than 0.4MW net rated thermal input.  PG1/1	SH 564 699	Smoke.
A & G Carbody Repairs Unit 4 Cibyn Industrial Estate Caernarfon LL55 2BD.	Respraying of road vehicles.  PG6/34	SH 495 626	Dust and particulate matter.
Tesco Filling Station Caernarfon Road Bangor LL57 4SU	Unloading of petrol into storage at Service Stations (over 1000m <sup>3</sup> ).  PG1/14	SH 563 700	Petrol vapour including benzene
BP, Garth Service Station Beach Road LL57 2SE	Unloading of petrol into storage at Service Stations (over 1000m <sup>3</sup> ).  PG1/14	SH585 729	Petrol vapour including benzene.
Texaco Llys y Gwynt Bangor Service Station A5/A55 Llandygai Interchange, Bangor LL57 4BG.	Unloading of petrol into storage at Service Stations. (over 1000m <sup>3</sup> ).  PG1/14	SH 591 696	Petrol vapour including benzene

## Gwynedd Council - Wales

Esso Beran Filling Station Deiniolen LL55 3NF.	Unloading of petrol into storage at Service Stations.  (over 1000m <sup>3</sup> ).  PG1/14	SH 570 647	Petrol vapour including benzene.
Esso Gwalia Garage Caeathro Caernarfon LL55 2SS.	Unloading of petrol into storage at Service Stations.  (over 1000m <sup>3</sup> )  PG1/14	SH 503 615	Petrol vapour including benzene.
Safeway Stores Plc. Safeway Service Station North Road Caernarfon LL55 1BE.	Unloading of petrol into storage at Service Stations.  (over 1000m <sup>3</sup> ).  PG1/14	SH 482 632	Petrol vapour including benzene
Esso Bryn Llwyd Services Caernarfon Road Bangor LL57 4SU.	Unloading of petrol into storage at Service Stations.  (over 1000m <sup>3</sup> ).  PG1/14	SH 566 703	Petrol vapour including benzene.
Texaco Caer Service Station South Road Caernarfon LL55 2HP.	Unloading of petrol into storage at Service Stations.  (over 1000m <sup>3</sup> ).  PG1/14	SH 482 624	Petrol vapour including benzene
Mr Trevor Hafod Garage Llanrug LL55 4AN.	Waste oil burner, less than 0.4MW net rated thermal input.  PG1/1	SH 537 635	Smoke.
Povey`s Garage Ltd Llanllyfni Road Penygroes Caernarfon Gwynedd LL54 6DA.	Unloading of petrol into storage at Service Stations.  (over 1000m <sup>3</sup> ).  PG1/14	SH 470 529	Petrol vapour including benzene.
Gwynedd Skip Hire, Lon Hen Felin Cibyn Industrial Estate Caernarfon LL54 6DA.	Mobile crushing plant.  PG3/8	SH 470 529	Dust, particulate matter.
Celtic Slate Ltd Industrial Estate Penygroes LL54 6BD.	Mobile crushing Plant.  PG3/8	SH 469 526	Dust, particulate matter.
NWF Fuels Ltd	Storage, Unloading	SH 573 716	Petrol vapour



## Gwynedd Council - Wales

Railway Goods Yard Bangor LL57 2TX. (Currently Processing)	and Loading Petrol at Terminals.  PG 1/13		including benzene.
Johnson Cleaners 18 Pool Street Caernarfon Gwynedd. LL55 2AB.	Dry Cleaning   PG 6/4	SH 480 626	VOC's.
Johnsons Cleaners 239 High Street Bangor LL57 1PA.	Dry Cleaning   PG 6/4	SH 582 720	VOC's

## Meirionnydd District:

Address	Type of Process	Grid Reference	Main Pollutants.
OMYA UK Gloddfa Ganol Blaenau Ffestiniog LL41 4ND	Quarry processes including road stone plant.  PG3/8	SH 696 474	Dust.
Tarmac, Minffordd Penrhyndeudraeth LL48 6HP	Quarry processes including road stone plant.  PG3/8	SH 594 390	Dust.
Hanson Premix Minffordd Plant Minffordd Penrhyndeudraeth LL48 6HF.	Blending, packing, loading and use of bulk cement.  PG3/1	SH 593 390	Particulates, cement dust
Cwmni Gro y Sarnau, Penybryn Sarnau Bala LL23 7LH.	Blending, packing, loading and use of bulk cement.  PG3/1	SH 967 390	Particulates, cement dust.
Lluest Motors Penrhyndeudraeth LL48 6BL.	Waste oil burner, less than 0.4MW net rated thermal input.  PG1/1	SH 612 389	Smoke
Esso Ffordd y Parc Garage Penrhyndeudraeth LL48 6LS	Unloading of petrol into storage at Service Stations. (over 1000m)  PG1/14	SH 392 614	Petrol vapour including benzene.
Moduron Bala West End Garage Stryd Fawr Y Bala LL27 7AE.	Unloading of petrol into storage at Service Stations. (over 1000m )  PG1/14	SH 358 924	Petrol vapour including benzene.

## Gwynedd Council - Wales

Mile End Filling Station, Lon Arran Dolgellau LL40 2AB.	Unloading of petrol into storage at Service Stations. (over 1000m )  PG1/14	SH 182 744	Petrol vapour including benzene
H G Thomas Motors Ltd, Dyffryn Garage Glanrafon Corwen LL21 0HA.	Unloading of petrol into storage at Service Stations. (over 1000m )  PG1/14	SJ 026 425	Petrol vapour including benzene
J R Baldwin Spar Supermarket and Garage, 16 High Street Tywyn LL36 9AD.	Unloading of petrol into storage at Service Stations. (over 1000m )  PG1/14	SH 584 007	Petrol vapour including benzene
Penrhos Service Station, Aberdyfi LL35 0NR	Unloading of petrol into storage at Service Stations. (over 1000m )  PG1/14	SN 609 960	Petrol vapour including benzene
W D Pugh & Sons Ltd, Bala Road Dolgellau LL40 2YE.	Unloading of petrol into storage at Service Stations. (over 1000m )  PG1/14	SH 729 180	Petrol vapour including benzene
W J Williams and Sons, Idris Service Station, Cader Road Dolgellau LL40 1UE.	Unloading of petrol into storage at Service Stations. (over 1000m )  PG1/14	SH 723 177	Petrol vapour including benzene
Cambrian Cleaners Ltd, Hwylfa'r Nant Harlech LL46 2UE.	Dry Cleaning Process  PG 6/4	SH 582 314	VOC's
Porthmadog Services, 1 <sup>st</sup> Floor Office HSBC Bank High Street Penrhyndeudraeth LL48 6BN	Mobile crushing plant.  PG3/8	SH 611 389	Dust, particulate matter

## Dwyfor District:

Address	Type of Process	Grid reference	Main Pollutants
G&H Agri Engineers, Bodvel Hall Pwllheli LL53 6DW	Waste oil burner, less than 0.4MW net rated thermal input.  PG1/1	SH 341 369	Smoke.
Berwyn Coaches Unit 1 Trefor Workshops, Trefor	Waste oil burner, less than 0.4MW net rated thermal input.	SH 370 368	Smoke.

## Gwynedd Council - Wales

LL54 5LL.	PG1/1		
Porthmadog Concrete Ltd. Rhosfawr Pwllheli	Blending, packing, loading and use of bulk cement.  PG3/1	SH 380 396	Cement Dust
Porthmadog Concrete Ltd. Glan Byl Criccieth LL52 ORD.	Blending, packing, loading and use of bulk cement.  PG3/1	SH 527 409	Cement Dust
Dolwar Service Station, Y Ffor Pwllheli LL53 6UR.	Unloading of petrol into storage at Service Stations (over 1000m <sup>3</sup> )  PG1/14	SH 398 389	Petrol vapour including benzene.
Pulrose Motor Services Ltd. Ala Road Pwllheli LL53 5TA.	Unloading of petrol into storage at Service Stations (over 1000m <sup>3</sup> )  PG1/14	SH 364 347	Petrol vapour including benzene.
Glandon Filling Station, Caernarfon Road Pwllheli LL53 5LF.	Unloading of petrol into storage at Service Stations (over 1000m <sup>3</sup> )  PG1/14	SH 377 355	Petrol vapour including benzene.
Pandy Garage Ltd. Chwillog Pwllheli LL53 6SQ.	Unloading of petrol into storage at Service Stations (over 1000m <sup>3</sup> )  PG1/14	SH 454 378	Petrol vapour including benzene.
Shell, Stryd Fawr Porthmadog LL49 9NG.	Unloading of petrol into storage at Service Stations (over 1000m <sup>3</sup> )  PG1/14	SH 333 320	Petrol vapour including benzene.
Madog Garage, Criccieth Road Porthmadog LL49 9NY.	Unloading of petrol into storage at Service Stations (over 1000m <sup>3</sup> )  PG1/14	SH 506 382	Petrol vapour including benzene
Tesco Service Station, High Street, Porthmadog, Gwynedd.	Unloading of petrol into storage at Service Stations (over 1000m <sup>3</sup> )  PG1/14	SH 566 389	Petrol vapour including benzene
Llanbedrog Service Station, Beach Road, Llanbedrog, Gwynedd.	Unloading of petrol into storage at Service Stations (over 1000m <sup>3</sup> )  PG1/14	SH 326 317	Petrol vapour including benzene

## Gwynedd Council - Wales

Williams& Williams, Y Ffor, Pwllheli. LL536RF  Currently processing	Mobile crushing plant.  PG3/8	SH 403 404	Dust, particulate matter.
Llyn Cleaners, 83 High Street, Pwllheli, Gwynedd. LL535RR.  Currently processing	Dry Cleaning  PG 6/4	SH 374 352	VOC's
Madog Dry Cleaners, High Street, Porthmadog, Gwynedd. LL499HD  Currently Processing	Dry Cleaning  PG 6/4	SH 566 389	VOC's

## EA – IPPC/PPC Part A1 Processes in Gwynedd (Information obtained from the Environmental Agency Wales).

Address	Process Description	Grid reference
REHAU Ltd Blaenau Plastics Works Tanygrisiau Blaenau Ffestiniog LL41 3RY.	Inorganic Chemicals: Using of Antimony etc (unless otherwise prescribed). Coating Printing and Textiles: Using Solvents > 5T/12 months.	SH 690 450
South Caernarfon Creameries Ltd Rhyd Y Gwystl Chwillog LL53 6SB.	Animal Vegetable and Food: Treating Milk etc >200T/day.	SH 405 391

## Appendix C: Diffusion Tube Location Maps

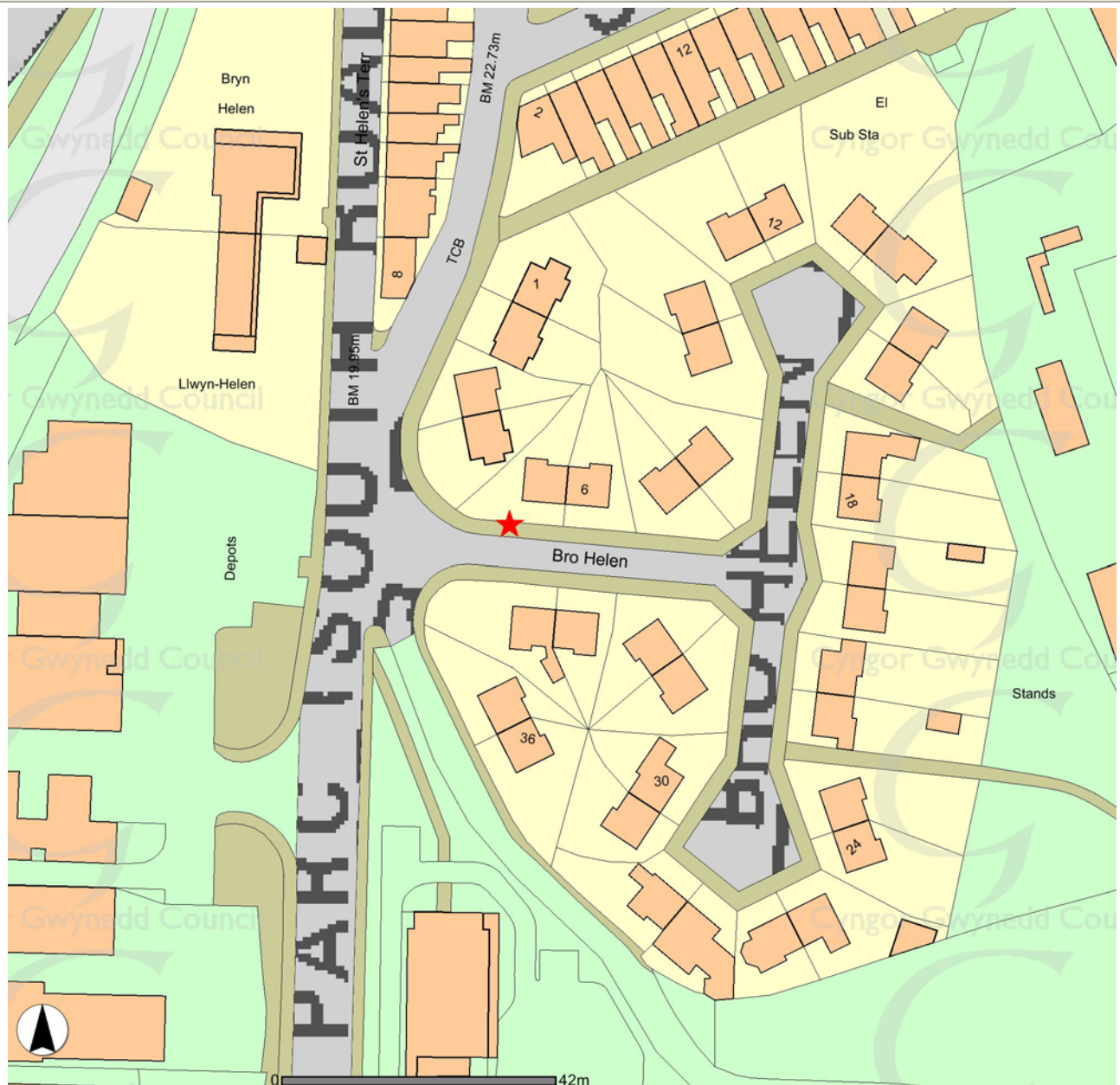
### Bro Helen, Caernarfon

Site Ref: C 1

WAQF Ref: GCC/001

NGR: 248273 262132

Parameter: NO<sub>2</sub>



Graddfa/Scale 1:1000

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# Roundabout nr./Cylchfan wrth Morrisons, A487 Caernarfon

Site Ref: C 2

WAQF Ref: GCC/002

NGR: 248147 363112

Parameter: NO<sub>2</sub>



Scale/Graddfa 1 : 1000

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# Cyffordd Lon Cambell/Junction Cambell Rd. & St. David's Rd, Caernarfon

Site Ref: C 3  
WAQF Ref: GCC/003  
NGR: 248489 363448  
Parameter: NO<sub>2</sub>



Graddfa/scale 1: 1000

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## Llys Meirion, A487 Caernarfon

Site Ref: C 4

WAQF Ref: GCC/004

NGR: 248537 363670

Parameter: NO<sub>2</sub>



Scale/Graddfa 1: 1000

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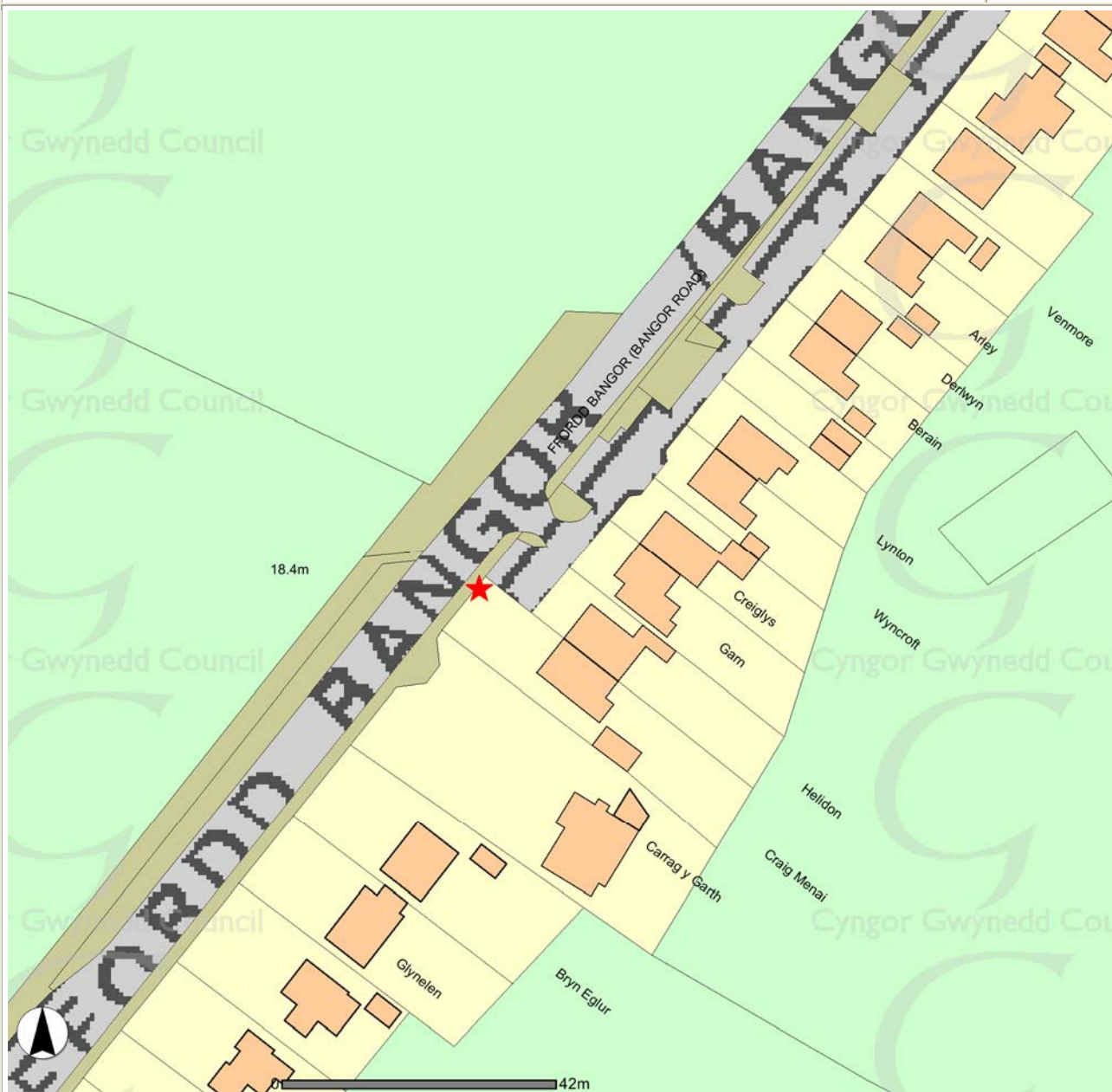
## Ffordd Bangor, A487 Caernarfon

Site Ref: C5

WAQF Ref: GCC/005

NGR: 248892 364120

Parameter: NO<sub>2</sub>



Scale/Graddfa 1 : 1000

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## Ffordd Glynne/Glynne Road, Bangor

Site Ref: B 1

WAQF Ref: GCC/006

NGR: 258341 372590

Parameter: NO<sub>2</sub>



Graddfa/Scale: 1 : 1000

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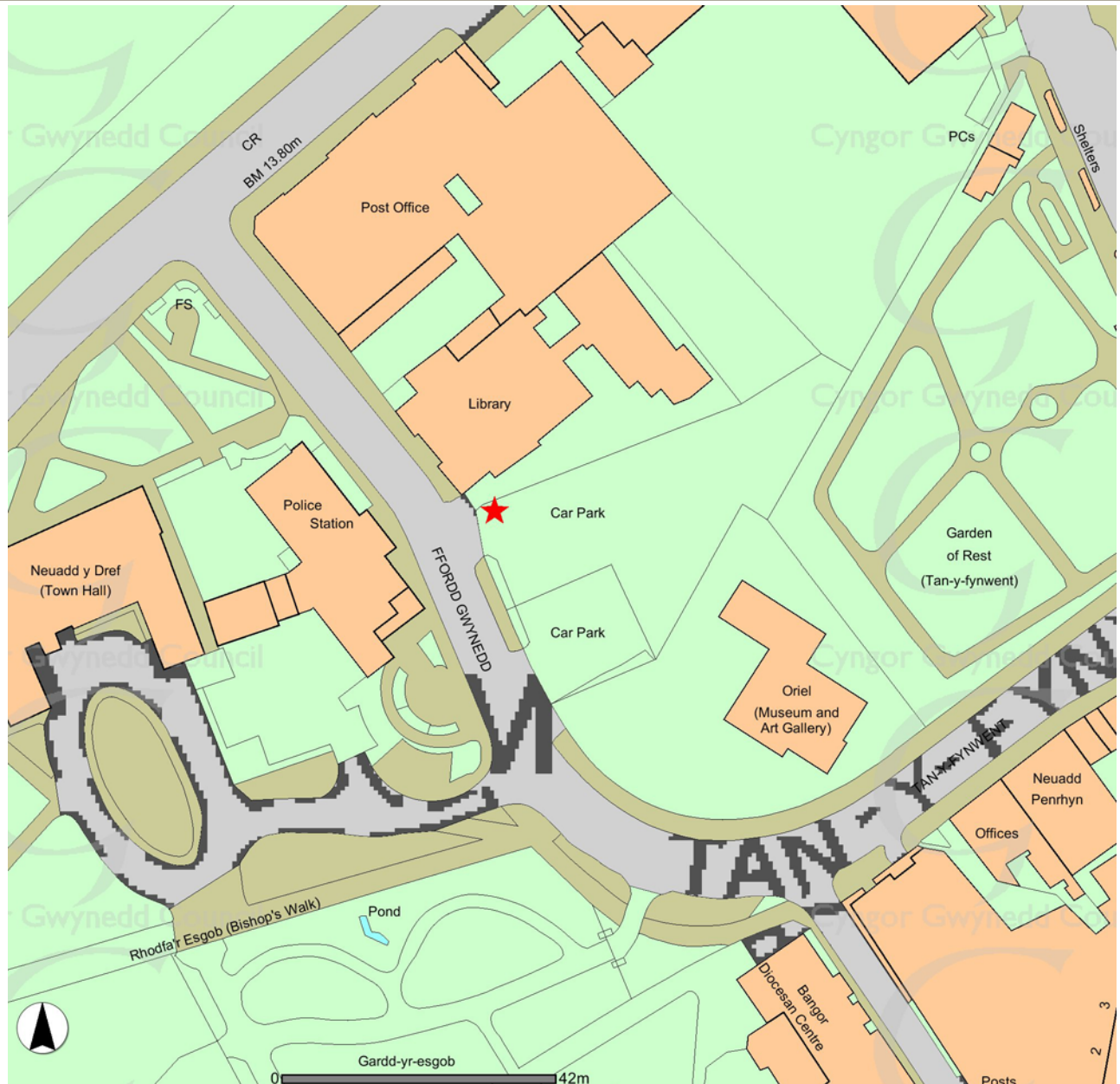
## Ffordd Gwynedd/Gwynedd Road, Bangor

Site Ref: B 2

WAQF Ref: GCC/007

NGR: 258078 372169

Parameter: NO<sub>2</sub>



Scale/Graddfa: 1 : 1000

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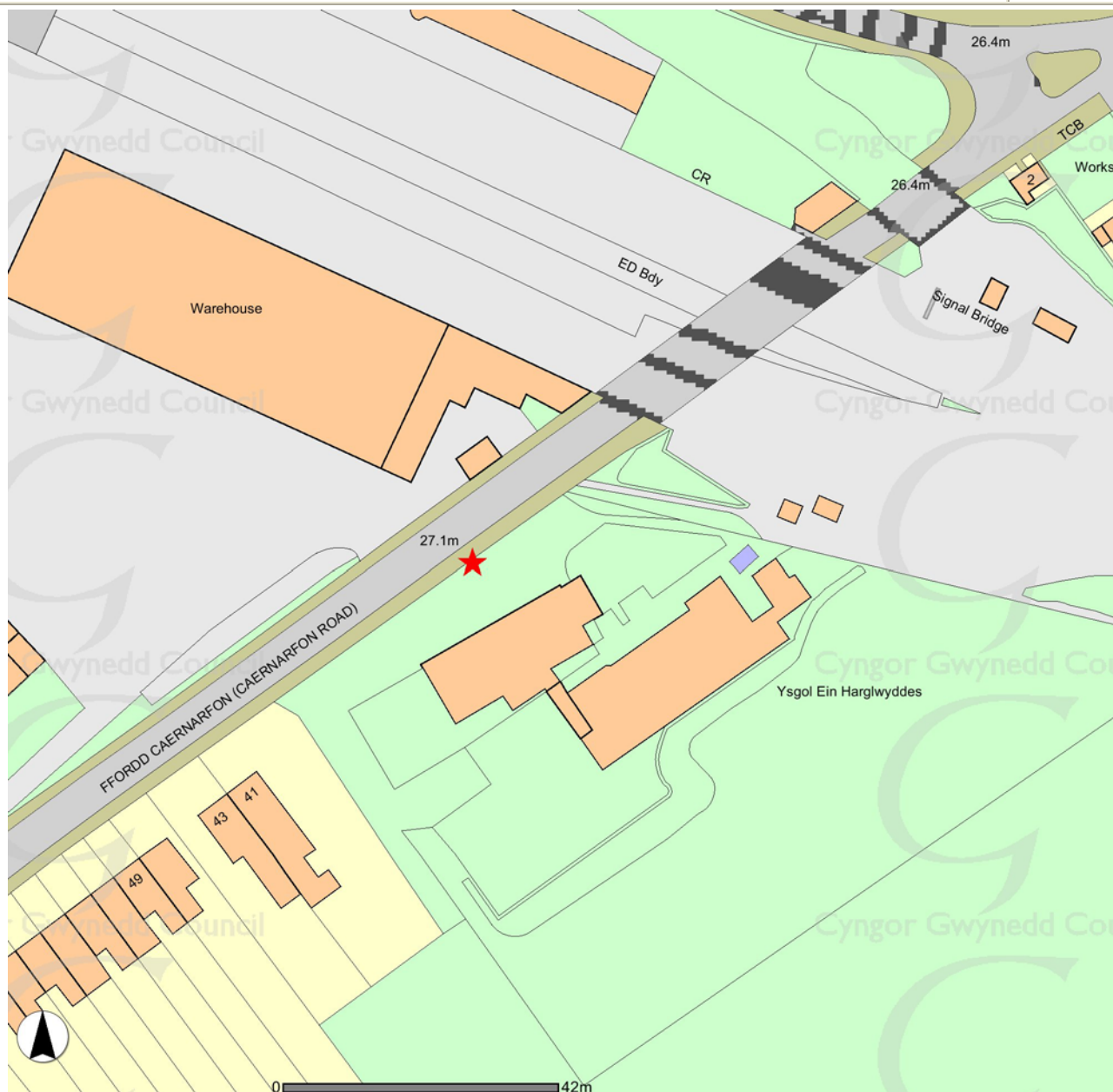
# Ysgol Ein Harglwyddes/Our Lady's School, A4087 Bangor

Site Ref: B3

WAQF Ref: GCC/008

NGR: 257587 371543

Parameter: NO<sub>2</sub>



Scale/Graddfa: 1 : 1000

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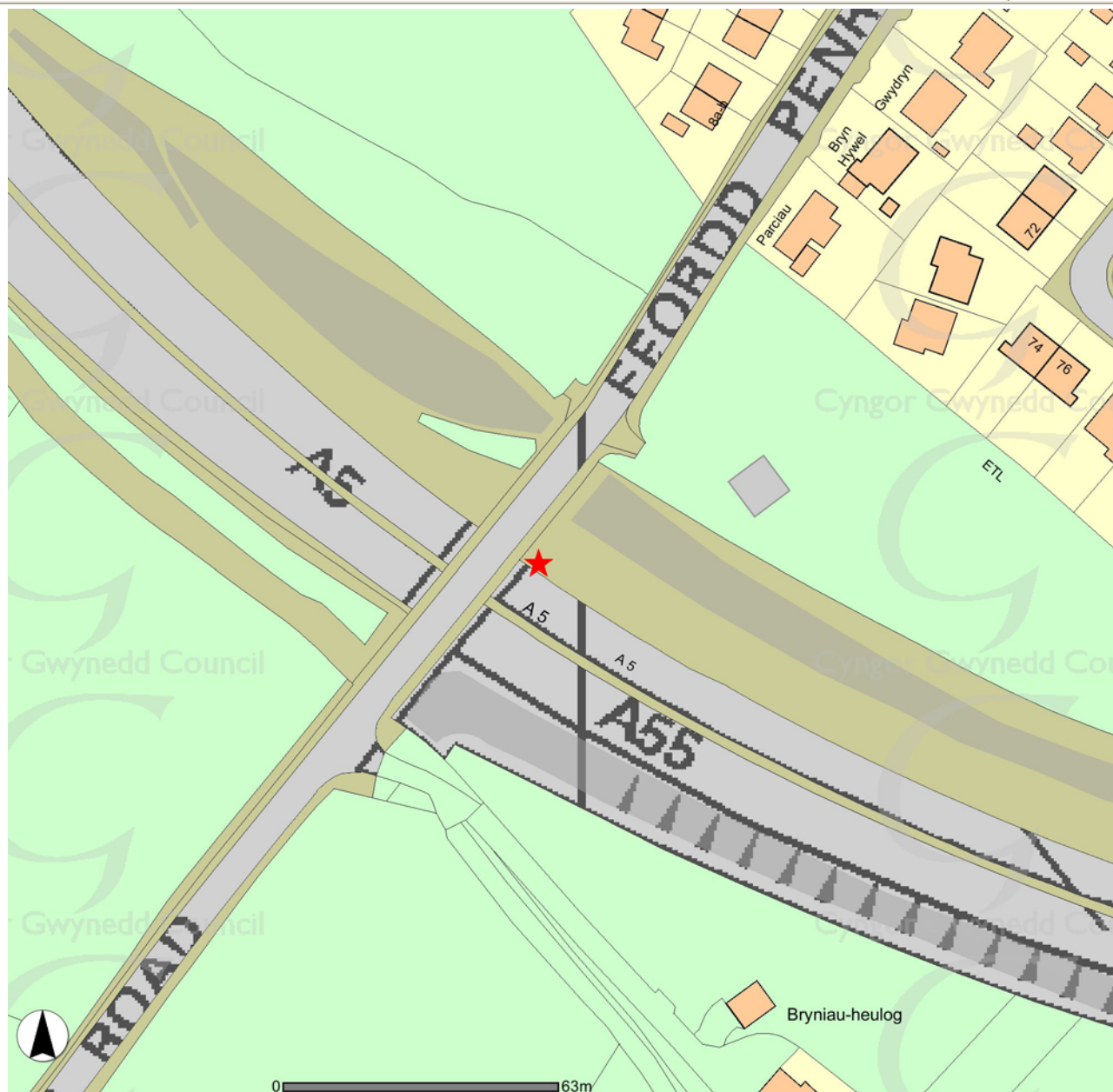
## A55 Penrhosgarnedd, Bangor

Site Ref: CO-LOC (Collocated with B 4)

WAQF Ref: GCC/009

NGR 254900 369727

Parameter: NO<sub>2</sub>



Scale/Graddfa: 1 : 1500

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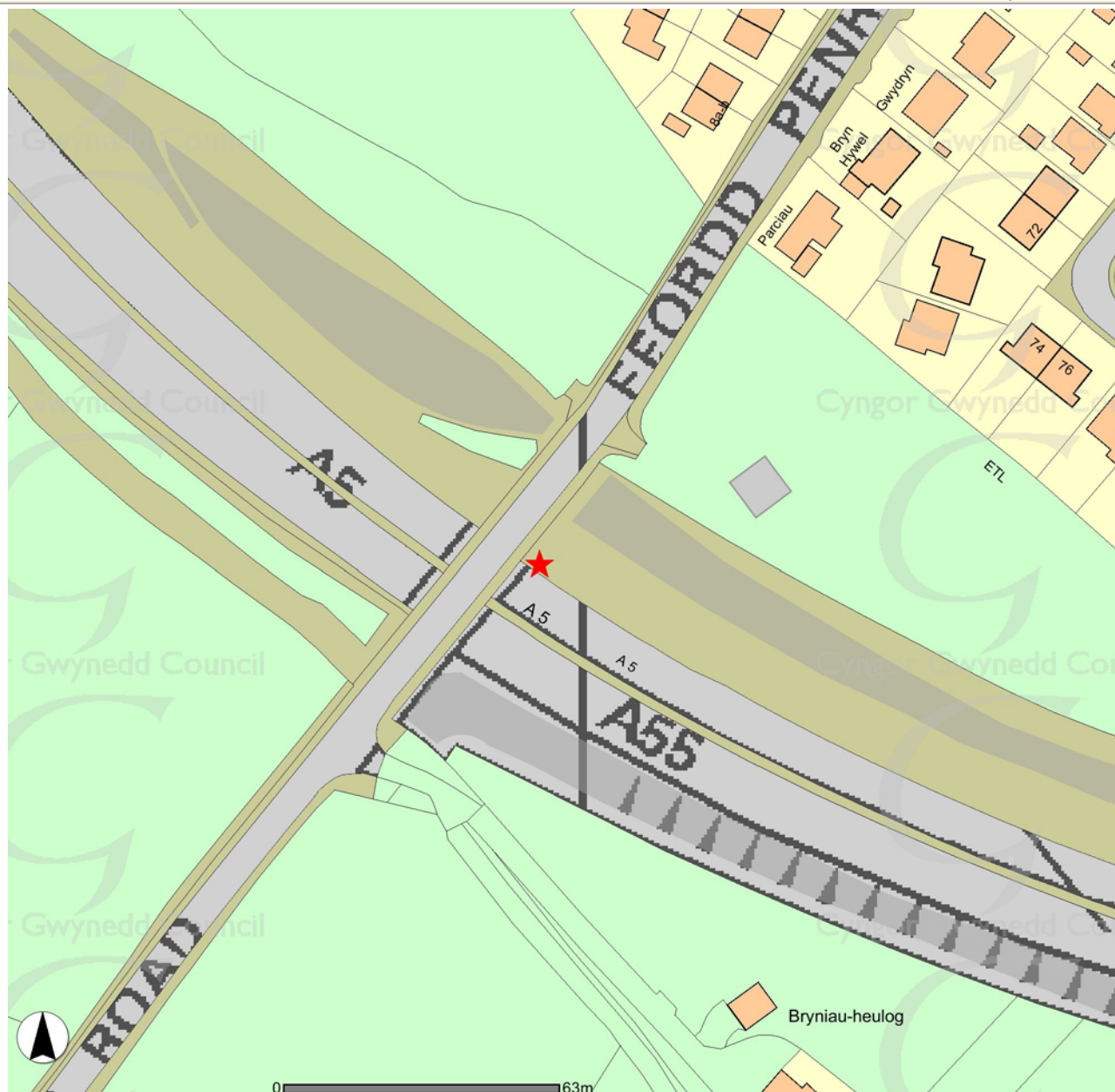
## A55 Penrhosgarnedd, Bangor

Site Ref: B 4

WAQF Ref: GCC/010

NGR: 254990 369727

Parameter: NO<sub>2</sub>



Scale/Graddfa: 1 : 1500

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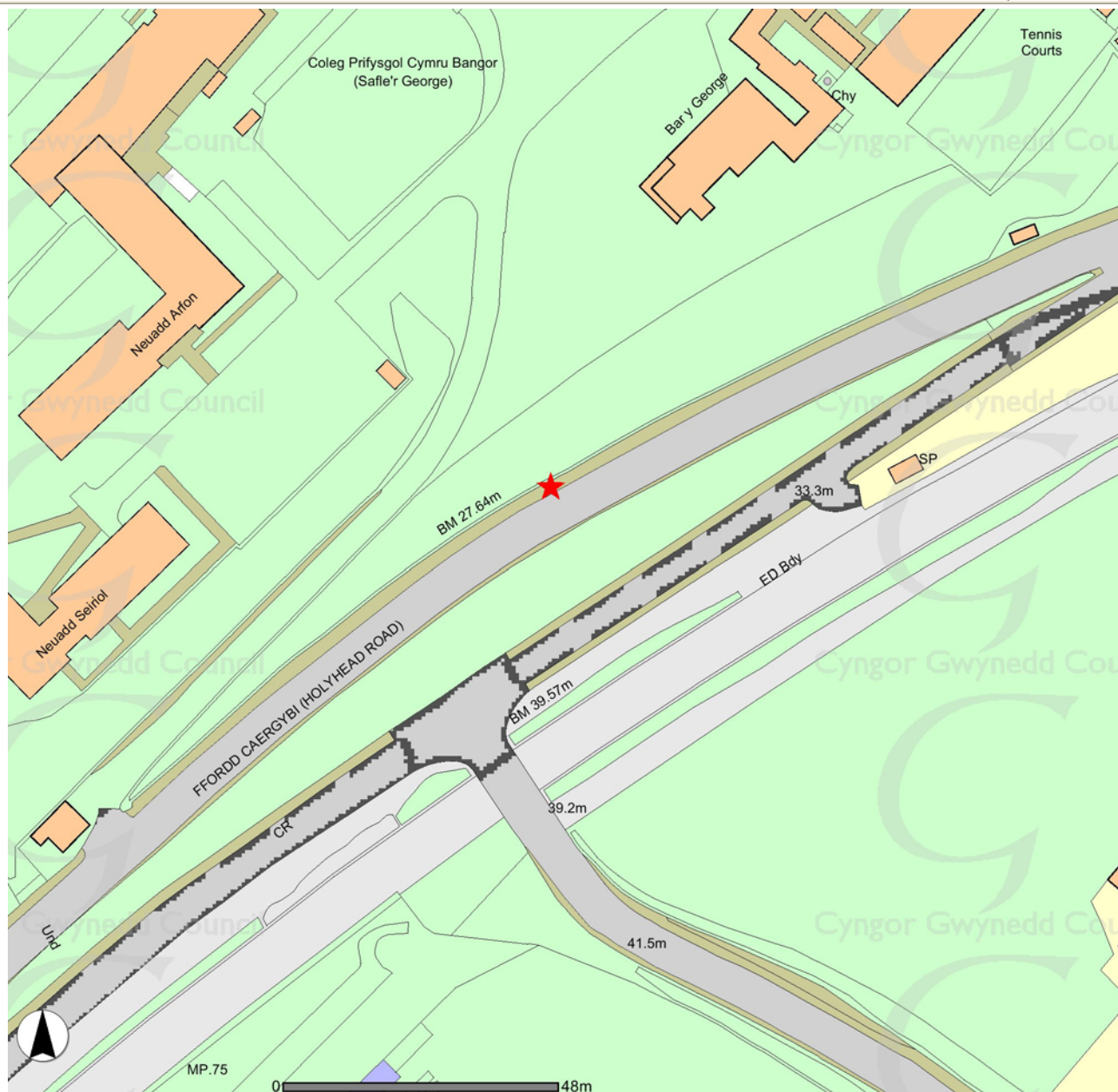
## A5122 Ffordd Caergybi/Hollyhead Road, Bangor

Site Ref: B 5

WAQF Ref: GCC/011

NGR: 256292 371663

Parameter: NO<sub>2</sub>



Scale/Graddfa 1: 1000

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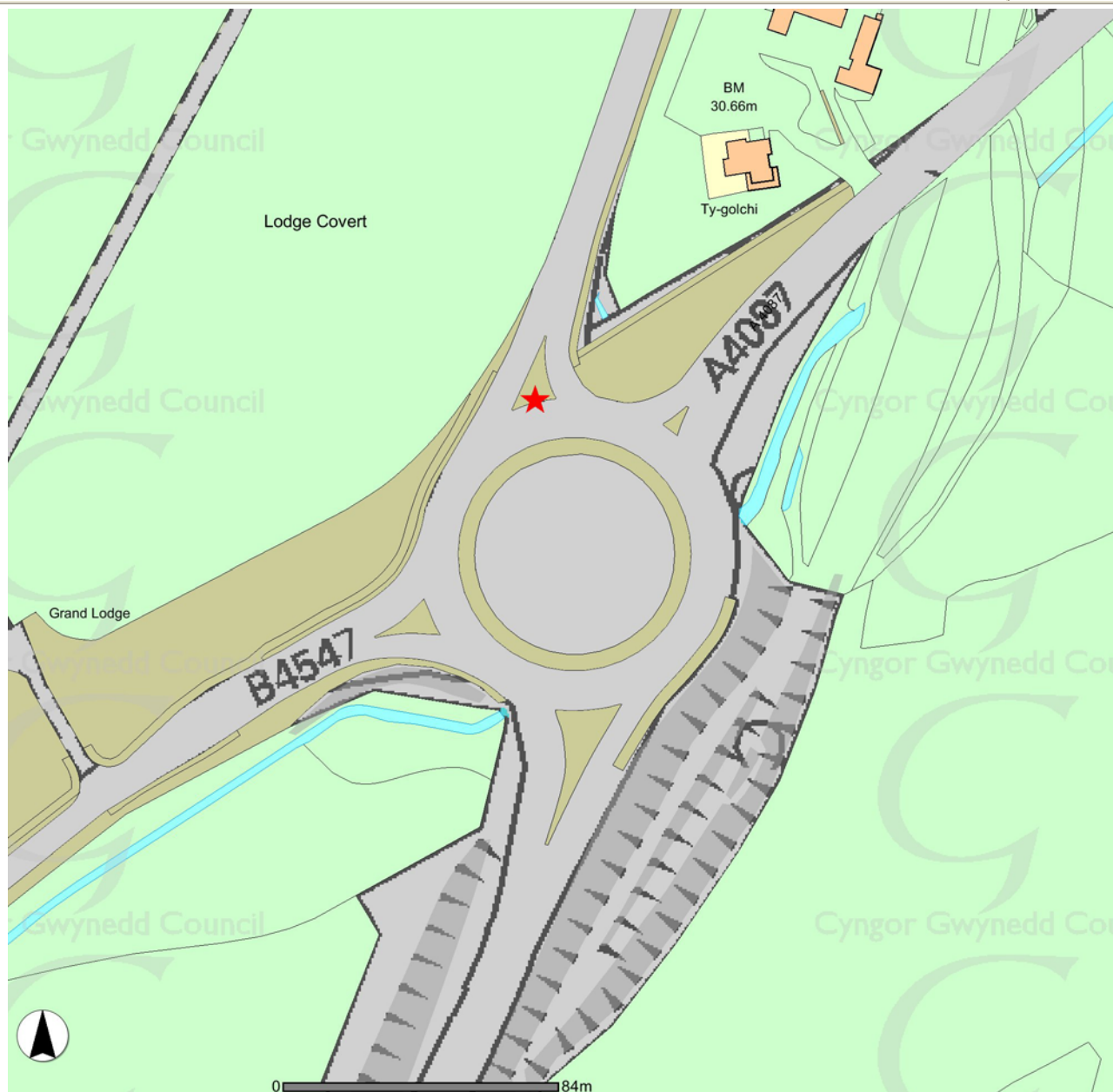
## Faenol Roundabout, Bangor

Site Ref: B 6

WAQF Ref: GCC/012

NGR: 254286 368835

Parameter: NO<sub>2</sub>



Scale/Graddfa: 1 : 2000

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## A5 Bethesda

Site Ref: BETH 1

WAQF Ref: GCC/013

NGR: 261529 367380

Parameter: NO<sub>2</sub>



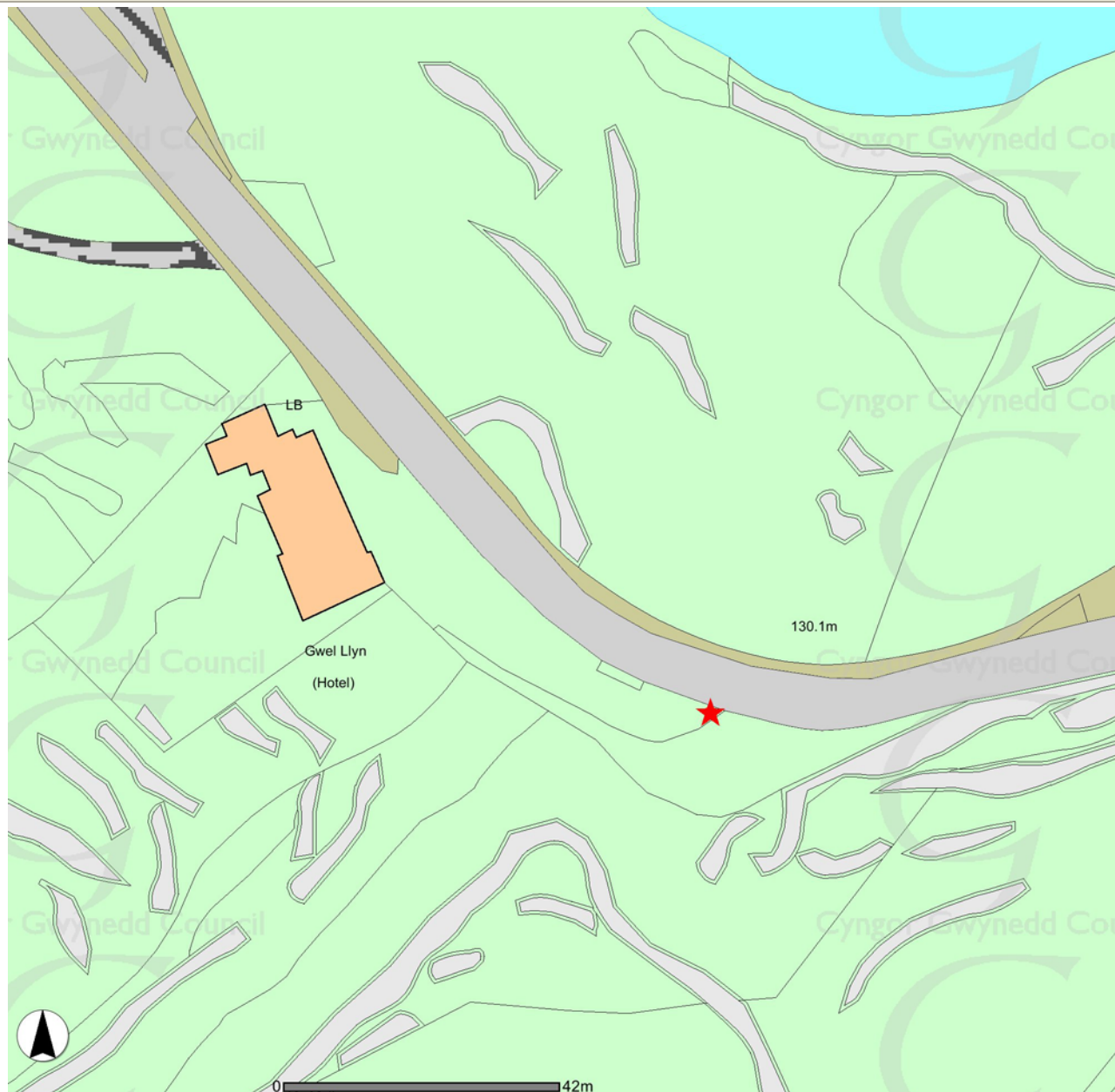
Scale/Graddfa 1: 1000

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## A4086 Llanberis

Site Ref: LLANBER 1  
WAQF Ref: GCC/014  
NGR: 256669 361192  
Parameter: NO<sub>2</sub>



Scale/Graddfa 1:1000

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## A487, Llanwnda

Site Ref: LL 1

WAQF Ref: GCC/015

NGR: 247770 358553

Parameter: NO<sub>2</sub>



Scale/Graddfa 1 : 1000

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# Penygroes

Site Ref: PEN 1

WAQF Ref: GCC/016

NGR: 247049 353223

Parameter: NO<sub>2</sub>



Scale/Graddfa 1 : 1000

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## Old A470 Llanllyfni

Site Ref: PEN 2  
WAQF Ref: GCC/017  
NGR: 247011 351838  
Parameter: NO<sub>2</sub>



Scale/Graddfa 1: 000

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## A497 Nefyn

Site Ref: NEF 1  
WAQF RRef: GCC/018  
NGR: 230709 340481  
Parameter: NO<sub>2</sub>



Graddfa/Scale 1 : 1000

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## Y Maes, Pwllheli

Site Ref: PW 1  
WAQF Ref: GCC/019  
NGR: 237387 334942  
Parameter: NO<sub>2</sub>



Scale Graddfa 1 :1000

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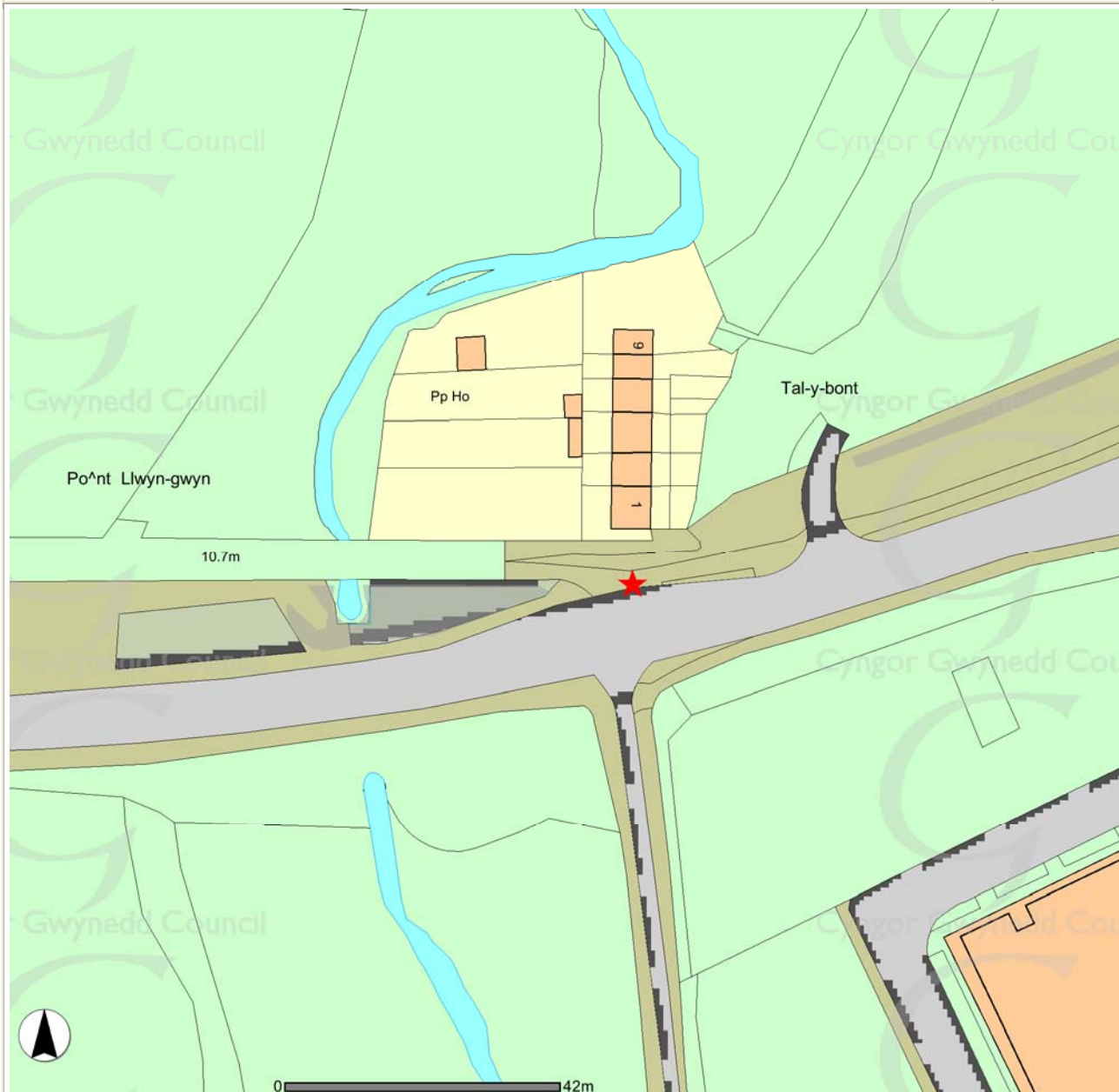
## Bus Stop, A497 Tal- y-Bont

Site Ref: Tal 1

WAQF Ref: GCC/020

NGR: 242728 336790

Parameter: NO<sub>2</sub>



Scale/Graddfa 1: 1000

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## Pont y Cwrt, A497 Cricieth

Site Ref: CR 1  
WAQF Ref: GCC/021  
NGR: 249959 338145  
Parameter: NO<sub>2</sub>



Graddfa/Scale 1 :100

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## Porthmadog

Site Ref: Port 1

WAQF Ref: GCC/022

NGR: 256919 338610

Parameter: NO<sub>2</sub>



Scale/Graddfa 1: 1000

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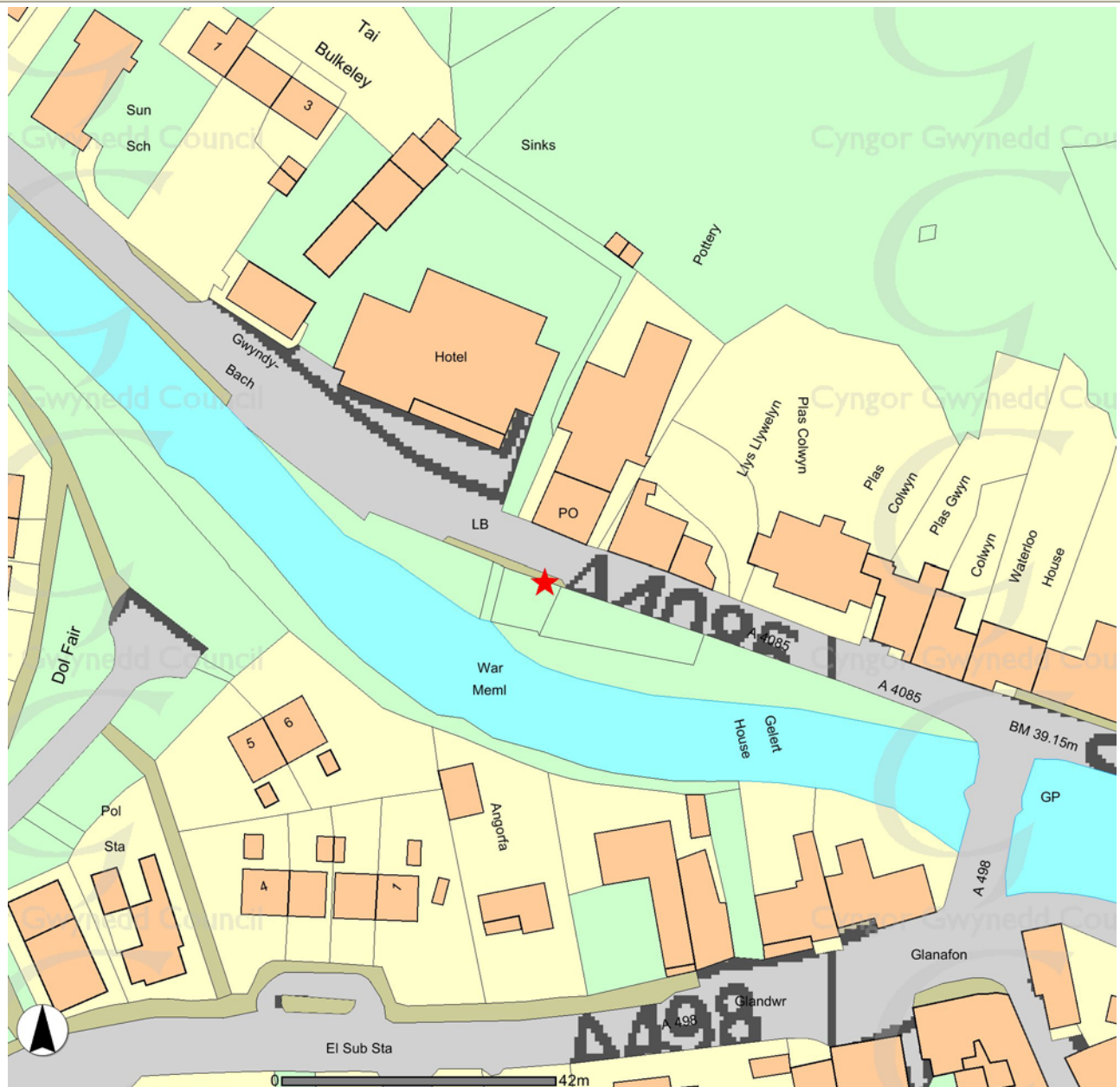
## A4085 Beddgelert

Site Ref: Bedd 1

WAQF Ref: GCC/023

NGR: 258956 348159

Parameter: NO<sub>2</sub>



Scale/Graddfa 1 : 1000

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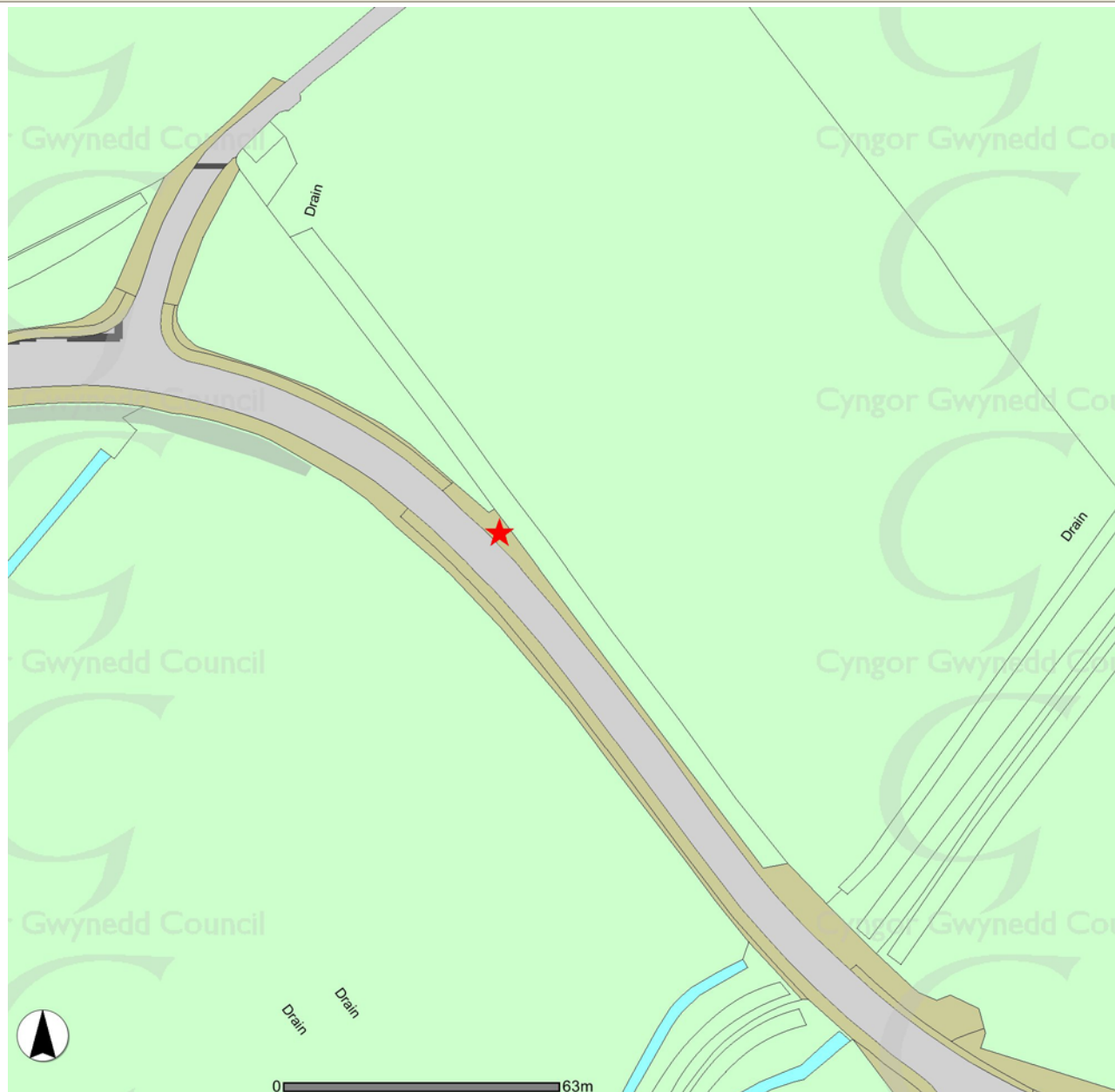
## A487 Maentwrog

Site Ref: MAEN 1

WAQF Ref: GCC/024

NGR: 266354 340919

Parameter: NO<sub>2</sub>



Scale/Graddfa 1 : 1500

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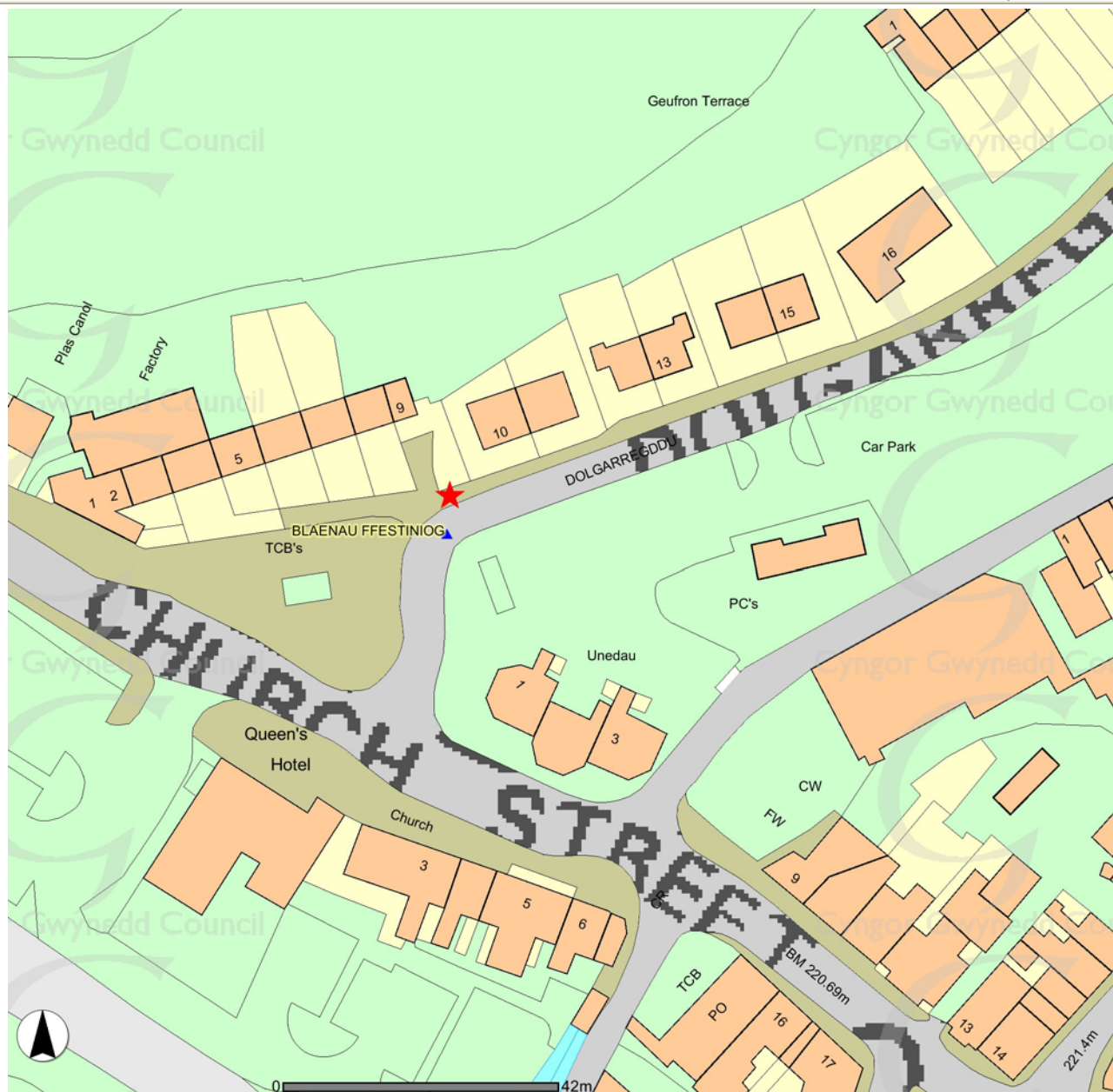
## Dolgaregddu, Blaenau Ffestiniog

Site Ref: BL 1

WAQF Ref: GCC/025

NGR: 270200 345935

Parameter: NO<sub>2</sub>



Scale/Graddfa 1 : 1000

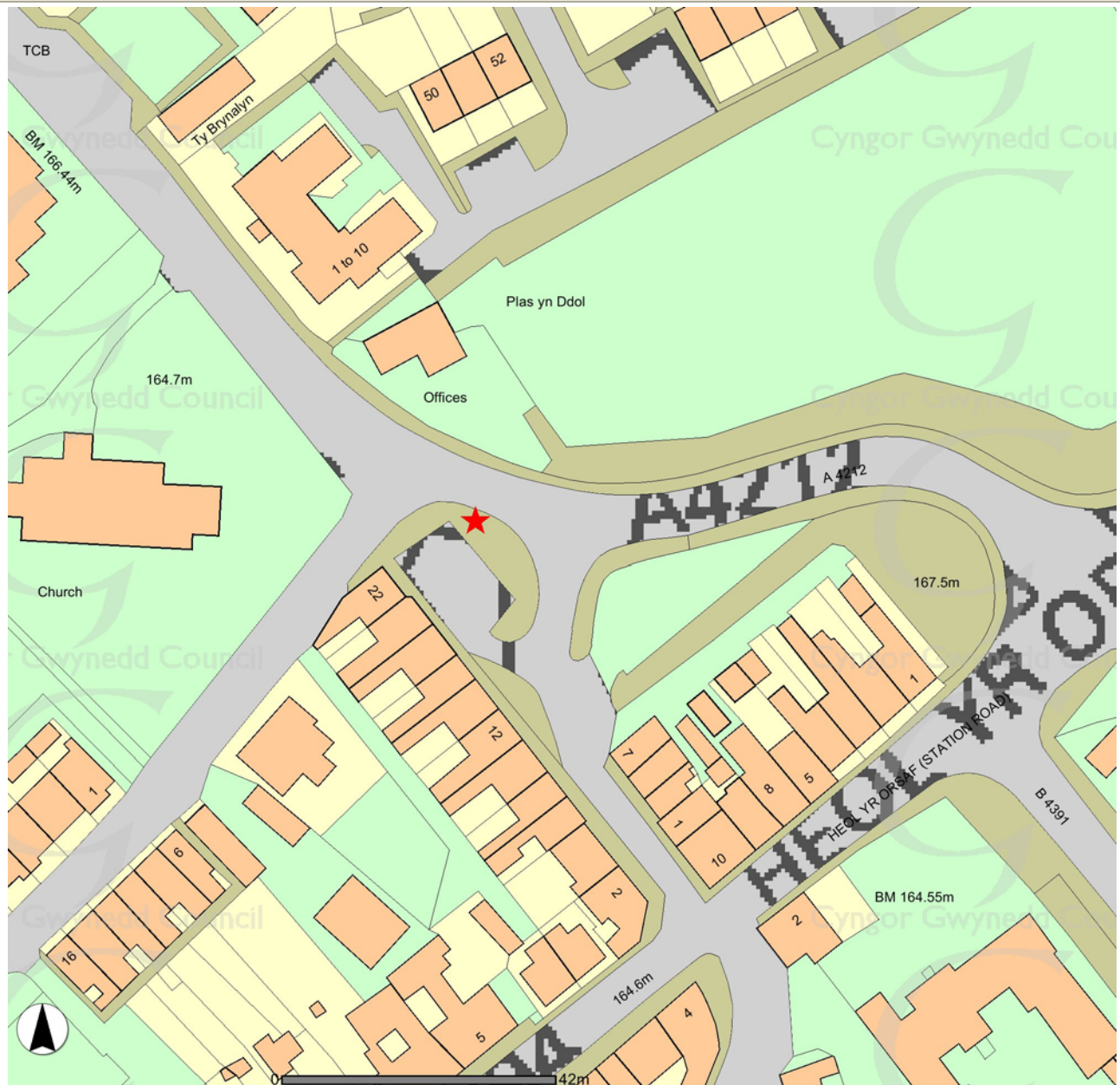
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## A4212 Bala

Site Ref: BALA 1  
WAQF Ref: GCC/026  
NGR 292753 336205  
Parameter: NO<sub>2</sub>



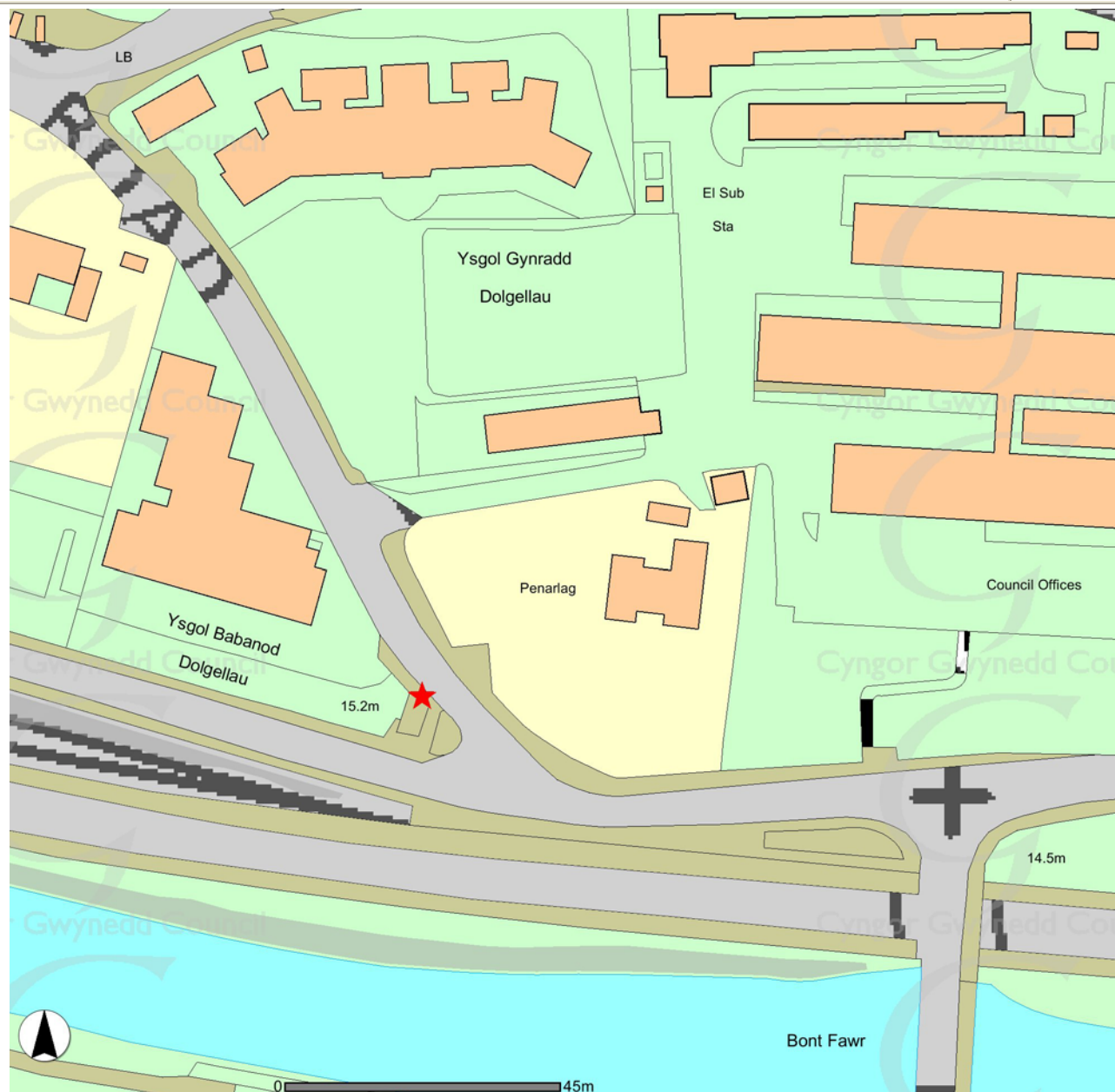
Scale/Graddfa: 1 : 1000

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## Ysgol Babanod Dolgellau

Site Ref: DOL 1  
WAQF Ref: GCC/027  
NGR: 272770 318062  
Parameter: NO<sub>2</sub>



Scale/Graddfa 1 : 1000

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## A496 Llanbedr

Site Ref: Llan 1  
WAQF Ref: GCC/028  
NGR: 258536 326803  
Parameter: NO<sub>2</sub>



Graddfa/Scale 1: 1000

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## Ffordd yr Orsaf/Station Road, Abermaw

Site Ref: AB 1  
WAQF Ref: GCC/029  
NGR: 261266 315891  
Parameter: NO<sub>2</sub>



Graddfa/Scale 1: 1000

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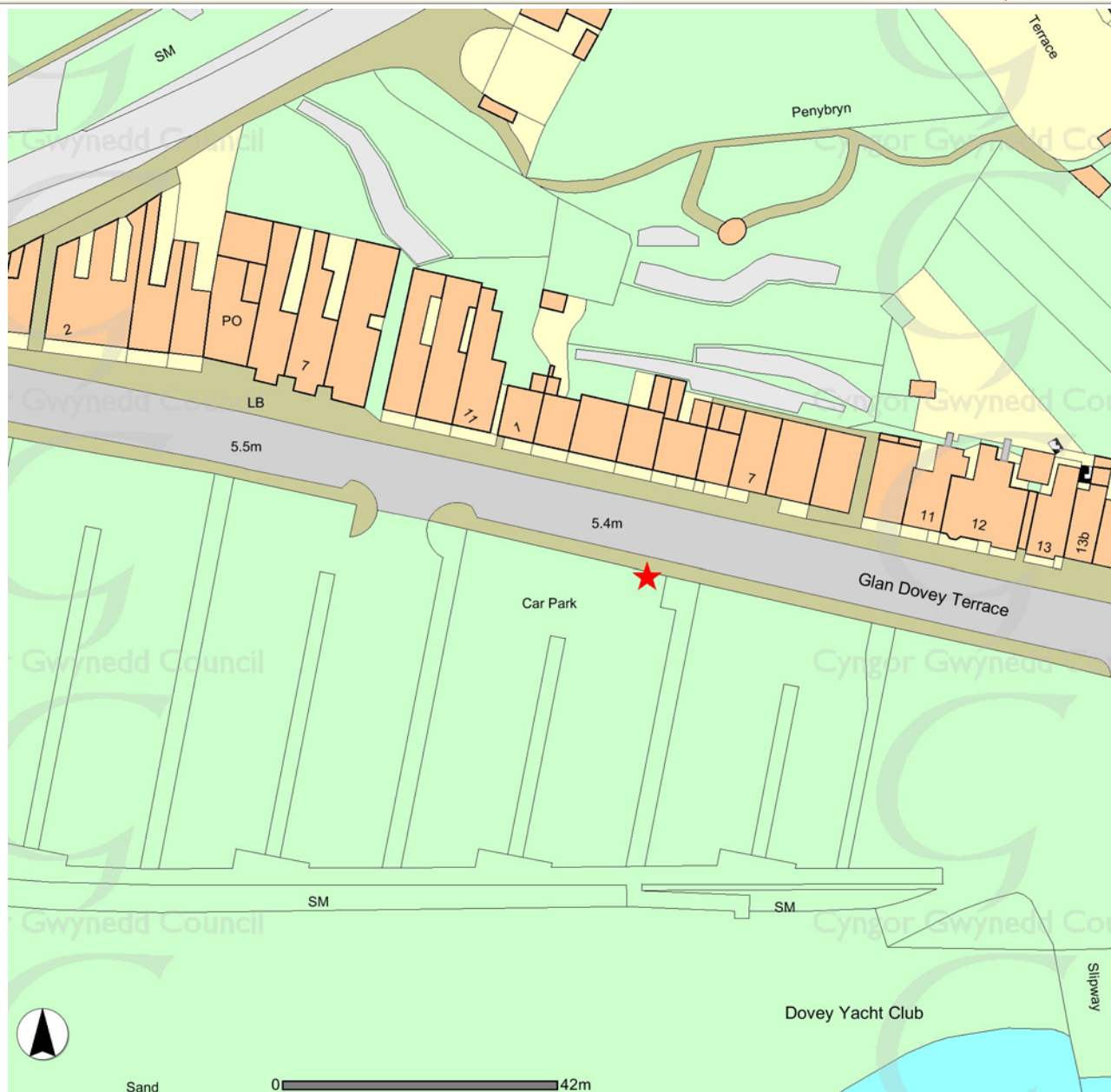
## A493 Aberdyfi

Site Ref: ABDYFI 1

WAQF Ref: GCC/030

NGR: 261287 295952

Parameter: NO<sub>2</sub>



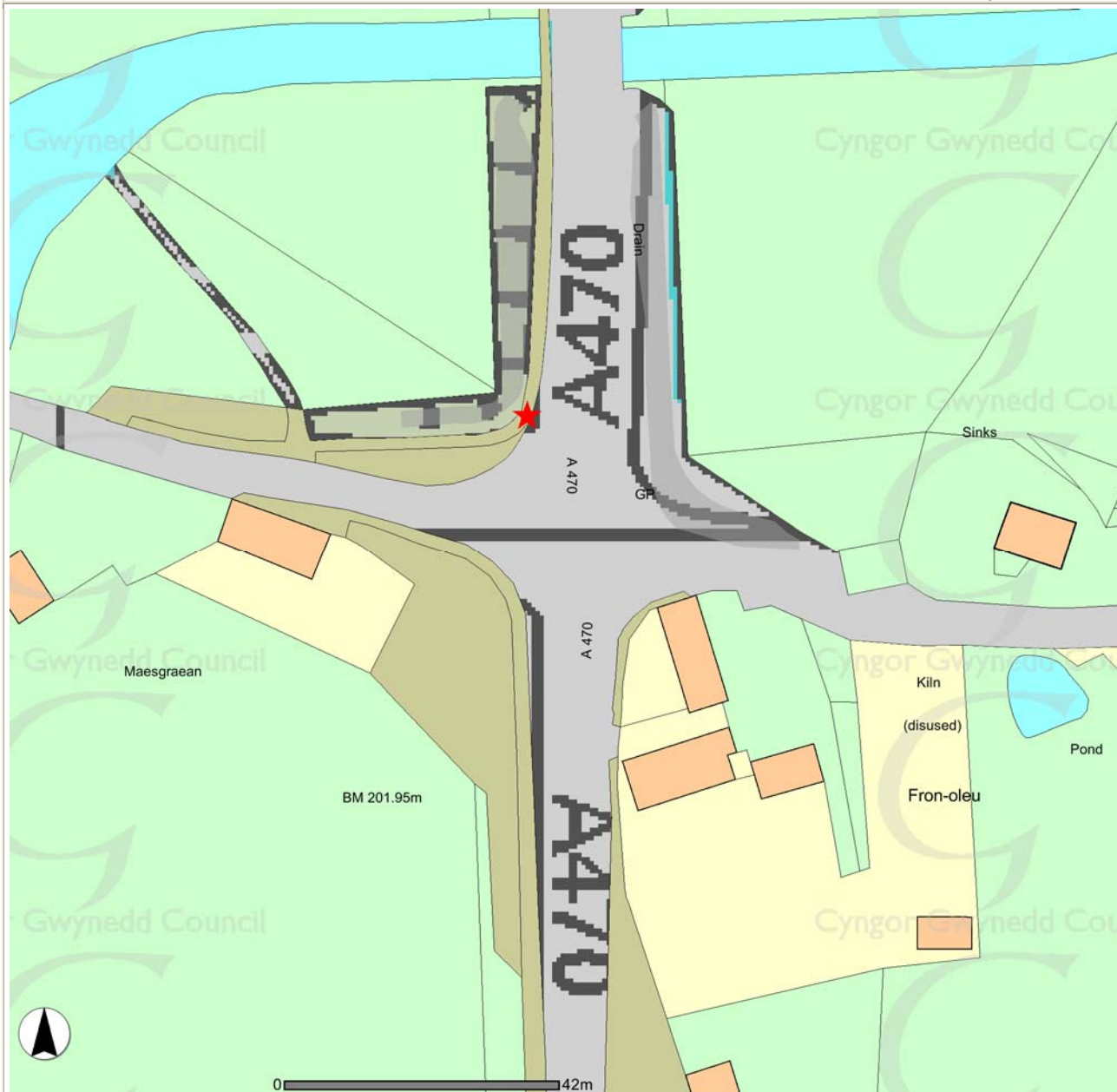
Scale/Graddfa: 1: 000

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## A470 Trawsfynydd

Site Ref: TRAWS 1  
WAQF Ref: GCC/031  
NGR: 271067 710350  
Parameter: NO<sub>2</sub>



Scale/Graddfa 1 : 1000

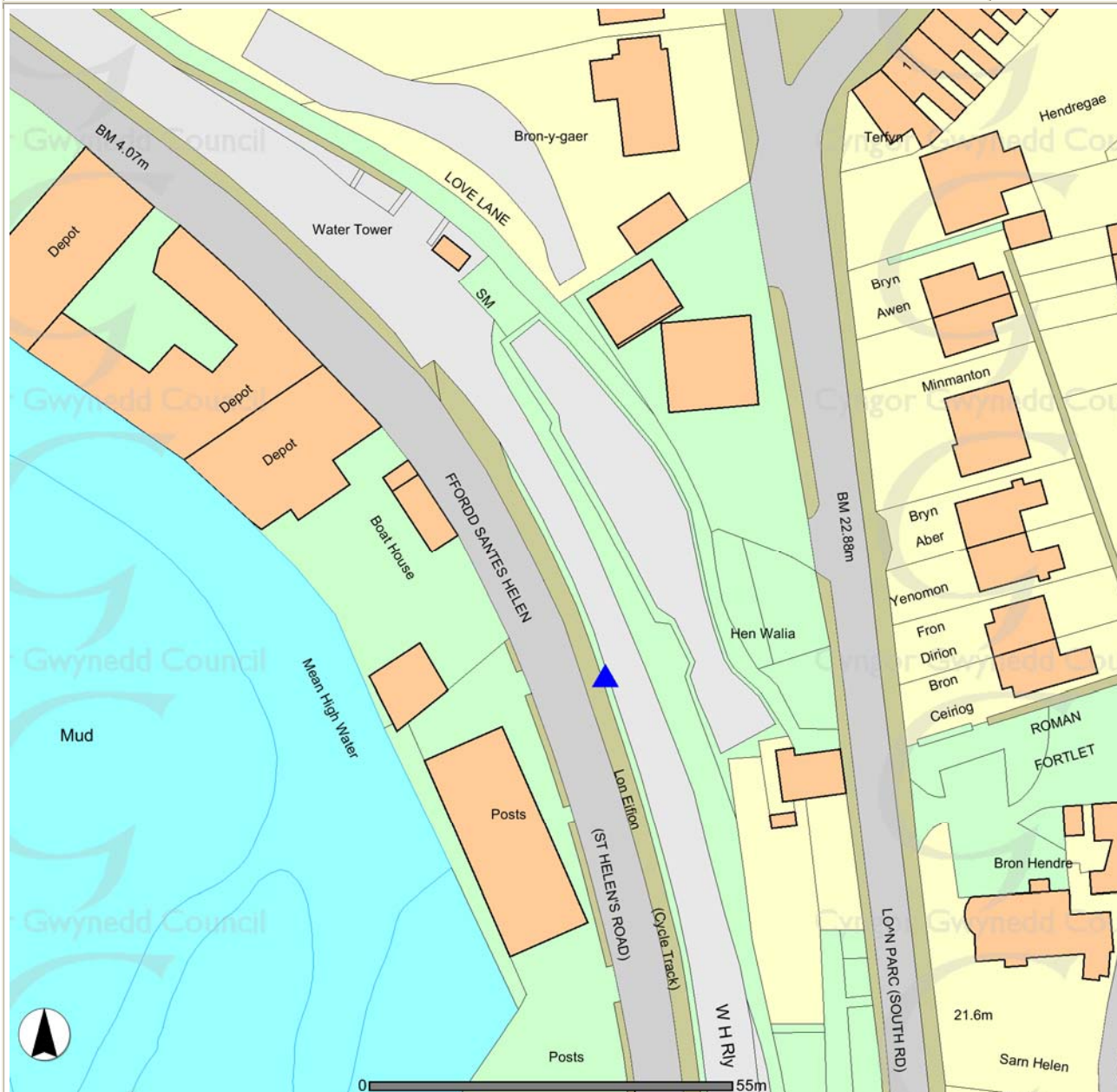
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# Rheilffordd Ucheldir/Highland Railway, Caernarfon

NGR 248205 362347  
Parameter: SO<sub>2</sub>



Graddfa/Scale 1: 1000

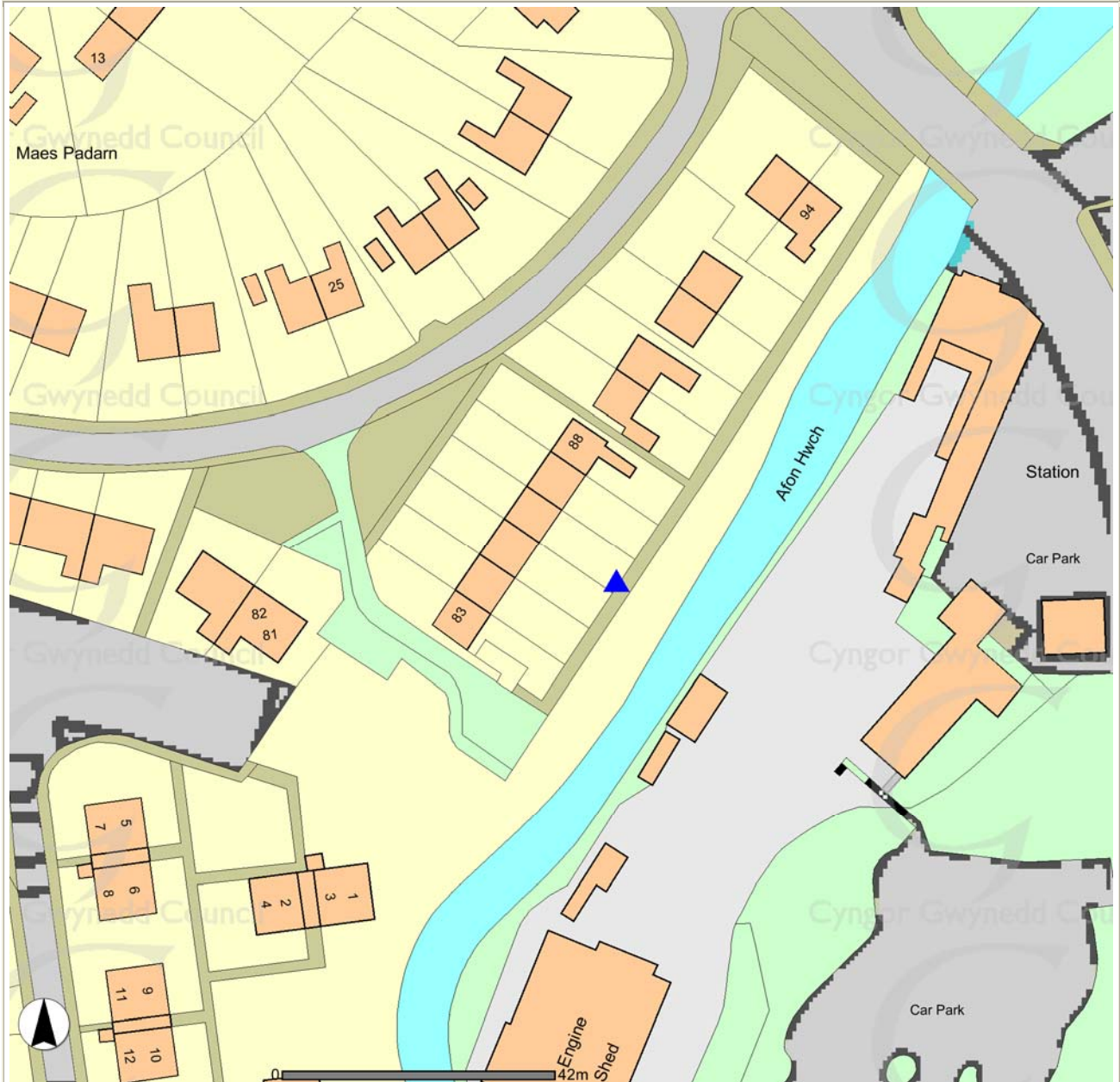
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## 86 Maes Padarn, Llanberis

NGR: 258188 359758

Parameter: SO<sub>2</sub>



Graddfa/Scale 1 ; 1000

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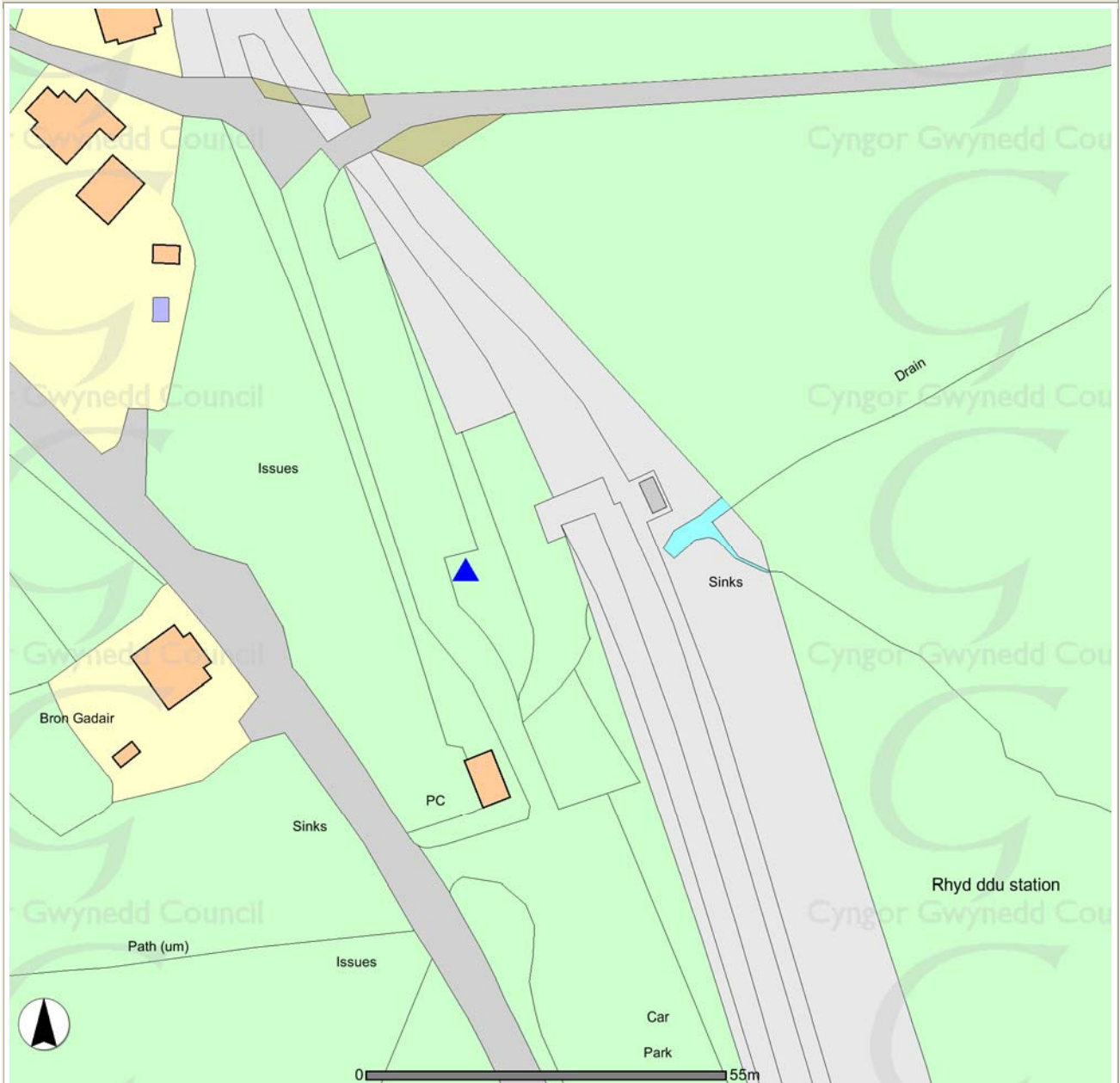
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## Gorsaf Rheilffordd Ucheldir/Highland Railway Station, Rhyd Ddu

NGR 257077 352644

Parameter: SO<sub>2</sub>



Graddfa/Scale 1 : 100

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## Canolfan Mynydda Chamois/Chamois Mountaineering Centre, Waunfawr

NGR 253140 360788

Parameter: SO<sub>2</sub>



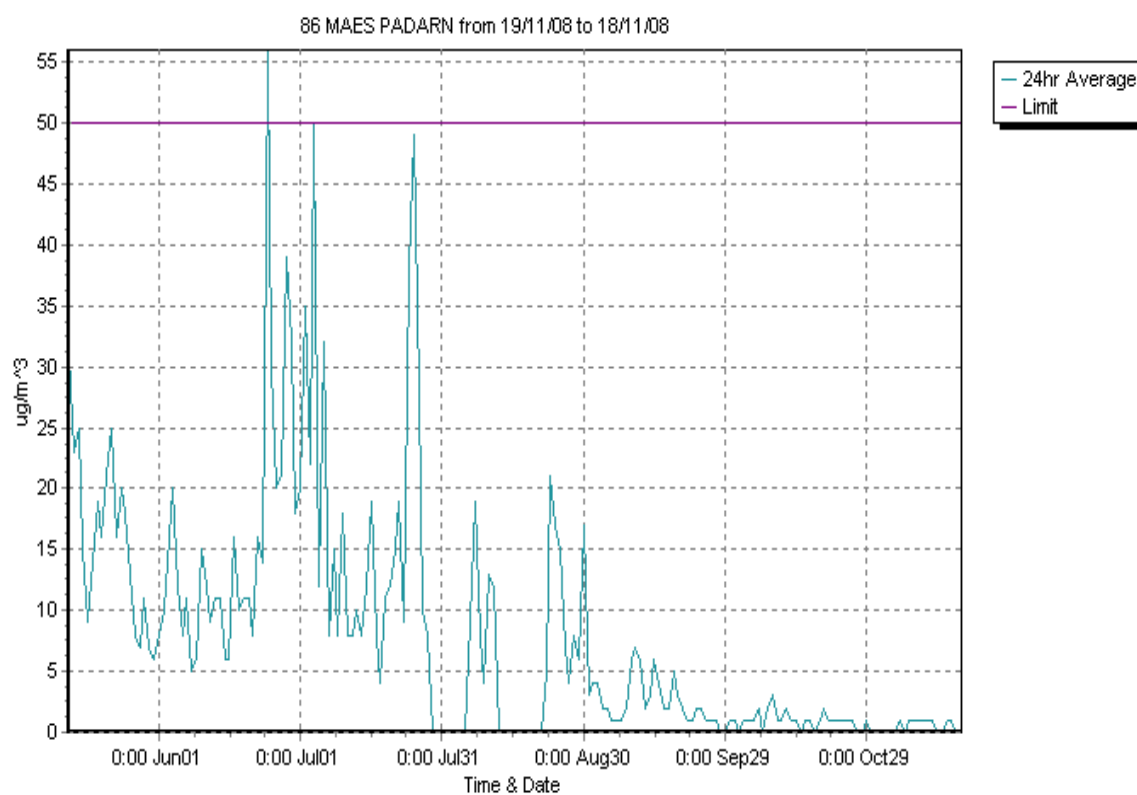
Scale/Graddfa 1 : 1000

Atgynhychir y map hwn o Ddeunydd yr Ordnance Survey gyda chaniatâd yr Ordnance Survey ar ran Rheolwr Llyfrfa Ei Mawrhydi. © Hawlfraint y Goron. Mae atgynhyrchu heb ganiatâd yn torri hawlfraint y Goron a gall hyn arwain at erlyniad neu achos sifil. Cyngor Gwynedd - 100023387 - 2009

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## Appendix D: Details of PM<sub>10</sub> Investigation at Maes Padarn

(i) Graph Showing 24 hour mean PM<sub>10</sub> against time from the 13/05/2008 until the 18/11/2008. The purple line indicates the 50µg/m<sub>3</sub> objective.





**(ii) Map showing the location of the Osiris dust monitor (blue triangle)**

