

# FloodSmart Plus



## Flood Consequence Assessment

### Site Address

Park Howard Road  
Gwaun-Cae-Gurwen  
SA18 1NZ

### Date

2022-10-12

### Report Status

FINAL

### Site Area

0.42 ha

### Report Reference

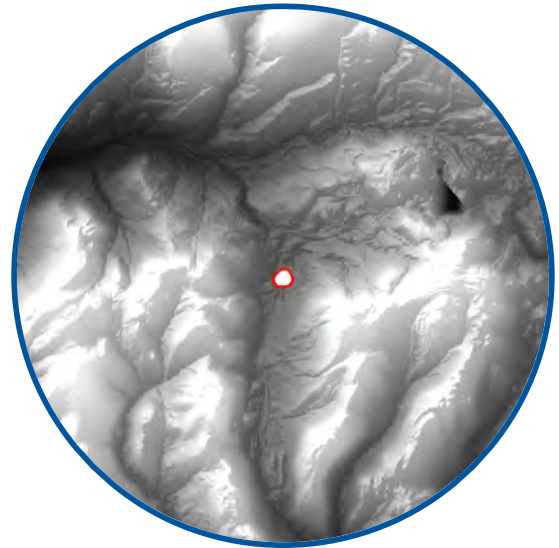
77081R1

### Grid Reference

270324, 211177

### Report Prepared for

SGW Planning  
69 Walter Road  
Swansea  
SA1 4QA



## RISK – Very Low to High

The proposed development is located within Flood Zones 1, 2 and 3 (low to high probability) with a Very Low to High risk of flooding from rivers and the sea. There is a Very Low risk of surface water (pluvial) flooding, and a Negligible to Low risk of groundwater flooding. The risk of flooding from artificial sources (i.e., reservoirs and sewers) is considered to be Negligible.

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# 1. Executive summary



The Planning Policy Wales (PPW) 11<sup>th</sup> edition (2021) and Technical Advice Note 15 (TAN 15) (2004) requires Flood Consequence Assessments (FCA) to review flooding from all potential sources. A review has been undertaken of national environmental data sets to assess the potential flood risk to the Site. The review is provided within this concise interpretative report written by an experienced GeoSmart consultant.

It should be noted that the TAN15 (2004) is anticipated to be updated in June 2023 and a new Flood Map for Planning will be published at the same time to support this. The new Flood Map for Planning will supersede the NRW's Development Advice Map (DAM) and the conclusions of this report may change as a result. However, this is yet to be implemented and this report is based upon TAN15 (2004) and DAM.

## Site analysis

| Source of Flood Risk                   | Baseline*                      | After Mitigation** |
|----------------------------------------|--------------------------------|--------------------|
| River (fluvial) flooding               | Very Low to High               | Very Low to Medium |
| Sea (coastal/tidal) flooding           | Very Low                       | N/A                |
| Surface water (pluvial) flooding       | Very Low                       | N/A                |
| Groundwater flooding                   | Negligible to Low <sup>1</sup> | Negligible         |
| Other flood risk factors present       | No                             | N/A                |
| Is any other further work recommended? | Yes                            | No (see below)     |

\*BASELINE risks have been calculated for the whole site, using national risk maps, including the benefit of NRW flood defences and include modification through a more detailed risk assessment based on site specific analysis including some or all of the following (where available): flood model data, high resolution mapping, building location, access routes, topographic and CCTV surveys. Reasons for the change in classification are provided in the text.

<sup>1</sup> Groundwater flooding risks adjusted from Negligible to Negligible to Low on the basis of more detailed analysis.

\*\*This includes an assessment of flooding risks over the lifetime of the proposed development, including allowances for climate change.

N/A indicates where mitigation is not required.

## Summary of existing and proposed development

The Site is located at Park Howard Road, Gwaun-Cae-Gurwen, SA18 1NZ in a setting of mixed land use at National Grid Reference 270324, 211177. The Site is currently used within a commercial capacity as a construction yard and storage facility. Development proposals comprise the construction of a light industrial unit towards the southwest of the Site.

## Summary of flood risks

The flood risks from all sources have been assessed as part of this report and are as follows:

### *River (fluvial) Flooding Risks*

According to the NRW's Flood Map for Planning, a minor area (15%) of the Site towards the southwest, including the majority of the proposed building footprint, is mapped within Flood Zone 3 (High probability). A very small area (2%) of the Site towards the southeast is mapped within Flood Zone 1 (Low probability). The majority (83%) of the Site including the central and eastern areas are mapped within Flood Zone 2 (medium probability).

The NRW's Development Advice Map (DAM) indicates that the majority (91%) of the Site is located within Zone C2 which is an area of the floodplain without significant flood defence infrastructure (TAN15, 2004). A minor (9%) section towards the southeast is mapped within Zone A which is considered to be at little or no risk of fluvial flooding (TAN15, 2004).

According to NRW's Flood Risk Assessment Wales map (FRAW), which considers the type, condition and crest height of flood defences, the Site currently has a Very Low to High risk of flooding from Rivers.

Investigation of modelled data provided by the NRW, taking into account the impact of climate change, the future flooding risks on Site are Very Low to High. The proposed building footprint is mapped within a Medium to High flood risk area.

The Glanamman Modelling Study provided undefended modelled flood levels and depths for the Site. During a 1 in 100 year event plus 20% CC the flood level could be up to 156.06 mAOD. This could result in flood depths of up to 0.75 m towards the southwest of the Site, including potential impacts on the proposed development. The eastern areas of the Site would not be affected.

### *Surface Water (Pluvial) and Small Watercourses Flooding Risk*

According to NRW's Flood Risk Assessment Wales (FRAW) map, the area of development is at Very Low risk of flooding from pluvial and small watercourses.

### *Groundwater Flooding Risk*

GeoSmart's Groundwater Flood Risk (GW5) Map indicates a Negligible potential for groundwater flooding on Site in a 1 % annual probability (1 in 100 year) event. However, a review of the BGS borehole database logs, indicates there is potentially a shallow

groundwater table at the Site. On the basis of the site-specific assessment (discussed in Section 4) the groundwater flood risk is considered to be Negligible to Low.

### *Artificial Flooding Risk*

The risk of flooding from artificial sources such as reservoirs, sewers and canals have been assessed:

- According to NRW's Risk of Flooding from Reservoir mapping, the Site is not at risk of Reservoir Flooding;
- According to Ordnance Survey (OS) mapping, there are no canals within the vicinity of the Site (Neath Port Talbot County Borough Council PFRA, 2011 and SFCA, 2014).

On the basis of the above the risk of flooding from artificial sources is considered Negligible.

The risk to the development has been assessed over its expected 60 year lifetime, including appropriate allowances for the impacts of climate change. More extreme weather events could increase the risk to the Site from increased river flows and fluvial flooding. Site specific assessment indicates risk to the Site will not increase significantly and appropriate mitigation measures are proposed.

## Recommendations

Recommendations for flood mitigation are provided below, based upon the proposed 'Less Vulnerable' development and the prevailing flood risk at the Site:

### *River (fluvial) Flooding Risk*

The Site is mapped as having a Very Low to High river (fluvial) flood risk. As such the following options are presented for the developer to choose in order to mitigate the flood risk. The developer should make clear to the LA which option will be taken forward:

#### *Option 1- Reconfigure development proposals*

According to the NRW model, the fluvial flood extent would be limited to the southwest of the Site, during a 1 in 100 year plus 20% CC event. The eastern areas of the Site would not be affected. Therefore, if the proposed development could be repositioned towards the eastern sector of the Site, the river (fluvial) flood risk would be reduced.

#### *Option 2 – Development proposals remain, finished floor levels are raised*

The development layout remains as currently proposed with the finished floor levels (FFL) raised in line with the NRW's FRSA including a recommended minimum FFL of 0.30m above the 1 in 100 year plus 20% CC event. Therefore, the FFL's should be set at least 156.36 mAOD.

Flood resilience measures and a water exclusion strategy would also be included within the building design. These are presented below in section *Additional mitigation measures for all options*.

### *Option 3 – Development proposals remain, working practices are adjusted with acceptance to the risk*

The Site is currently used within a commercial capacity as a construction yard and storage facility. Development proposals comprise the construction of a light industrial unit towards the southwest of the Site.

The developer could accept the risk of river (fluvial) flooding at the Site, including damages to the building. This could include a water entry strategy.

Where flood depths are expected to exceed 0.6 m at the Site, a water entry strategy should be adopted to preserve building integrity and to promote flood resilience rather than resistance (which is more difficult to achieve for significant flood depths). A structural engineer should be consulted to confirm this would be a suitable strategy for the proposed development, to ensure flood flows would not impact the structural integrity of the building. Potential strategies include:

- Ground floors designed to permit water passage at high flood depths;
- Hard flooring and flood resilient metal staircases;
- Heating systems, electrical sockets and utility meters should be raised above the predicted flood level where possible;
- Sump and pump;
- Stock / storage could be lifted above the 1 in 100 year plus 20% CC event with the use of racking;
- Water, electricity and gas meters and electrical sockets should be located above the predicted flood level;
- Communications wiring: wiring for telephone, Internet and other services should be protected by suitable insulation in the distribution ducts to prevent damage.

Where flood depths are expected to be between 0.3 m and 0.6 m both water exclusion (see below) and water entry strategies should be adopted depending on a structural assessment of the building.

### *Additional mitigation measures for all options*

A water exclusion strategy, using avoidance and resistance measures, is appropriate where floods are expected to last for short durations. Potential water exclusion strategies include:

- Temporary flood barriers;
- Landscaping to divert water away from the property;
- Sustainable Drainage Systems (SuDS) to store/intercept flood water.

Note: a SuDS scheme should be developed for the Site regardless, to enable effective management of surface water runoff from the proposed development.

In addition, the regular maintenance of any drains and culverts surrounding/on the Site should be undertaken to reduce the flood risk.

As the development would displace flood waters, compensatory flood storage is required for the loss in flood plain storage. Any losses in floodplain storage are likely to displace flooding and could potentially alter flood flow routes, increasing flood risk elsewhere. A separate floodplain storage compensation assessment may be required.

A business continuity plan is recommended to reduce risks to people, property and profit.

A Flood Warning and Evacuation Plan (FWEP) is recommended, and Site personnel should be signed up to receive the EAs Flood Alerts.

## Groundwater Flooding Risk

It is likely that the flood mitigation measures recommended for river flood risk will be sufficient to reduce the groundwater flood risk to the built development. However, specific groundwater measures that may also be considered to reduce risks further include:

- Interceptor drains.

GeoSmart recommend the mitigation measures discussed within this report are considered as part of the proposed development where possible and evidence of this is provided to the Local Planning Authority as part of the planning application.

## 2. Introduction



### Background and purpose

This assessment has been undertaken by firstly compiling information concerning the Site and the surrounding area. The information gathered was then used to construct a 'conceptual site model', including an understanding of the appropriateness of the development as defined in the PPW (2021) and the source(s) of any flood risk present. Finally, a preliminary assessment of the steps that can be taken to manage any flood risk to the development was undertaken.

This report has been prepared with reference to the Technical Advice Note (TAN) 15 (2004) which supplements the PPW (2021).

The general approach of PPW, supported by TAN15, is to advise caution in respect of new development in areas at high risk of flooding by setting out a precautionary framework to guide planning decisions. The overarching aim of the precautionary framework is, in order of preference, to:

- Direct new development away from those areas which are at high risk of flooding; and
- Where development is considered to be in high-risk areas (Zone C) only those developments which can be justified on the basis of the tests outlined in section 6 and section 7 are located within such areas.

The purpose of this report is to provide clear and pragmatic advice regarding the nature and potential significance of flood hazards which may be present at the Site.

### Report scope

A thorough review of a commercially available flood risk report and NRW supplied data indicating potential sources of flood risk to the Site from rivers and tidal sources, surface run-off (pluvial), groundwater and reservoirs, including historical flood information and modelled flood extent. Appropriate measures are recommended to manage and mitigate the flood risk to the property.

Information obtained from NRW and a review of the Neath Port Talbot County Borough Council Strategic Flood Consequences Assessment (2014) has been used to ascertain local flooding issues and, where appropriate, identify information to support a Justification test and Assessment of Flood Consequences required as part of the PPW (2021).

Using available data, the existing and future flood risks to and from the Site from all flood sources will be assessed in line with current best practice.

An indication of potential flood risk from the Site to downstream receptors is provided where the proposed development increases run-off from the Site.

## Report limitations

It is noted that the findings presented in this report are based on a desk study of information supplied by third parties. Whilst we assume that all information is representative of past and present conditions, we can offer no guarantee as to its validity and a proportionate programme of site investigations would be required to fully verify these findings.

This report excludes consideration of potential hazards arising from any activities at the Site other than normal use and occupancy for the intended land uses. Hazards associated with any other activities have not been assessed and must be subject to a specific risk assessment by the parties responsible for those activities.

## Datasets

The following table shows the sources of information that have been consulted as part of this report:

**Table 1. Datasets consulted to obtain confirmation of sources of flooding and risk**

| Source of flooding                    | Datasets consulted    |                                    |                                      |         |
|---------------------------------------|-----------------------|------------------------------------|--------------------------------------|---------|
|                                       | Commercial Flood Maps | Local Policy & Guidance Documents* | Natural Resources Wales (Appendix B) | OS Data |
| Historical                            | X                     | X                                  | X                                    |         |
| River (fluvial) / Sea (tidal/coastal) | X                     | X                                  | X                                    |         |
| Surface water (pluvial)               | X                     | X                                  | X                                    |         |
| Groundwater                           | X                     | X                                  |                                      |         |
| Sewer                                 |                       | X                                  |                                      |         |
| Culvert/bridges                       |                       | X                                  |                                      | X       |

| Source of flooding | Datasets consulted    |                                    |                                      |         |
|--------------------|-----------------------|------------------------------------|--------------------------------------|---------|
|                    | Commercial Flood Maps | Local Policy & Guidance Documents* | Natural Resources Wales (Appendix B) | OS Data |
| Reservoir          |                       | X                                  | X                                    |         |

\*Local guidance and policy, referenced in Section 6, has been consulted to determine local flood conditions and requirements for flood mitigation measures.

## Local policy and guidance

For this report, several documents have been consulted for local policy and guidance and relevant information is outlined below:

*Neath Port Talbot County Borough Council Local Development Plan (2011-2026)*

### 3.0.2 SP1 Climate Change

In relation to the consequences of climate change:

- 1) Likely increased flood risk will be taken into account and addressed by ensuring that there is greater resilience by avoiding development on land that is at risk from flooding in the first instance in accordance with the sequential approach set out in the national guidance or in locations that could increase the risk of flooding elsewhere.

### 3.0.5

New developments will be expected to avoid unnecessary flood risk and to meet the requirements of TAN 15: Development and Flood Risk. No highly vulnerable development will be permitted within Development Advice Map (DAM) Zone C2(8) and development will only be considered in areas at risk of flooding where it can be demonstrated that the site can comply with the justification and assessment requirements set out in the TAN.

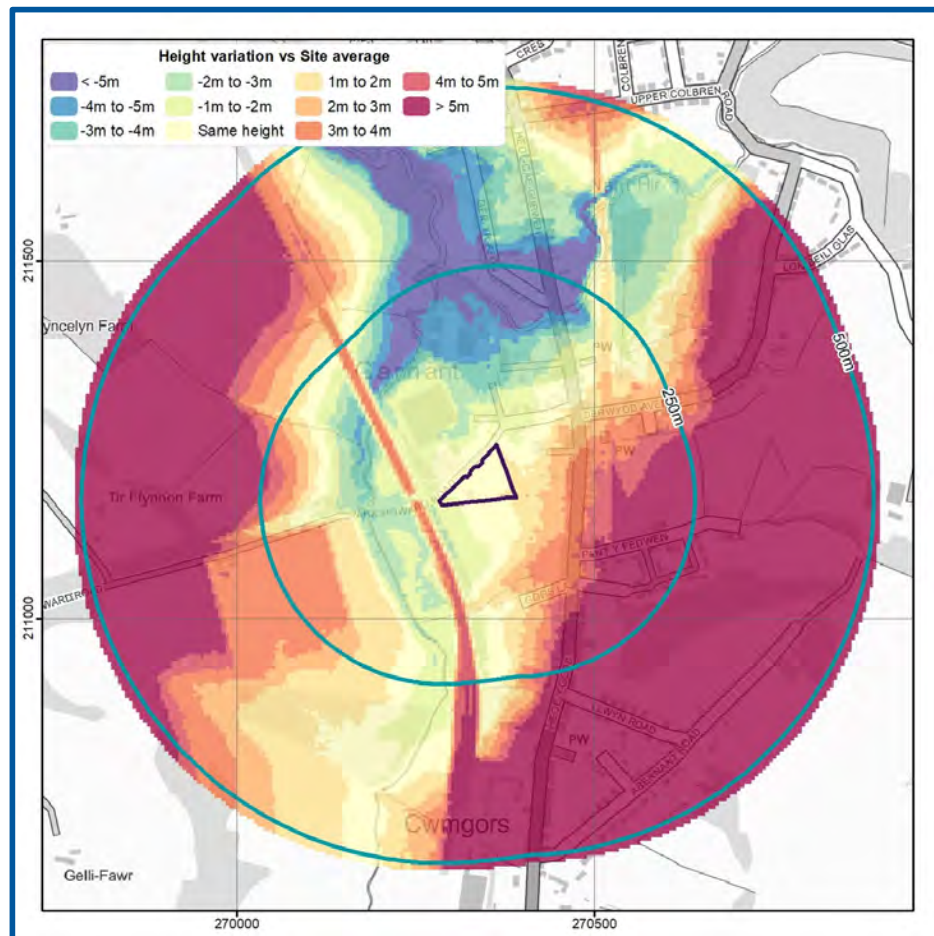
## 3. Site analysis

### Site information

The Site is located at Park Howard Road, Gwaun-Cae-Gurwen, SA18 1NZ in a setting of mixed land use at National Grid Reference 270324, 211177. Site plans and drawings are provided in Appendix A.

The ground levels at the Site are between 155.31 mAOD and 156.78 mAOD with the Site falling gradually in an westerly direction. This is based upon a Site specific topographic survey undertaken by Alpine Land Surveyors Ltd  $\pm 0.15$  m (Appendix A).

Figure 1. Site Location and Relative Elevations (GeoSmart, 2022)



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## Development

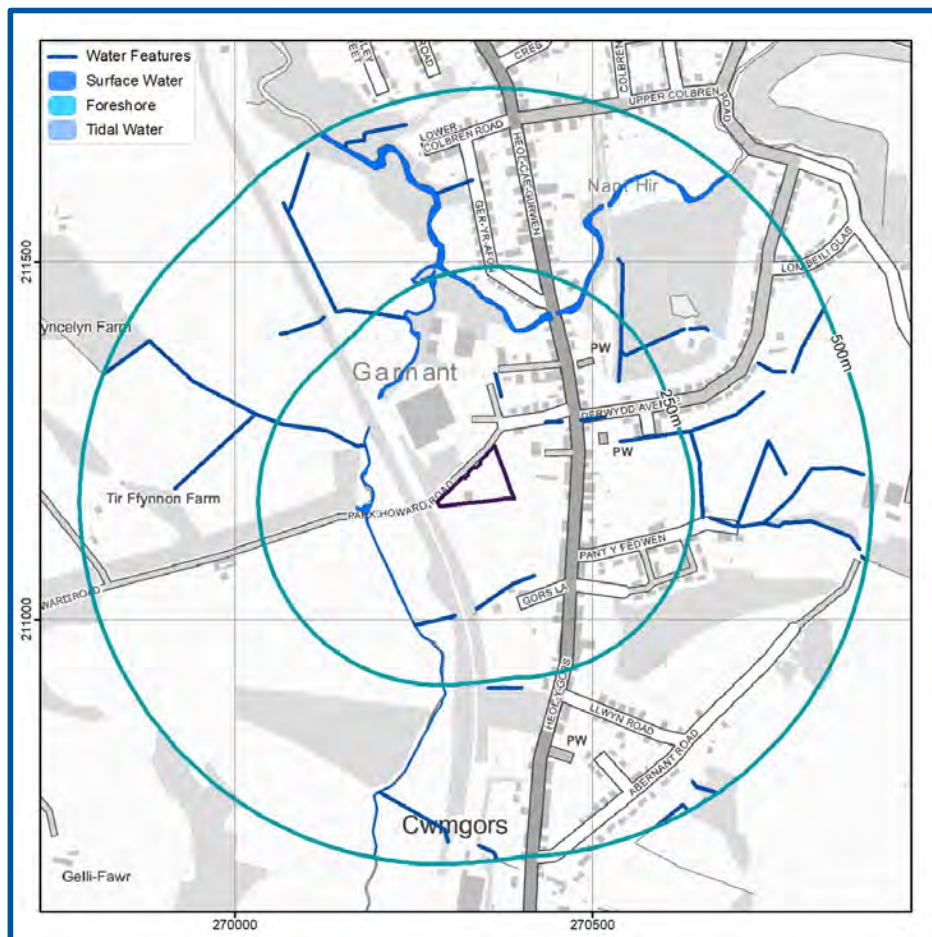
The Site is currently used within a commercial capacity as a construction yard and storage facility. Development proposals comprise the construction of a light industrial unit towards the southwest of the Site. Site plans are included within Appendix A.

The effect of the overall development will not result in an increase in number of occupants and/or users of the Site and will not result in the change of use, nature or times of occupation. According to Table 2 of the NPPG (2014), the vulnerability classification of the existing development is Less Vulnerable and proposed development is Less Vulnerable. The estimated lifespan of the development is 60 years.

## Hydrological features

According to Ordnance Survey (OS) mapping included in the following figure, there are numerous surface water features within 500 m of the Site.

Figure 2. Surface water features (NRW, 2022)



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The River Garnant is mapped c. 90 m west of the Site at a lower elevation. The River Garnant is bridged by Park Howard Road c. 100 m west of the Site

The Nant Hir is mapped c. 180 m north of the Site at a lower elevation.

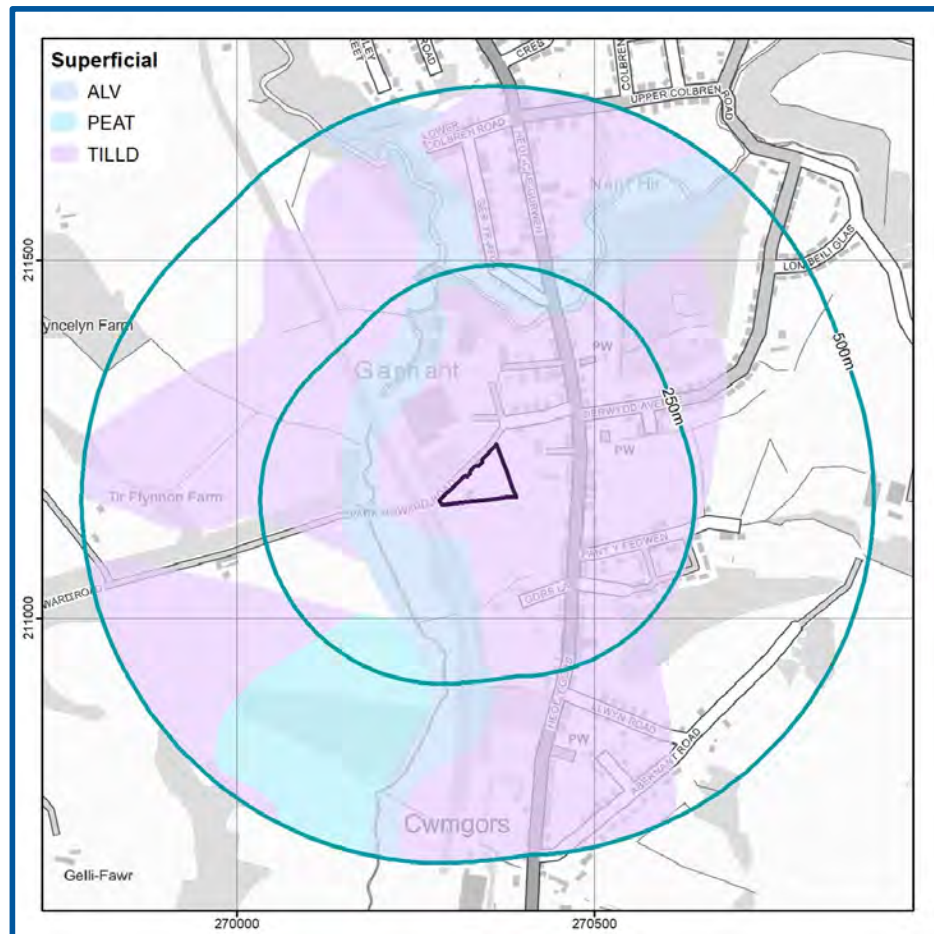
There are a number of smaller tributaries mapped c. 130 m and c. 220 m northwest of the Site at a lower elevation than the Site.

There are a number of drainage ditches associated with agricultural fields located c. 65 m north, c. 75 m east, c. 125 m east and c. 175 m east of the Site.

## Hydrogeological features

British Geological Survey (BGS) mapping indicates that the underlying superficial geology (Figure 3) consists of Glacial Till (TILLD) (BGS, 2022) which is classified as a Secondary Undifferentiated Aquifer (NRW, 2022).

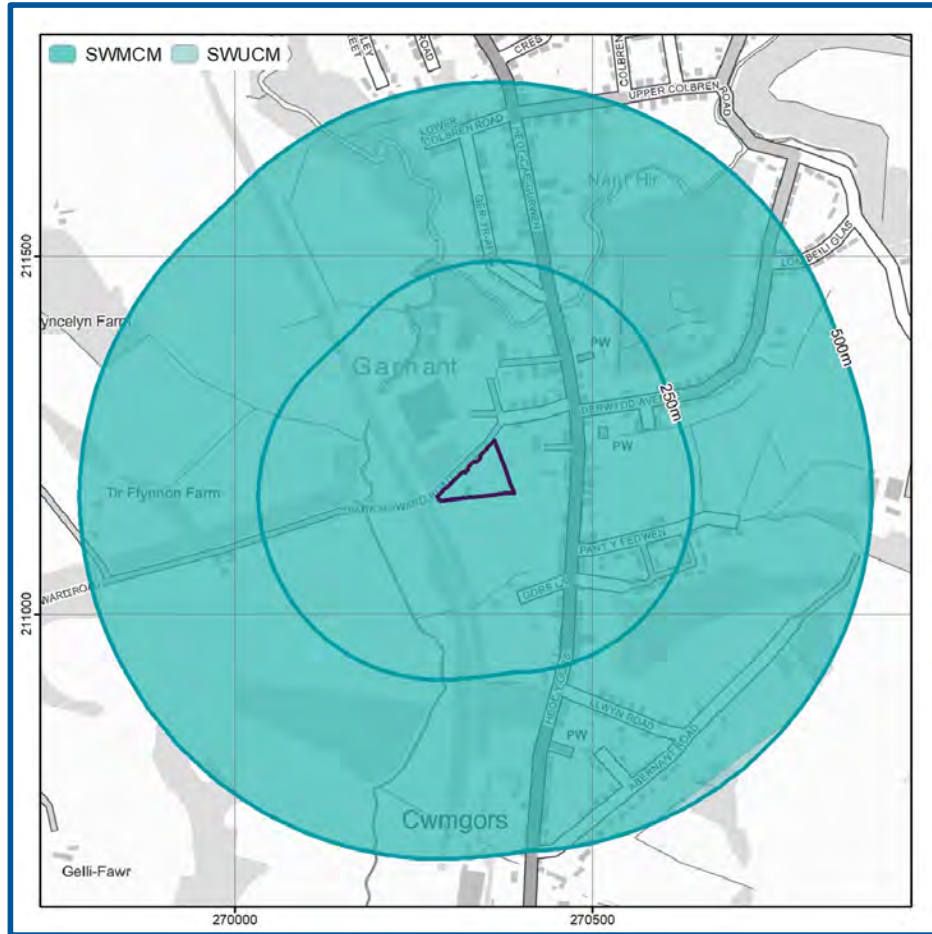
Figure 3. Superficial Geology (BGS, 2022)



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BGS mapping indicates the underlying bedrock geology (Figure 4) consists of the South Wales Middle Coal Measures Formation (SWMCM) which is comprised of coal bearing mudstones and siltstones (BGS, 2022) and is classified as a Secondary (A) Aquifer (EA, 2022).

Figure 4. Bedrock Geology (BGS, 2022)



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### *Geological conditions*

A review of the BGS borehole database (BGS, 2022) indicates that the nearest boreholes were drilled c. 100 m and c. 150 m southwest (BGS ref: SN71SW134 WS1B and SN71SW135 WS3). The boreholes drilled by Geotechnics Ltd in June 2005 when groundwater levels are low. The logs recorded:

#### SN71SW134 WS1B

- Soft occasionally soft to firm dark grey and dark brown slightly sandy slightly gravelly CLAY. From ground level to 1.65 m below ground level (bgl).
- Very soft grey and brown CLAY to 3.90 mbgl.

- Firm to stiff light grey to grey green slightly sandy gravelly CLAY with occasionally pockets of grey silt to 4.65 mbgl.
- Weathered MUDSTONE to at least the base of the borehole at 5.20 mbgl.
- Groundwater was not encountered.

#### SN71SW134 WS1B

- Soft occasionally soft to firm dark grey and dark brown slightly sandy slightly gravelly CLAY. From ground level to 1.65 mbgl.
- Very soft grey and brown CLAY to 3.90 mbgl.
- Firm to stiff light grey to grey green slightly sandy slightly gravelly CLAY with occasional pockets of grey silt to 4.65 mbgl.
- Weathered MUDSTONE to at least the base of the borehole at 5.20 mbgl.
- Some seepage was noted.

#### *Groundwater*

Shallow groundwater levels could potentially be present within several metres of the on-Site ground level, subject to local hydrogeological conditions. This inference is based on the elevation of the River Garnant (153.22 mAOD) located c. 90 m west of the Site.

## 4. Flood risk to the development

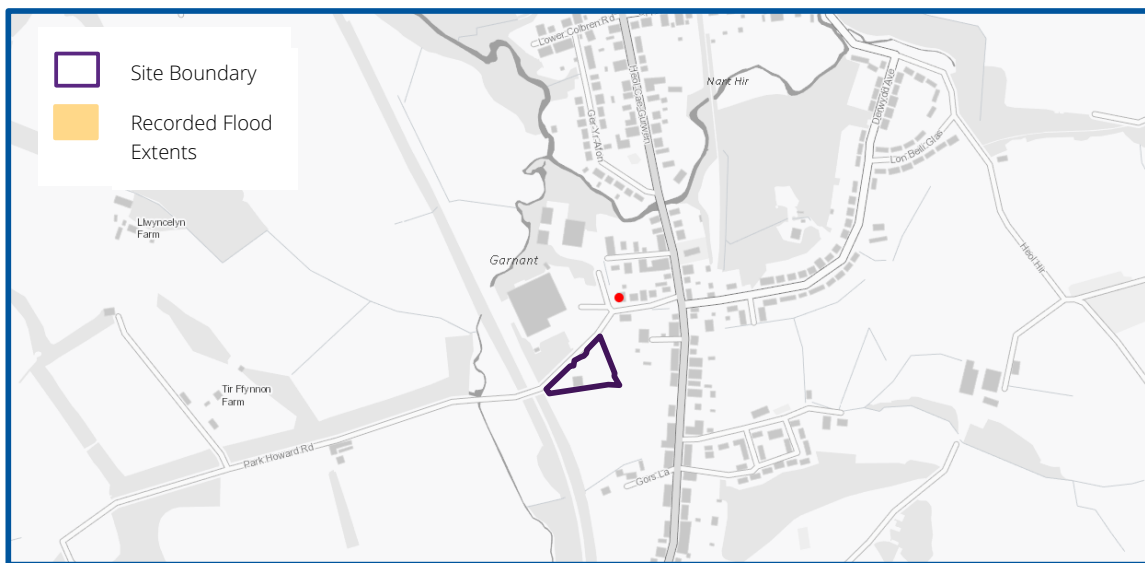


### Historical flood events

According to the NRW's Recorded Flood Extents Map (Figure 5), no historical flood events have been recorded at the Site (NRW, 2022).

The purpose of historical flood data is to provide information on where and why flooding may have occurred in the past. The absence of any recorded events does not mean flooding has never occurred on-Site or that flooding will never occur at the Site.

**Figure 5. Historic Flood Event Outline (NRW, 2022)**



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### Rivers (fluvial) flooding

The predominant risk at the Site is from flooding from rivers, termed as fluvial flooding. The Site is located in an inland location and the risk of flooding from coastal and tidal processes are therefore considered to be Negligible.

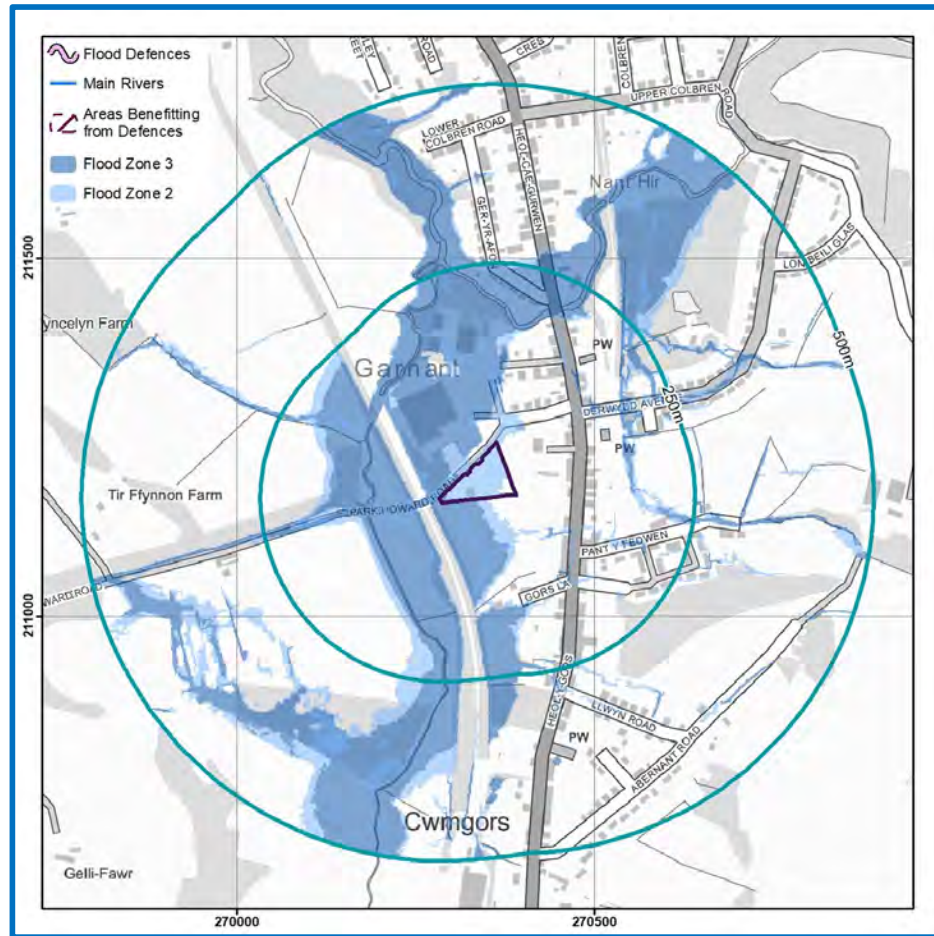
River (fluvial) flooding occurs during times of heavy rainfall or snow melt when watercourses' capacity can be exceeded, over topping the banks and flood defences.

### Flood Zones Map

According to the NRW's Flood Map for Planning (Figure 6), the Site is located within fluvial Flood Zone 1, 2 and 3 and is therefore classified as having Low to High probability of fluvial flooding from the River Garnant. A minor area (15%) of the Site towards the southwest, including the majority of the proposed building footprint, is mapped within Flood Zone 3 (High

probability). A minor area (2%) of the Site towards the southeast is mapped within Flood Zone 1 (Low probability). The majority (83%) of the Site, including the central and eastern areas, are mapped within Flood Zone 2 (medium probability).

Figure 6. NRW Flood Zone mapping (NRW, 2022)



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Please note these Flood Zones are not presently used for planning purposes, but instead provide an indicative extent for the 1 in 100 year and 1 in 1000 year fluvial and tidal events, respectively.

The above Flood Zones will become live, once the revised version of TAN15 is published in June 2023. The Development Advice Map (DAM) is currently the most up to date mapping for planning purposes in line with TAN15 (2004).

## Development Advice Map

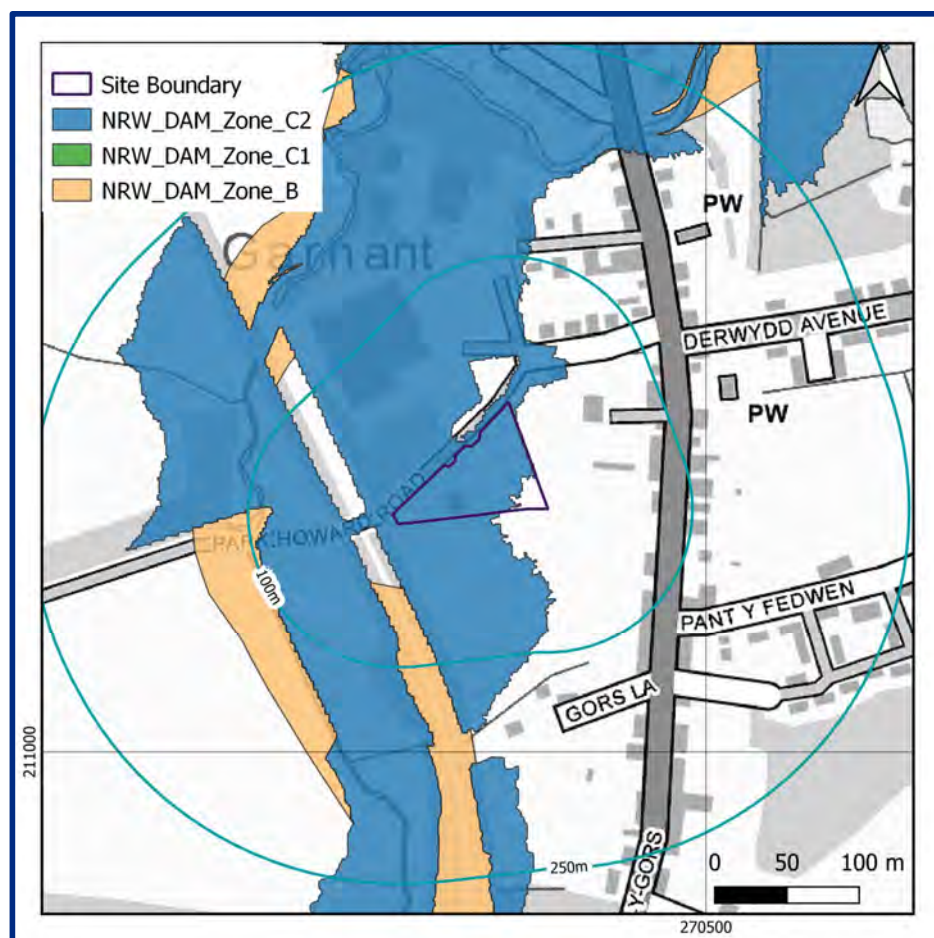
The NRW's Development Advice Map (DAM) confirms the majority (91%) of the Site is located within Zone C2 which is an area of the floodplain without significant flood defence

infrastructure (TAN15, 2004). A minor (9%) section towards the southeast is mapped within Zone A, which is considered to be at little or no risk of fluvial flooding (TAN15, 2004).

**Table 1. Development Advice Map Classification**

| Description of Zone                                                                                             | Zone |
|-----------------------------------------------------------------------------------------------------------------|------|
| Considered to be at little or no risk of fluvial or tidal/coastal flooding.                                     | A    |
| Areas known to have been flooded in the past evidenced by sedimentary deposits.                                 | B    |
| Areas of the floodplain which are developed and served by significant infrastructure, including flood defences. | C1   |
| Areas of the floodplain without significant flood defence infrastructure.                                       | C2   |

**Figure 7. Development Advice Map (NRW, 2022)**

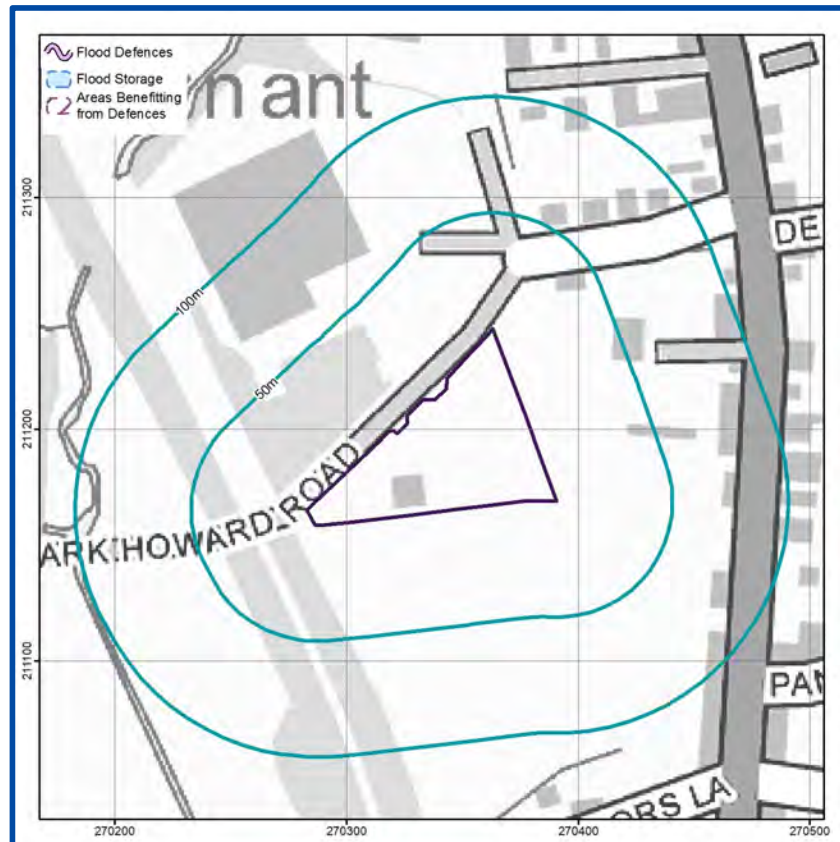


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## Flood defences

- The Site does not benefit from flood defences, the only protection afforded to the Site is through the capacity of the watercourse.<sup>1</sup>

Figure 8. Location of flood defences mapping (NRW 2022)

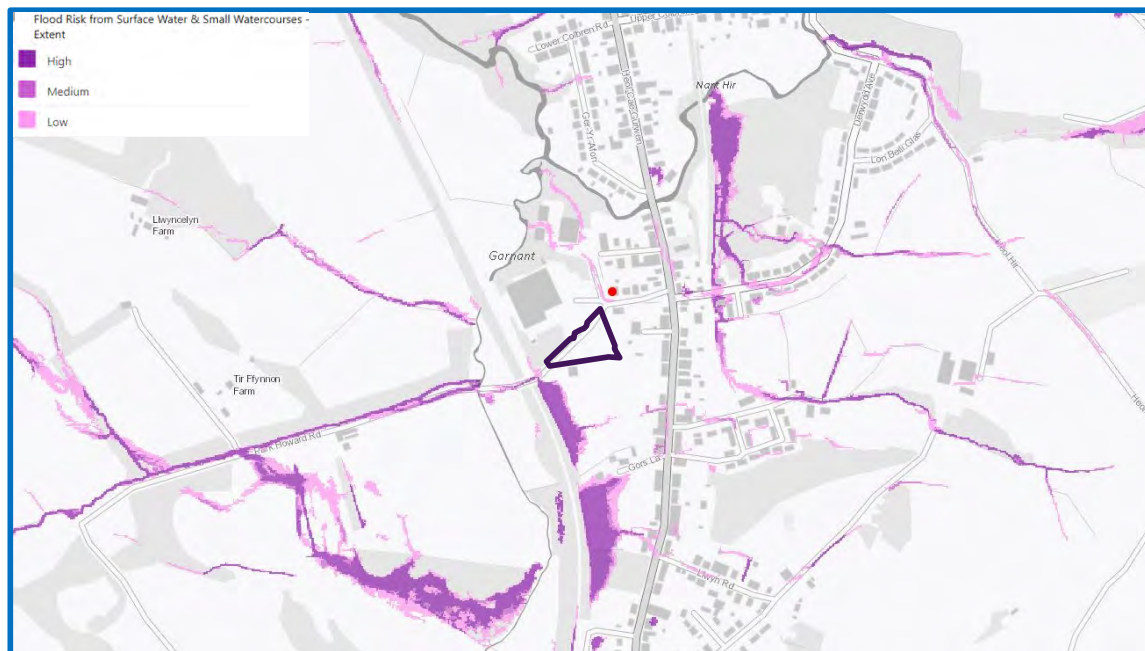


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<sup>1</sup> The NRW maps Areas which Benefit from the presence of Defences (ABD) in a 1 in 100 (1%) chance of flooding each year from rivers; or 1 in 200 (0.5 %) chance of flooding each year from the sea. If the defences were not there, these areas would flood in a 1 in 100 (1%)/ 1 in 200 (0.5 %) or larger flooding incident. The NRW do not show all areas that benefit from all flood defences, some defences are designed to protect against a smaller flood with a higher chance of occurring in any year, for example a flood defence which protects against a 1 in 30 chance of flooding in any year. Such a defence may be overtopped in a flood with a 1 in 100 (1%)/ 1 in 200 (0.5%) chance of occurring in any year, but the defence may still reduce the affected area or delay (rather than prevent) a flood, giving people more time to act and therefore reduce the consequences of flooding.



Figure 10. Surface Water and Small Watercourses – FRAW Risk Map (NRW 2022)



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Figure 12. 1 in 100 year (Medium risk) map for river flooding



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Figure 13. 1 in 1000 year (Low risk) map for river flooding



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## NRW Glanaman fluvial model

As the Site is located within the NRW's fluvial floodplain, modelled flood elevation data were obtained from the NRW and have been used to further assess the flood risk and to inform recommendations for mitigation for the proposed development.

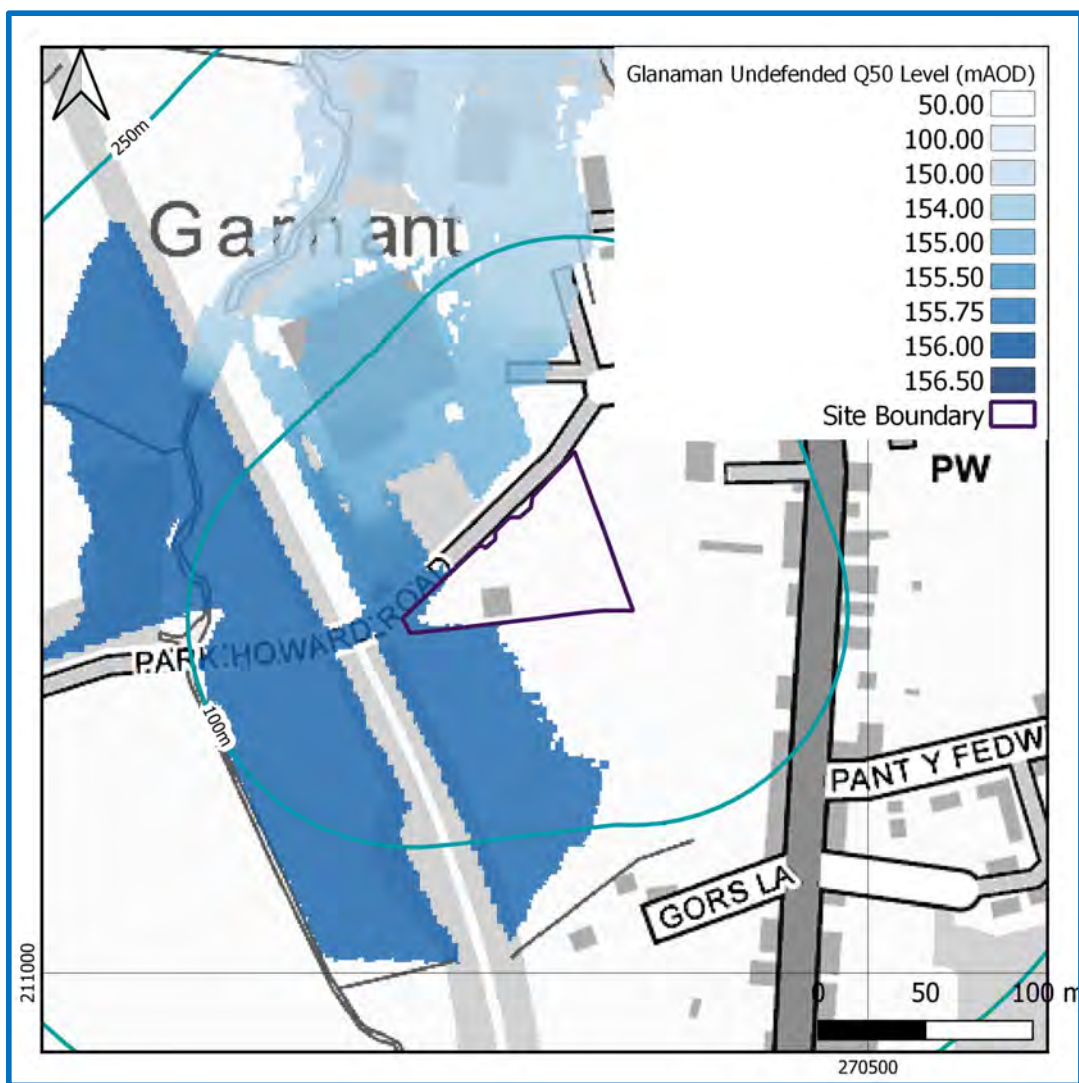
1D nodes and undefended processed data provided from NRW's model of Glanaman Phase 2 (NRW, 2016) have been used to assess flood risk<sup>2</sup>.

The data have been taken from the point shown on the map Figure 14 and are provided in Table 2 below and also within Appendix B.

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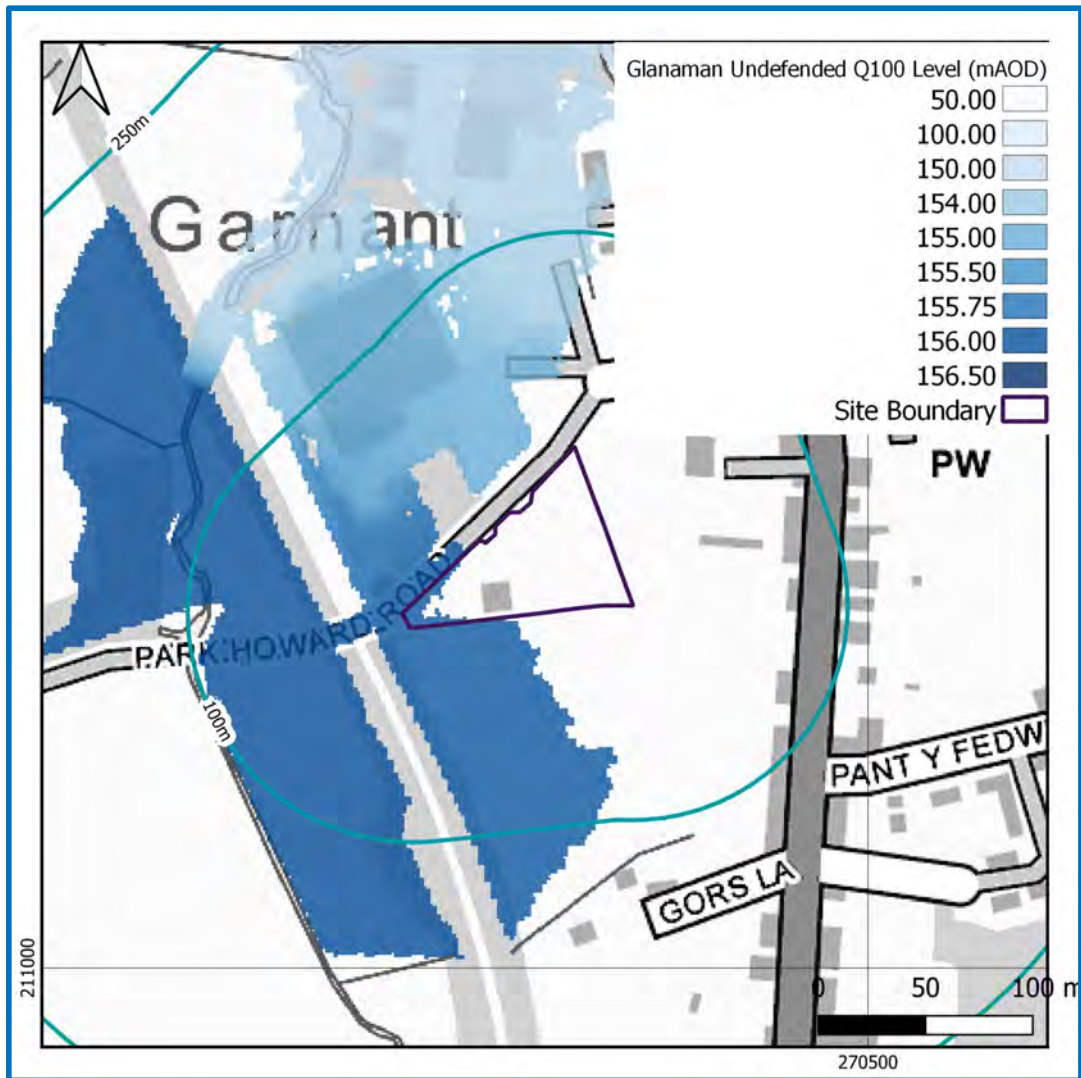
<sup>2</sup> The accuracy of the modelled flood levels are not known. These are dependent on the accuracy of input datasets such as LiDAR data, used to model the impacts of flooding within the 2D domain. Confirmation of the accuracy of the modelled flood data can be obtained separately from Natural Resources Wales.

Figure 14. NRW Modeling undefended 1 in 50 year



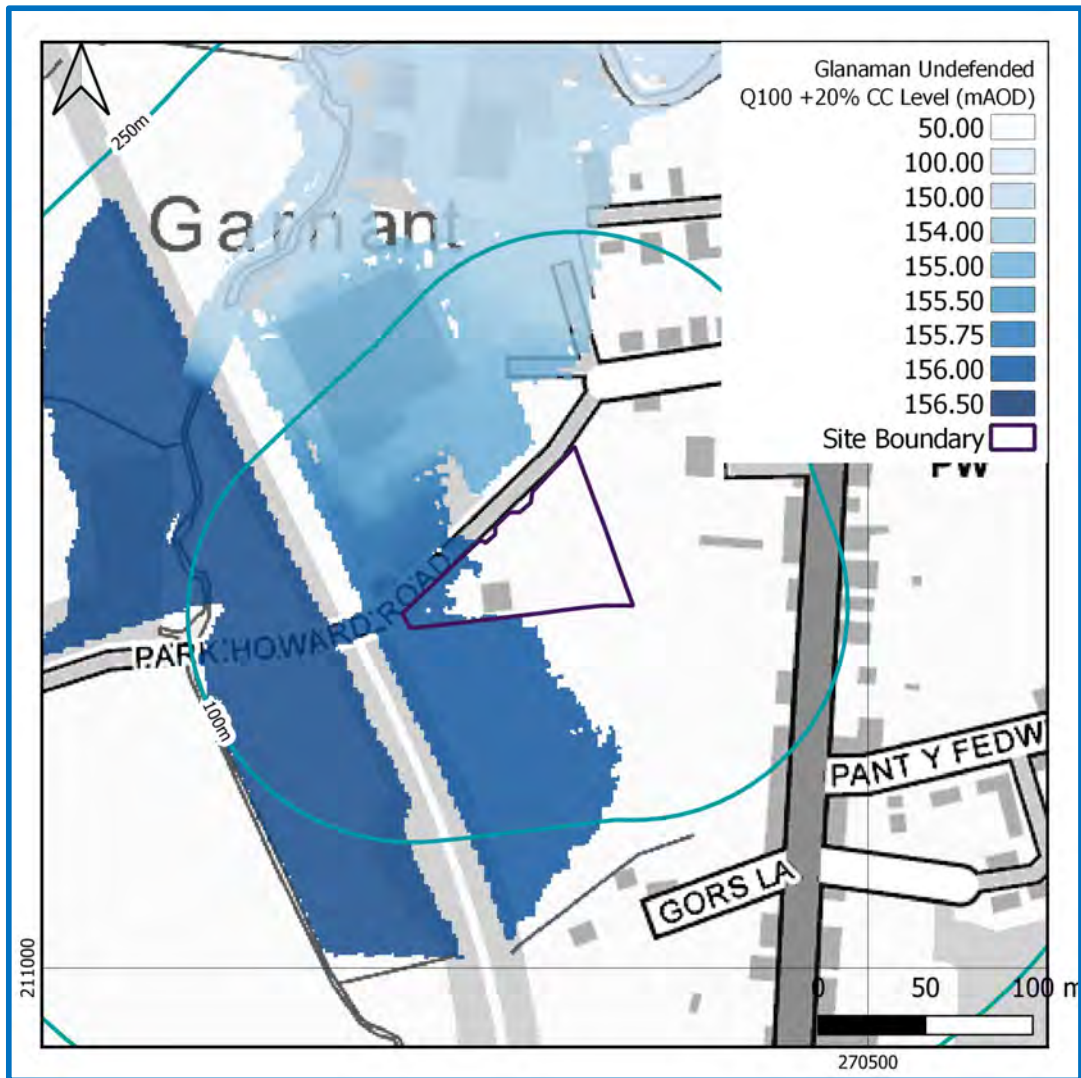
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Figure 15. NRW Modeling undefended 1 in 100 year



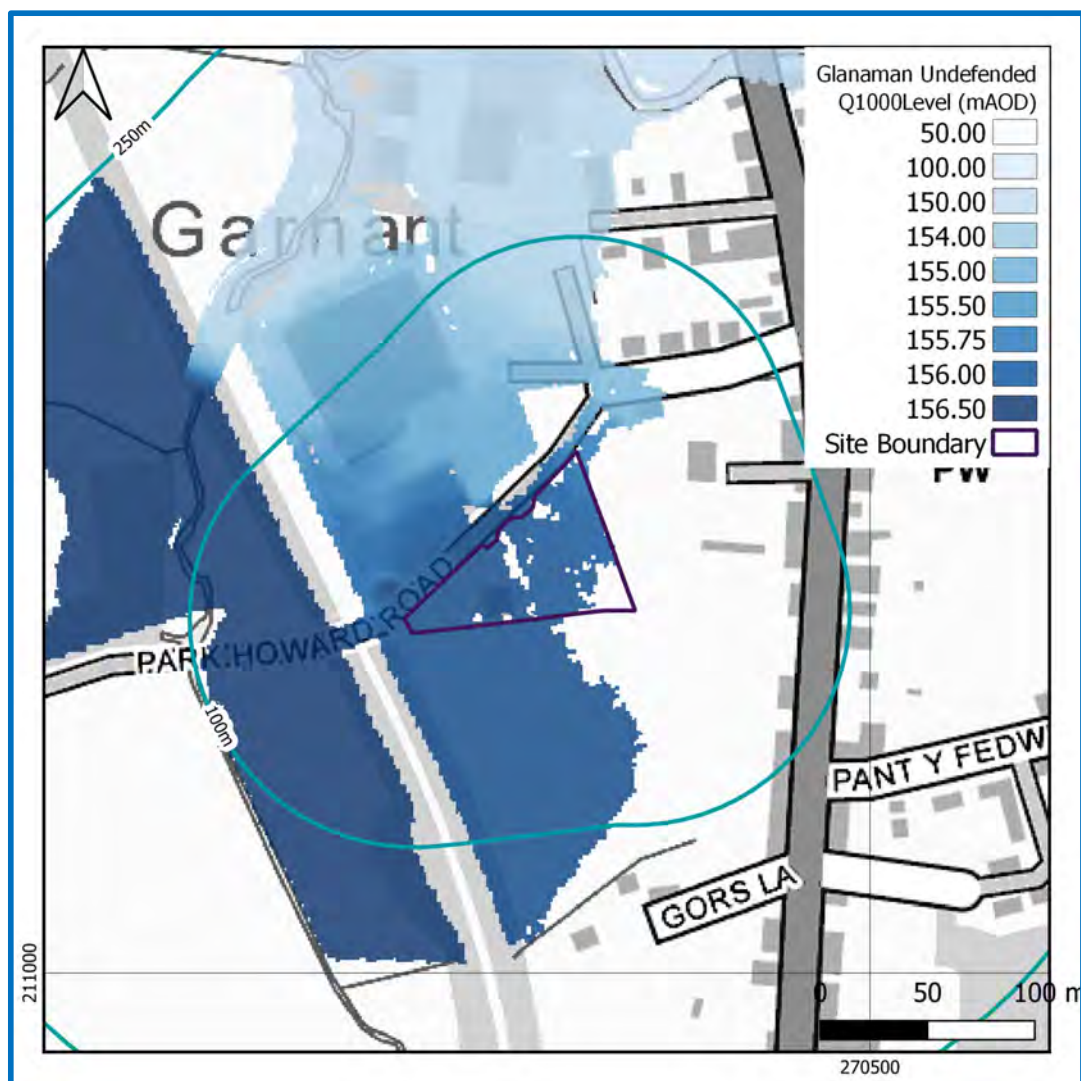
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Figure 16. NRW Modeling undefended 1 in 100 year plus 20% CC



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Figure 17. NRW Modeling undefended 1 in 1000 year



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Table 2. NRW Modeling Glanaman Fluvial Undefended

| Ground levels at the Site (mAOD)<br>155.31-156.78 | Modelled Flood Levels (mAOD) |               |                           |                |
|---------------------------------------------------|------------------------------|---------------|---------------------------|----------------|
|                                                   | 1 in 50 year                 | 1 in 100 year | 1 in 100 year plus 20% CC | 1 in 1000 year |
| Flood level (mAOD)                                | 155.85                       | 155.96        | 156.06                    | 156.27         |
| Flood depths (m)                                  | Up to 0.54                   | Up to 0.65    | Up to 0.75                | Up to 0.96     |

## Summary of Glanaman Modelling

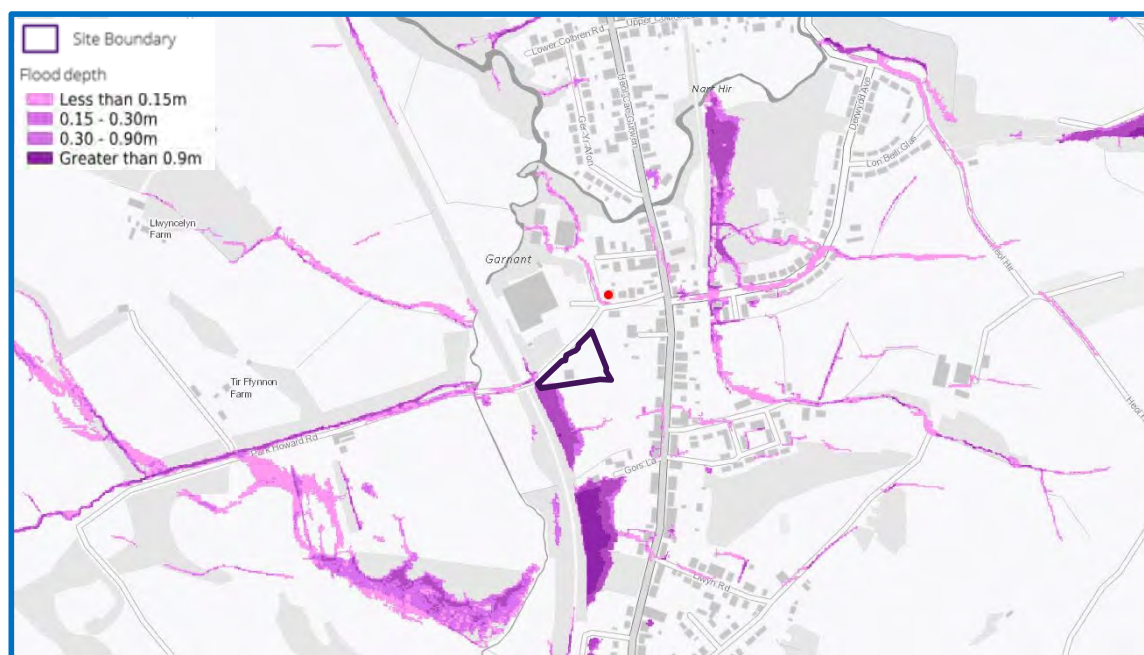
The Glanaman Modelling Study has provided undefended modelled flood levels and depths for the Site. During a 1 in 100 year event plus 20% CC the flood level at the Site could reach 156.06 mAOD. This could result in flood depths of up to 0.75 m in the southwest of the Site, including impacts on the proposed development. The eastern areas of the Site would not be affected.

## Surface water (pluvial) flooding

Surface water flooding occurs when intense rainfall exceeds the infiltration capacity of the ground and overwhelms the drainage systems. It can occur in most locations even at higher elevations and at significant distances from river and tidal floodplains.

According to NRW's Risk of Flooding from Surface Water (pluvial) mapping for a 1 in 1000 year pluvial event (Figure 18), the Site is not at risk to surface water (pluvial) flooding in the Low risk event.

Figure 18. NRW Low surface water risk Hazard map (NRW, 2022)



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### Guidance

According to NRW's surface water flood risk map the Site is at:

- According to NRW's surface water flood risk map, a site at Very Low risk has a chance of flooding of less than 1 in 1000 (0.1%)

Analysis of OS mapping, ground elevation data and the NRW's pluvial flow route mapping confirms the Site is not located on a potential overland flow route.

Climate change may lead to an increase in rainfall intensity which affects river levels, land and urban drainage systems. Rainfall intensity for small and urban catchments may increase from 5 to 20 % (central estimate) or 10 % to 40 % (Upper estimate) over the period to 2115 (EA, 2021).

Any existing and proposed on-Site surface water drainage systems should be designed and maintained appropriately to manage the run-off over the lifetime of the proposed development.

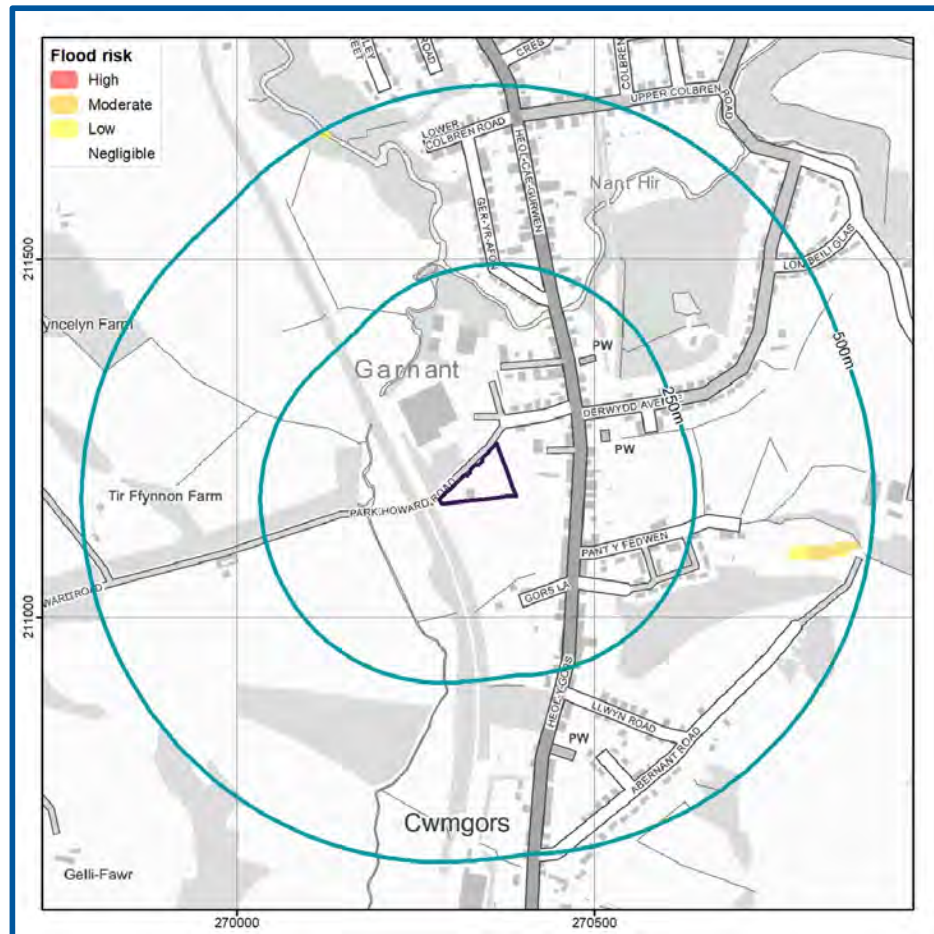
## Groundwater flooding

Groundwater flooding occurs when sub-surface water emerges from the ground at the surface or into Made Ground and structures. This may be as a result of persistent rainfall that recharges aquifers until they are full; or may be as a result of high river levels, or tides, driving water through near-surface deposits. Flooding may last a long time compared to surface water flooding, from weeks to months. Hence the amount of damage that is caused to property may be substantially higher.

Mapped classes within the screening map combine likelihood, possible severity and the uncertainty associated with predicting the subsurface system. The map is a national scale screening tool to prompt site-specific assessment where the impact of groundwater flooding would have significant adverse consequences. Mapping limitations and a number of local factors may reduce groundwater flood risk to land and property even where it lies within mapped groundwater flood risk zones, which do not mean that groundwater floods will occur across the whole of the risk area.

Groundwater Flood Risk screening data (Figure 19) indicate that there is a Negligible risk of groundwater flooding at surface in the vicinity from permeable bedrock and superficial deposits during a 1 in 100 year event.

Figure 19. GeoSmart GW5 Groundwater Flood Risk Map (GeoSmart, 2022)



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A site-specific assessment has been undertaken to refine the groundwater risk screening information on the basis of site-specific datasets (see Section 3) including BGS data and the NRW's fluvial and tidal floodplain data (where available) to develop a conceptual groundwater model. The risk rating is refined further using the vulnerability of receptors including occupants and the existing and proposed Site layout, including the presence of any basements and buried infrastructure. The presence of any nearby or on-Site surface water features such as drainage ditches, which could intercept groundwater have also been considered.

It is understood that a basement is not proposed as part of the development.

According to the BGS borehole database (2022) the nearest boreholes were drilled c. 100 m and c. 150 m southwest (BGS ref: SN71SW134 WS1B and SN71SW135 WS3). Although some seepage was noted at WS1B, no groundwater strikes were encountered.

BGS regional mapping indicates the Site is underlain by superficial and bedrock deposits of potentially variable permeability. Groundwater levels may rise in the bedrock and superficial

aquifers in a seasonal response to prolonged rainfall recharge which may cause an unusually high peak in groundwater levels during some years.

Groundwater levels may also rise in the superficial aquifer in response to high river events due to the potential hydraulic continuity with the nearby River Garnant. Hence, the shallow groundwater level may be influenced by the adjacent river levels; it is noted that the 1 in 100 year estimated river level is 153.22 mAOD (at a distance of 90 m from the Site), compared with Site levels of between 155.31 mAOD and 156.78 mAOD. As such, groundwater may occur within several meters of the ground surface at the Site.

Despite the presence of a superficial aquifer the Site would only be at risk of groundwater flooding if the water table reaches the base of the proposed development or the ground surface when groundwater seepage could lead to overland flow and ponding.

The PFRA and SFCA does not indicate any reported incidents of historical groundwater flooding within 50 m of the Site (Neath Port Talbot County Borough Council PFRA, 2011 and SFCA, 2014).

The hydrogeological characteristics suggest there is potential for a groundwater table beneath the Site.

The baseline groundwater flood risk rating is Negligible, but on the basis of the site-specific assessment the groundwater flood risk is considered to be Negligible to Low.

#### Guidance

Negligible Risk - There will be a remote possibility that incidence of groundwater flooding could lead to damage to property or harm to other sensitive receptors at, or near, this location.

Low Risk - There will be a remote possibility that incidence of groundwater flooding could lead to damage to property or harm to other sensitive receptors at, or near, this location.

Climate change predictions suggest an increase in the frequency and intensity of extremes in groundwater levels. Rainfall recharge patterns will vary regionally resulting in changes to average groundwater levels. A rise in peak river levels will lead to a response of increased groundwater levels in adjacent aquifers subject to the predicted climate change increases in peak river level for the local catchment. Sea level rises of between 0.4m and 1m are predicted by 2100, leading to a rise in average groundwater levels in the adjacent coastal aquifer systems, and potential increases in water levels in the associated drainage systems. The 'backing up' of groundwater levels from both coast and tidal estuary locations may extend a significant distance inland and affect infrastructure previously constructed above average groundwater levels. The impact of climate change on groundwater levels beneath the Site is linked to the predicted rise in peak river levels.

## Flooding from artificial sources

Artificial sources of flood risk include waterbodies or watercourses that have been amended by means of human intervention rather than natural processes. Examples include reservoirs (and associated water supply infrastructure), docks, sewers and canals. The flooding mechanism associated with flood risk from artificial sources is primarily related to breach or failure of structures (reservoir, lake, sewer, canal, flood storage areas, etc.).

### Sewer flooding

The SFCA does not include any information regarding flooding events from sewers at the Site (Neath Port Talbot County Borough Council PFRA, 2011 and SFCA, 2014).

#### Guidance

Properties classified as “at risk” are those that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system either once or twice in the ten year reference period. Records held by the sewage utility company provide information relating to reported incidents, the absence of any records does not mean that the Site is not at risk of flooding.

### Canal failure

According to Ordnance Survey (OS) mapping, there are no canals within 500 m of the Site.

### Water supply infrastructure

Water supply infrastructure is comprised of a piped network to distribute water to private houses or industrial, commercial or institution establishments and other usage points. In urban areas, this represents a particular risk of flooding due to the large amount of water supply infrastructure, its condition and the density of buildings. The risks of flooding to properties from burst water mains cannot be readily assessed.

If more information regarding the condition and history of the water supply infrastructure within the vicinity of the Site is required, then it is advisable to contact Welsh Water.

### Culverts and bridges

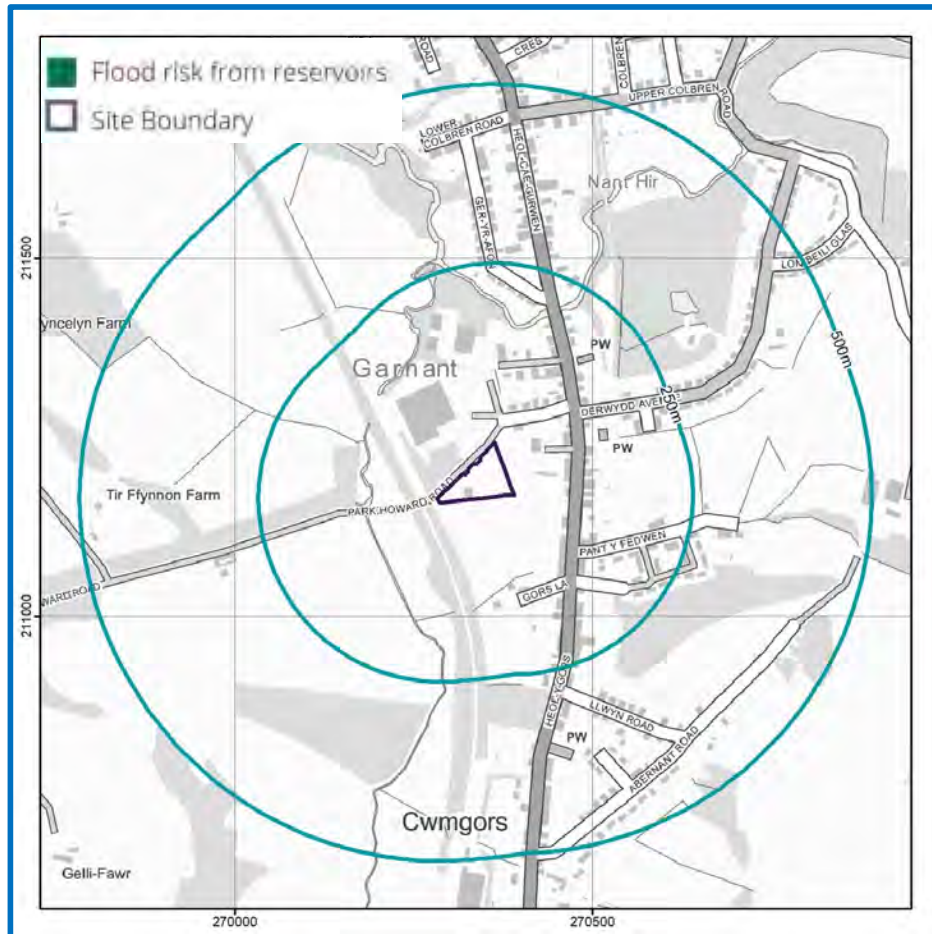
The blockage of watercourses or structures by debris (that is, any material moved by a flowing stream including vegetation, sediment and man-made materials or refuse) reduces flow capacity and raises water levels, potentially increasing the risk of flooding. High water levels can cause saturation, seepage and percolation leading to failure of earth embankments or other structures. Debris accumulations can change flow patterns, leading to scour, sedimentation or structural failure.

Culverts and bridges have not been identified within 50 m of the Site.

## Reservoir flooding

According to the EA's Risk of Flooding from Reservoir mapping the Site is not at risk of flooding from reservoirs (Figure 20) (NRW, 2022).

Figure 20. NRW Risk of Reservoir Flooding (NRW, 2022)



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### Guidance

The risk of reservoir flooding is related to the failure of a large reservoir (holding over 25,000 m<sup>3</sup> of water) and is based on the worst-case scenario. Reservoir flooding is extremely unlikely to occur (NRW, 2022).

## 5. Flood risk from the development



### Floodplain storage

The development is located within fluvial Flood Zones 1, 2 and 3, it would be impacted by the 1 in 100 year plus 20% climate change event. As the development would displace flood waters, compensatory flood storage is required for the loss in flood plain storage. Any losses in floodplain storage are likely to displace flooding and could potentially alter flood flow routes, increasing flood risk elsewhere.

Compensation for any reduction in floodplain storage and displacement of flood water (up to the 1 in 100 year event with allowance made for climate change) should be provided. Compensatory flood storage should be provided through a level for level, volume for volume approach and may require an area at the edge of the floodplain to provide storage.

Where this is not possible, the NRW and Lead Local Flood Authority (LLFA) may accept voids, stilts or undercroft parking as options for flood plain storage compensation. These solutions should be discussed at an early stage and may require a management and maintenance plan, as they can become blocked over time leading to a gradual reduction in storage. More information is provided in the EA's *"Framework and Guidance for Assessing and Managing Flood Risk for New Development"* FD2320/TR2 publication (EA, 2005).

Scoping estimates of the storage requirements can be made by multiplying the increase in building footprint by the average flood depth at the development, during the 1 in 100 year flood event with a 20% allowance for climate change.

A separate floodplain storage compensation assessment may be required.

### Drainage and run-off

Based on the topography and low surface water flood risk in the vicinity, interference or interaction with overland flow paths and inflows from offsite is considered unlikely.

The potential surface water run-off generated from the Site during a 1 in 100 year return period should be calculated, using FEH 2013 rainfall data from the online Flood Estimation Handbook (FEH), developed by NERC (2009) and CEH (2016).

The PPW (2021) recommends the effects of climate change are incorporated into FRA's and the recently updated climate change guidance (published in 2016 and updated in 2021) confirms the requirements for inclusion within FRA's.

As the proposed development is being changed to residential, the lifespan of the development and requirements for climate change should allow up to the 2115 scenario.

Table 3. Climate change rainfall allowances for West Wales

| West Wales river basin district | Total potential change anticipated by the 2020s | Total potential change anticipated by the 2050s | Total potential change anticipated by the 2080s |
|---------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|
| Upper end                       | 25%                                             | 40%                                             | 75%                                             |
| Central                         | 15%                                             | 25%                                             | 30%                                             |

A separate assessment of surface water runoff may be required, as the Statutory requirements in Wales are to include a SuDS strategy, where development proposals are greater than 100m<sup>2</sup> in size. This is to ensure surface water runoff is managed in accordance with the Welsh Statutory requirements over the lifetime of the proposed development.

## 6. Suitability of the proposed development



The information below outlines the suitability of proposed development in relation to national and local planning policy.

### National policy and guidance

The aims of the national planning policies TAN15 (2004) and PPW (2021) are achieved through application of the Justification Test and by assessing Flood Consequences. The key requirements of these are outlined below:

| Guidance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Justification Test:</b> New developments should be directed away from Zone C and towards suitable land in Zone A, otherwise Zone B, where river or coastal flooding will be less of an issue. In Zone C the tests outlined in sections 6 and 7 of TAN15 will be applied, recognizing, however, that highly vulnerable development and Emergency Services in Zone C2 should not be permitted. All other new development should only be permitted within Zones C1 and C2 if determined by the planning authority to be justified in that location.</p> <p><b>Assessing Flood Consequences:</b> If a development proposal in Zone C1, or in C2 and if it is defined as being of low vulnerability, it would meet the test outlines in section 6, however it should be noted that those developments would be more likely to flood and appropriate mitigation would need to be planned accordingly. This section applies to Zone C, and those parts of Zone B where flooding has been identified as a material consideration to allow for localised problems.</p> <p>Assessing whether a development should proceed or not will depend upon whether the consequences of flooding of that development can be managed and reduced to a level which is acceptable for the nature/type of proposed development, including its effects on existing development.</p> |

The proposed Site use is residential, classified as “Less Vulnerable” development. The Site is located with the Development Advice Map (DAM) Zone C2.

**Table 4. Flood risk vulnerability and flood zone compatibility (taken from TAN15, 2004)**

| DAM Zone | Development Type                                                   | Planning Requirements                                                                                                            | Acceptability Criteria            | Development Advice                                                        |
|----------|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|---------------------------------------------------------------------------|
| A        | Emergency Services, highly vulnerable development, less vulnerable | <ul style="list-style-type: none"> <li>Justification test not applicable</li> <li>Refer to surface water requirements</li> </ul> | No increase in flooding elsewhere | No constraints relating to river or coastal flooding, other than to avoid |

|    |                                                                                |                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                |
|----|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | development, other                                                             |                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | increasing risk elsewhere                                                                                                                                                                                                                                                                      |
| B  | Emergency services & Highly vulnerable development                             | <ul style="list-style-type: none"> <li>If site levels are greater than the flood levels used to define adjacent extreme flood outline there is no need to consider flood risk further</li> <li>Refer to surface water requirements</li> </ul> | <ul style="list-style-type: none"> <li>Acceptable consequences for nature of use</li> <li>Occupiers aware of flood risk</li> <li>Escape/Evacuation routes present</li> <li>Effective flood warning provided</li> <li>Flood emergency plans and procedures</li> <li>Flood resistant design</li> <li>No increase in flooding elsewhere</li> </ul>                                                                                                    | Generally suitable for most forms of development. Assessments where required, are unlikely to identify consequences that cannot be overcome or managed to an acceptable level. It is unlikely, therefore, that these would result in a refusal of planning consent on the grounds of flooding. |
|    | Less vulnerable development                                                    |                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>Occupiers aware of flood risk</li> <li>No increase in flooding elsewhere</li> </ul>                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                |
|    | Other                                                                          | Refer to surface water requirements                                                                                                                                                                                                           | No increase in flooding elsewhere                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                |
| C1 | Emergency services, highly vulnerable development, less vulnerable development | <ul style="list-style-type: none"> <li>Application of justification test including acceptability of consequences</li> <li>Refer to surface water requirements</li> </ul>                                                                      | <ul style="list-style-type: none"> <li>Acceptable consequences for nature of use</li> <li>Flood defences adequate</li> <li>Agreement for construction and maintenance costs secured</li> <li>Occupiers aware of flood risk</li> <li>Escape/evacuation routes present</li> <li>Effective flood warning provided</li> <li>Flood emergency plans and procedures</li> <li>Flood resistant design</li> <li>No increase in flooding elsewhere</li> </ul> | Plan allocations and applications for all development can only proceed subject to justification in accordance to section 6 of TAN 15 and acceptability of consequences in accordance to section 7 and Appendix 1 of TAN 15                                                                     |

|    |                                                   |                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                           |
|----|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | Other                                             | <ul style="list-style-type: none"> <li>• Application of acceptability of consequences (TAN 15 section 7 and Appendix 1)</li> <li>• Refer to surface water requirements</li> </ul>                                                        | <ul style="list-style-type: none"> <li>• Acceptable consequences for nature of use</li> <li>• Occupiers aware of flood risk</li> <li>• Desirable if effective flood warning and evacuation routes/procedure provided depending on nature of proposal</li> <li>• No increase in flooding elsewhere</li> </ul>                                                                          | Plan allocations and applications for development should only be made if considered acceptable in accordance with section 7 and Appendix 1 of TAN 15                                                                                      |
| C2 | Emergency services, highly vulnerable development | The flooding consequences associated with Emergency Services and highly vulnerable developments are not considered to be acceptable. Plan allocations should not be made for such developments and planning applications not proposed    |                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                           |
|    | Less vulnerable development                       | <ul style="list-style-type: none"> <li>• Application of justification test (section 6 of TAN 15), including acceptability of consequences (section 7 and Appendix 1 of TAN 15)</li> <li>• Refer to surface water requirements</li> </ul> | <ul style="list-style-type: none"> <li>• Acceptable consequences for nature of use</li> <li>• Flood defences adequate</li> <li>• Agreement for construction and maintenance costs secured</li> <li>• Occupiers aware of flood risk</li> <li>• Escape/evacuation routes present</li> <li>• Effective flood warning provided</li> <li>• Flood emergency plans and procedures</li> </ul> | Plan allocations or applications for less vulnerable development can only proceed subject to justification in accordance with section 6 of TAN 15 and acceptability of consequences in accordance with section 7 and Appendix 1 of TAN 15 |
|    | Other                                             | <ul style="list-style-type: none"> <li>• Application of acceptability of consequences (section 7 and Appendix 1 of TAN 15)</li> <li>• Refer to surface water requirements</li> </ul>                                                     | <ul style="list-style-type: none"> <li>• Flood resistant design</li> <li>• No increase in flooding elsewhere</li> <li>• Acceptable consequences for nature of use</li> <li>• Occupiers aware of flood risk</li> <li>• Effective flood warning provided</li> <li>• No increase in flooding elsewhere</li> </ul>                                                                        | Plan allocations and applications for development should only be made if considered acceptable in accordance with section 7 and Appendix 1 of TAN 15.                                                                                     |

### Justification Criteria:

- 1) Should be located only in an area of flood risk which is developed and served by significant infrastructure, including flood defences (Zone C1 of the DAM).
- 2) Its location is necessary to assist a local authority regeneration initiative or Strategy, or contribute to key employment objectives, necessary to sustain an existing settlement or region.
- 3) The site meets the definition of previously developed land (i.e. it is not a Greenfield site) and concurs with the aims of Planning Policy Wales (i.e. the presumption in favour of sustainable development).
- 4) A Flood Consequence Assessment has been produced to demonstrate that the potential consequences of a flood event up to the extreme flood event (1 in 1000 chance of occurring in any year) have been considered and meet the criteria below in order to be considered acceptable.

### Acceptability Criteria (has to meet all):

Q. Flood defences must be shown by the developer to be structurally adequate particularly under extreme overtopping conditions (i.e. that flood with a 1 in 1000 chance of occurring in any year).

Q. The cost of future maintenance for all new/approved flood mitigation measures, including defences must be accepted by the developer and agreed with the Environment Agency (now Natural Resources Wales).

Q. The developer must ensure that future occupiers of the development are aware of the flooding risks and consequences.

Q. Effective flood warnings are provided at the site.

Q. Escape/evacuation routes are shown by the developer to be operational under all conditions.

Q. Flood emergency plans and procedures produced by the developer must be in place.

Q. The development is designed by the developer to allow the occupier the facility for rapid movement of goods/possessions to areas away from floodwaters.

Q. Development is designed to minimise structural damage during a flooding event and is flood proofed to enable it to be returned to its prime use quickly in the aftermath of the flood.

Q. No flooding elsewhere.

Q. Developer is required to demonstrate that the site is designed to be flood free for the lifetime (A1.5) of development for either a 1 in 100 chance (fluvial) flood event, or a 1 in 200 chance (tidal) flood event including an allowance for climate change (depending on the type of flood risk present) in accordance with table A1.14.

**GeoSmart Comment.** Analysis of the Site demonstrates that the eastern part of the development would be flood free during a 1 in 100 year (fluvial) event. The proposed building footprint towards the southwest would be impacted during a 1 in 100 year (fluvial) event.

Q. In respect of the residual risk to the development it should be designed so that over its lifetime (A1.5) in an extreme (1 in 1000 chance) event there would be less than 600mm of water on access roads and within properties, the velocity of any water flowing across the development would be less than 0.3 m/second on access roads and 0.15m/second in properties, and the maximum rate of rise of floodwater would not exceed 0.1m/hour (see table A1.15).

**GeoSmart Comment.** Analysis of the Site demonstrates that the access roads would be flood free during a 1 in 1000 year event.

## Natural Resources Wales Flood Risk Standing Advice for Sites located in Flood Zones 2 or 3

For all relevant vulnerable developments (i.e. more vulnerable, less vulnerable and water compatible), advice on the points should be followed:

- Surface water management;
- Access and evacuation; and
- Floor levels.

### Surface water management

Plans for the management of surface water need to meet the requirements set out in either the local authority's:

- Surface water management plan where available; OR
- Strategic flood consequence assessment.

They also need to meet the requirements of the approved building regulations Part H: drainage and water disposal. Read section H3 rainwater drainage.

### Access and evacuation

Details of emergency escape plans should be provided for any parts of a building that are below the estimated flood level:

Plans should show:

- Single storey buildings or ground floors that don't have access to higher floors can access a space above the estimated flood level, e.g. higher ground nearby;
- Basement rooms have clear internal access to an upper level, e.g. a staircase; and,
- Occupants can leave the building if there's a flood and there's enough time for them to leave after flood warnings.

### Floor levels

The following should be provided:

- Average ground level of the building; and
- Finished floor level of the lowest habitable room in the building.

Ground floor levels should be a minimum of whichever is higher of:

- 300 millimetres (mm) above the general ground level of the site; OR
- At least 600 mm above the estimated river or sea flood level.

## 7. Resilience and mitigation



Based on the flood risk identified at the Site, the national and local policies and guidance and proposed development, the mitigation measures outlined within this section of the report are likely to help protect the development from flooding.

### Sea (coastal/tidal) flood mitigation measures

As the Site is not identified as being at risk of flooding from the sea, mitigation measures are not required.

### Rivers (fluvial) flood mitigation measures

The Site is located within an area which is affected by flooding from rivers. the following table confirms the flood depths associated with the area proposed for development.

**Table 5. NRW Modeling Glanaman Fluvial Undefended**

| Ground levels at the Site (mAOD)<br>155.31-156.78 | Modelled Flood Levels (mAOD) |               |                           |                |
|---------------------------------------------------|------------------------------|---------------|---------------------------|----------------|
|                                                   | 1 in 50 year                 | 1 in 100 year | 1 in 100 year plus 20% CC | 1 in 1000 year |
| Flood level (mAOD)                                | 155.85                       | 155.96        | 156.06                    | 156.27         |
| Flood depths (m)                                  | Up to 0.54                   | Up to 0.65    | Up to 0.75                | Up to 0.96     |

The Glanaman Modelling Study has provided undefended modelled flood levels and depths for the Site. During a 1 in 100 year event plus 20% CC the flood level could be up to 156.06 mAOD. This could result in flood depths of up to 0.75 m in the southwest of the Site, including impacts on the proposed development. The eastern areas of the Site would not be affected.

The following options are presented for the developer to choose in order to mitigate the fluvial flood risk. The developer should make clear to the LA which option will be taken forward:

#### *Option 1- Reconfigure development proposals*

According to the NRW model, the fluvial flood extent would be limited to the southwest of the Site, during a 1 in 100 year plus 20% CC event. The eastern areas of the Site would not be affected. Therefore if the proposed development could be repositioned towards the eastern part of the Site, the river (fluvial) flood risk would be reduced.

### *Option 2 – Development proposals remain, finished floor levels are raised*

The vulnerability classification of the Site and the Flood Zone means proposals for the Site fall under the EA's Flood Risk Standing Advice (FRSA) for less vulnerable developments.

In this instance, in line with the NRW's FRSA the recommended minimum Finished Floor Level (FFL) should be set at least 0.3 m above 1 in 100 year plus 20% allowance for climate change flood level of 156.06 mAOD.

**Table 6. Recommended Minimum Finished Floor Level Required**

| Ground Level (mAOD) | Flood Level (mAOD) | Freeboard above Flood Level (m) | Recommended FFL (mAOD) |
|---------------------|--------------------|---------------------------------|------------------------|
| 155.31-156.78       | 156.06             | 0.30                            | 156.36                 |

If finished floor levels are able to be raised this could reduce the Low to High flood risk to the proposed building to Low to Medium.

Flood resilience measures and a water exclusion strategy would also be included within the building design. These are presented below in section *Additional mitigation measures for all options*.

### *Option 3 – Development proposals remain, working practices are adjusted with acceptance to the risk*

The Site is currently used within a commercial capacity as a construction yard and storage facility. Development proposals comprise the construction of a light industrial unit towards the southwest of the Site.

The developer could accept the risk of river (fluvial) flooding at the Site, including damages to the building. This could include a water entry strategy.

Where flood depths are expected to exceed 0.6 m at the Site, a water entry strategy should be adopted to preserve building integrity and to promote flood resilience rather than resistance (which is more difficult to achieve for significant flood depths). A structural engineer should be consulted to confirm this would be a suitable strategy for the proposed development, to ensure flood flows would not impact the structural integrity of the building. Potential strategies include:

- Ground floors designed to permit water passage at high flood depths;
- Hard flooring and flood resilient metal staircases;
- Heating systems, electrical sockets and utility meters should be raised above the predicted flood level where possible;
- Sump and pump;

- Stock / storage could be lifted above the 1 in 100 year plus 20% CC event with the use of racking;
- Water, electricity and gas meters and electrical sockets should be located above the predicted flood level;
- Communications wiring: wiring for telephone, Internet and other services should be protected by suitable insulation in the distribution ducts to prevent damage.

Where flood depths are expected to be between 0.3 m - 0.6 m both water exclusion (see below) and water entry strategies should be adopted depending on a structural assessment of the building.

### *Additional mitigation measures for all options*

A water exclusion strategy, using avoidance and resistance measures, is appropriate where floods are expected to last for short durations. Potential water exclusion strategies include:

- Temporary flood barriers;
- Landscaping to divert water away from the property;
- Sustainable Drainage Systems (SuDS) to store/intercept flood water;

Note: a SuDS scheme should be developed for the Site regardless, to enable effective management of surface water runoff from the proposed development.

In addition, the regular maintenance of any drains and culverts surrounding/on the Site should be undertaken to reduce the flood risk.

As the development would displace flood waters, compensatory flood storage is required for the loss in flood plain storage. Any losses in floodplain storage are likely to displace flooding and could potentially alter flood flow routes, increasing flood risk elsewhere. A separate floodplain storage compensation assessment may be required.

A business continuity plan is recommended to reduce risks to people, property and profit.

A Flood Warning and Evacuation Plan (FWEP) is recommended, and Site personnel should be signed up to receive the EAs Flood Alerts.

## Surface water (pluvial) flood mitigation measures

As the Site is not identified as being at risk of pluvial flooding, mitigation measures are not required.

## Groundwater flood mitigation measures

It is likely the flood mitigation measures recommended for the fluvial flood risk will reduce the groundwater flood risk at the development. However, specific groundwater measures that may also be considered for the Negligible to Low risk identified include:

- Interceptor drains.

If these mitigation measures are implemented this could reduce the flood risk to the development from Negligible to Low to Negligible.

## Reservoir flood mitigation measures

The Site is not a risk of flooding from reservoirs; therefore, mitigation measures are not required.

## Other flood risk mitigation measures

As the Site is not identified as at risk from other sources, mitigation measures are not required.

## Residual flood risk mitigation measures

The risk to the Site has been assessed from all sources of flooding and appropriate mitigation and management measures proposed to keep the users of the development safe over its lifetime. There is however a residual risk of flooding associated with the potential for failure of mitigation measures if regular maintenance and upkeep isn't undertaken. If mitigation measures are not implemented or maintained, the risk to the development will remain as the baseline risk.

## Further flood mitigation information

More information on flood resistance, resilience and water entry can be found here: [http://www.planningportal.gov.uk/uploads/br/flood\\_performance.pdf](http://www.planningportal.gov.uk/uploads/br/flood_performance.pdf)

[www.knowyourfloodrisk.co.uk](http://www.knowyourfloodrisk.co.uk)

## Emergency evacuation - safe access / egress and safe refuge

An area of safe refuge should be sufficient in size for all potential users and be reasonably accessible to the emergency services.

Emergency evacuation from the development and the Site should only be undertaken in strict accordance with any evacuation plans produced for the Site, with an understanding of the flood risks at the Site including available mitigation, the vulnerability of occupants and preferred evacuation routes.

## Flood warnings

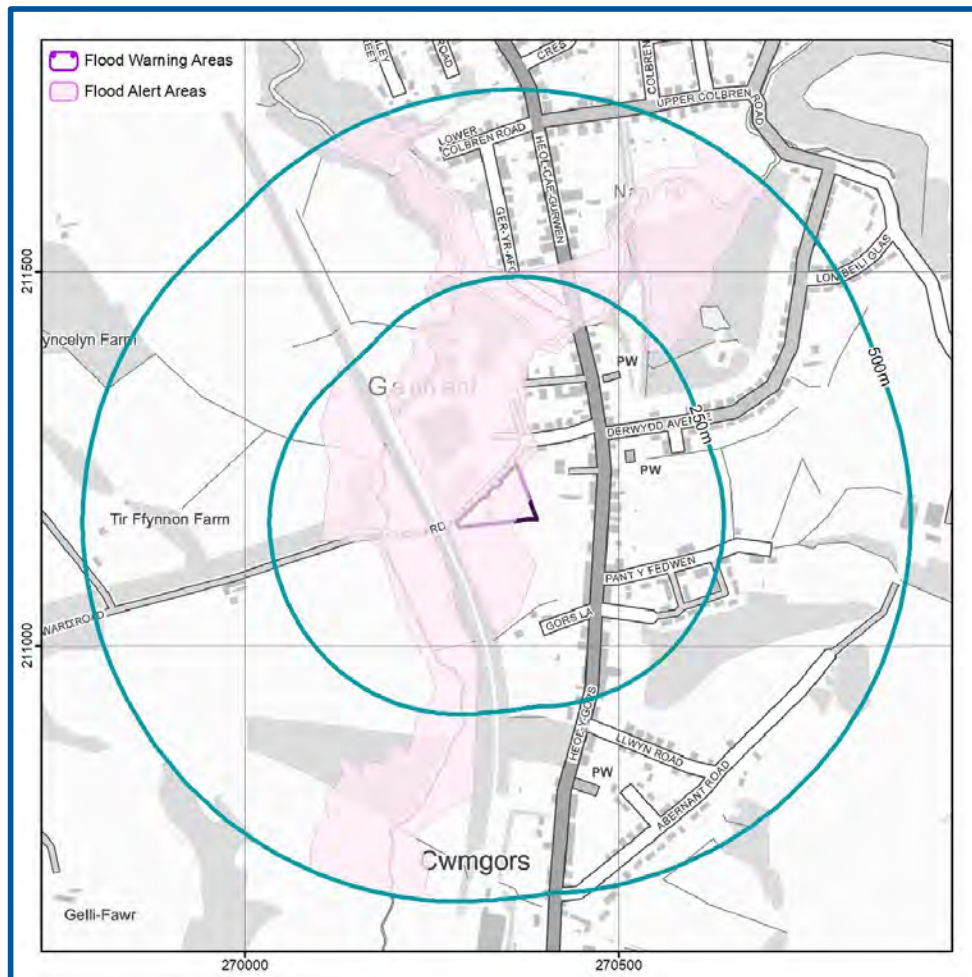
The NRW operates a flood warning service in all areas at risk of flooding; this is available on their website: <https://www.gov.uk/check-flood-risk>. The Site is located within an NRW Flood Alerts area (Quick Dial 503008) coverage area (ref: NRW South West) so is able to receive FloodSmart Plus

Ref: 77081R1

alerts (Figure 21). All warnings are also available through the NRW's 24 hour Floodline Service 0345 988 1188.

The NRW aims to issue Flood Warnings 2 hours in advance of a flood event. Flood Warnings can provide adequate time to enable protection of property and evacuation from a Site, reducing risk to life and property.

**Figure 21. NRW Flood Warning Coverage for the local area (NRW, 2022).**



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## Emergency evacuation

Where possible, a safe access and egress route with a 'very low' hazard rating from areas within the floodplain to an area wholly outside the 1 in 100 year flood event including an allowance for climate change should be demonstrated.

Based on the NRW's Flood Zone Map the closest dry evacuation area within Flood Zone 1 is along Park Howard Road (c. 60m northeast of the Site). It is advised that evacuation from the premises would be the preferred option in a flood event if safe to do so. It is recommended

that residents prepare to evacuate as soon as an NRW Flood Warning is issued in order to completely avoid flood waters.

### Other relevant information

A business continuity plan is recommended to reduce risks to people, property and profit.

A Flood Warning and Evacuation Plan (FWEP) is recommended, and occupants should be signed up to receive NRW Flood Alerts.

Registration to the Natural Resource's Wales flood warning scheme can be done by following this link: <https://www.gov.uk/sign-up-for-flood-warnings>.

It is recommended that main communication lines required for contacting the emergency services, electricity sockets/meters, water supply and first aid stations and supplies are not compromised by flood waters. Where possible these should all be raised above the extreme flood level.

## 8. Conclusions and Recommendations

A summary of the flood risk and mitigation measures is presented in the Executive Summary, Section 1. The outcome of our site specific assessment is discussed in the table below.

**Table 7. Risk ratings following site analysis**

| Source of Flood Risk                   | Baseline*         | After Mitigation** |
|----------------------------------------|-------------------|--------------------|
| River (fluvial) flooding               | Very Low to High  | Very Low to Medium |
| Sea (coastal/tidal) flooding           | Very Low          | N/A                |
| Surface water (pluvial) flooding       | Very Low          | N/A                |
| Groundwater flooding                   | Negligible to Low | Negligible         |
| Other flood risk factors present       | No                | N/A                |
| Is any other further work recommended? | Yes               | No (see below)     |

The table below provides a summary of where the responses to key questions are discussed in this report. Providing the recommended mitigation measures are put in place it is likely that flood risk to this Site will be reduced to an acceptable level. The Site is located in Flood Zone 1, 2 and 3 and the development is classed as “Less Vulnerable” which may require review and discussion of mitigation measures with the Local Authority.

**Table 8. Summary of responses to key questions in the report**

|                                                                                               |                                       |
|-----------------------------------------------------------------------------------------------|---------------------------------------|
| Key sources of flood risks identified                                                         | Fluvial, groundwater (see Section 4). |
| Are standard mitigation measures likely to provide protection from flooding to/from the Site? | Yes (see Section 7).                  |
| Is any further work recommended?                                                              | No                                    |

## 9. References and glossary



### References

**British Geological Survey (BGS) (2022).** Onshore Geoindex. Accessed from: <http://mapapps.bgs.ac.uk/geologyofbritain/home.html> on 10.10.22

**Department for Environment, Food and Rural Affairs.** Flood Risk Assessment Guidance for New development (DEFRA, 2005) and Supplementary note on flood hazard ratings and thresholds for development planning and control purpose (2008).

**GeoSmart (2022).** GeoSmart groundwater flood risk (GW5) map (version 2.4).

**Natural Resources Wales [NRW] (2022b).** Long term flood risk maps. Accessed from: <https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en> on 10.10.22

**Neath Port Talbot County Borough Council Local Development Plan (2011-2026).** Accessed 10.10.22

**Neath Port Talbot County Borough Council Preliminary Flood Risk Assessment (2011).** Accessed 10.10.22

**Neath Port Talbot County Borough Council Strategic Flood Consequences Assessment (2014).** Accessed 10.10.22

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**Welsh Government (2021).** Flood Consequence Assessments: Climate change allowances. Accessed from: [https://gov.wales/sites/default/files/publications/2021-09/climate-change-allowances-and-flood-consequence-assessments\\_0.pdf](https://gov.wales/sites/default/files/publications/2021-09/climate-change-allowances-and-flood-consequence-assessments_0.pdf) on 18.05.2022.

**Welsh Government (2021).** Planning Policy Wales, Edition 11, February 2021

**Welsh Government (2004).** Technical Advice Note 15: Development and Flood Risk.

**Welsh Government (2021).** Technical Advice Note 15: Development, Flooding and Coastal Erosion (not currently used to inform national policy, will be implemented in June 2023). [https://www.npt.gov.uk/media/7321/ldp\\_written\\_statement\\_jan16.pdf?v=20170727124344](https://www.npt.gov.uk/media/7321/ldp_written_statement_jan16.pdf?v=20170727124344)

# Glossary

## General terms

|                                       |                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BGS                                   | British Geological Survey                                                                                                                                                                                                                                                                                                                                 |
| NRW                                   | National Resource Wales                                                                                                                                                                                                                                                                                                                                   |
| GeoSmart groundwater flood risk model | GeoSmart's national groundwater flood risk model takes advantage of all the available data and provides a preliminary indication of groundwater flood risk on a 50m grid covering England and Wales. The model indicates the risk of the water table coming within 1 m of the ground surface for an indicative 1 in 100 year return period scenario.      |
| Dry-Island                            | An area considered at low risk of flooding (e.g. In a Flood Zone 1) that is entirely surrounded by areas at higher risk of flooding (e.g. Flood Zone 2 and 3)                                                                                                                                                                                             |
| Flood resilience                      | Flood resilience or wet-proofing accepts that water will enter the building, but through careful design will minimise damage and allow the re-occupancy of the building quickly. Mitigation measures that reduce the damage to a property caused by flooding can include water entry strategies, raising electrical sockets off the floor, hard flooring. |
| Flood resistance                      | Flood resistance, or dry-proofing, stops water entering a building. Mitigation measures that prevent or reduce the likelihood of water entering a property can include raising flood levels or installation of sandbags.                                                                                                                                  |
| Flood Zone 1                          | This zone has less than a 0.1% annual probability of river flooding                                                                                                                                                                                                                                                                                       |
| Flood Zone 2                          | This zone has between 0.1 and 1% annual probability of river flooding and between 0.1% and 0.5 % annual probability sea flooding                                                                                                                                                                                                                          |
| Flood Zone 3                          | This zone has more than a 1% annual probability of river flooding and 0.5% annual probability of sea flooding                                                                                                                                                                                                                                             |
| Functional Flood Plain                | An area of land where water has to flow or be stored in times of flood.                                                                                                                                                                                                                                                                                   |
| Hydrologic model                      | A computer model that simulates surface run-off or fluvial flow. The typical accuracy of hydrologic models such as this is $\pm 0.25\text{m}$ for estimating flood levels at particular locations.                                                                                                                                                        |
| OS                                    | Ordnance Survey                                                                                                                                                                                                                                                                                                                                           |
| Residual Flood Risk                   | The flood risk remaining after taking mitigating actions.                                                                                                                                                                                                                                                                                                 |

|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SFCA | Strategic Flood Consequence Assessment. This is a brief flood risk assessment provided by the local council                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| SuDS | A Sustainable drainage system (SuDS) is designed to replicate, as closely as possible, the natural drainage from the Site (before development) to ensure that the flood risk downstream of the Site does not increase as a result of the land being developed. SuDS also significantly improve the quality of water leaving the Site and can also improve the amenity and biodiversity that a Site has to offer. There are a range of SuDS options available to provide effective surface water management that intercept and store excess run-off. Sites over 1 Ha will usually require a sustainable drainage assessment if planning permission is required. The current proposal is that from April 2014 for more than a single dwelling the drainage system will require approval from the SuDS Approval Board (SABs). |

### Aquifer Types

|                            |                                                                                                                                                                                                                                               |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Principal aquifer          | These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. |
| Secondary A aquifer        | Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.                                                                           |
| Secondary B aquifer        | Predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.                                                          |
| Secondary undifferentiated | Has been assigned in cases where it has not been possible to attribute either category A or B to a rock type due to the variable characteristics of the rock type.                                                                            |
| Unproductive Strata        | These are rock layers or drift deposits with low permeability that has negligible significance for water supply or river base flow.                                                                                                           |

## Data Sources

|                                                                                                                 |                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Aerial Photography                                                                                              | Contains Ordnance Survey data © Crown copyright and database right 2022<br>BlueSky copyright and database rights 2022                                                               |
| Bedrock & Superficial Geology                                                                                   | Contains British Geological Survey materials © NERC 2022<br>Ordnance Survey data © Crown copyright and database right 2022                                                          |
| Flood Risk (Flood Zone/RoFRS/Historic Flooding/Pluvial/Surface Water Features/Reservoir/ Flood Alert & Warning) | Natural Resource Wales copyright and database rights 2022<br>Ordnance Survey data © Crown copyright and database right 2022                                                         |
| Flood Risk (Groundwater)                                                                                        | GeoSmart, BGS & OS<br>GW5 (v2.4) Map (GeoSmart, 2022)<br>Contains British Geological Survey materials © NERC 2022<br>Ordnance Survey data © Crown copyright and database right 2022 |
| Location Plan                                                                                                   | Contains Ordnance Survey data © Crown copyright and database right 2022                                                                                                             |
| Topographic Data                                                                                                | OS LiDAR/EA<br>Contains Ordnance Survey data © Crown copyright and database right 2022<br>Natural Resource Wale copyright and database rights 2022                                  |

## 10. Appendices

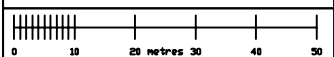


## Appendix A



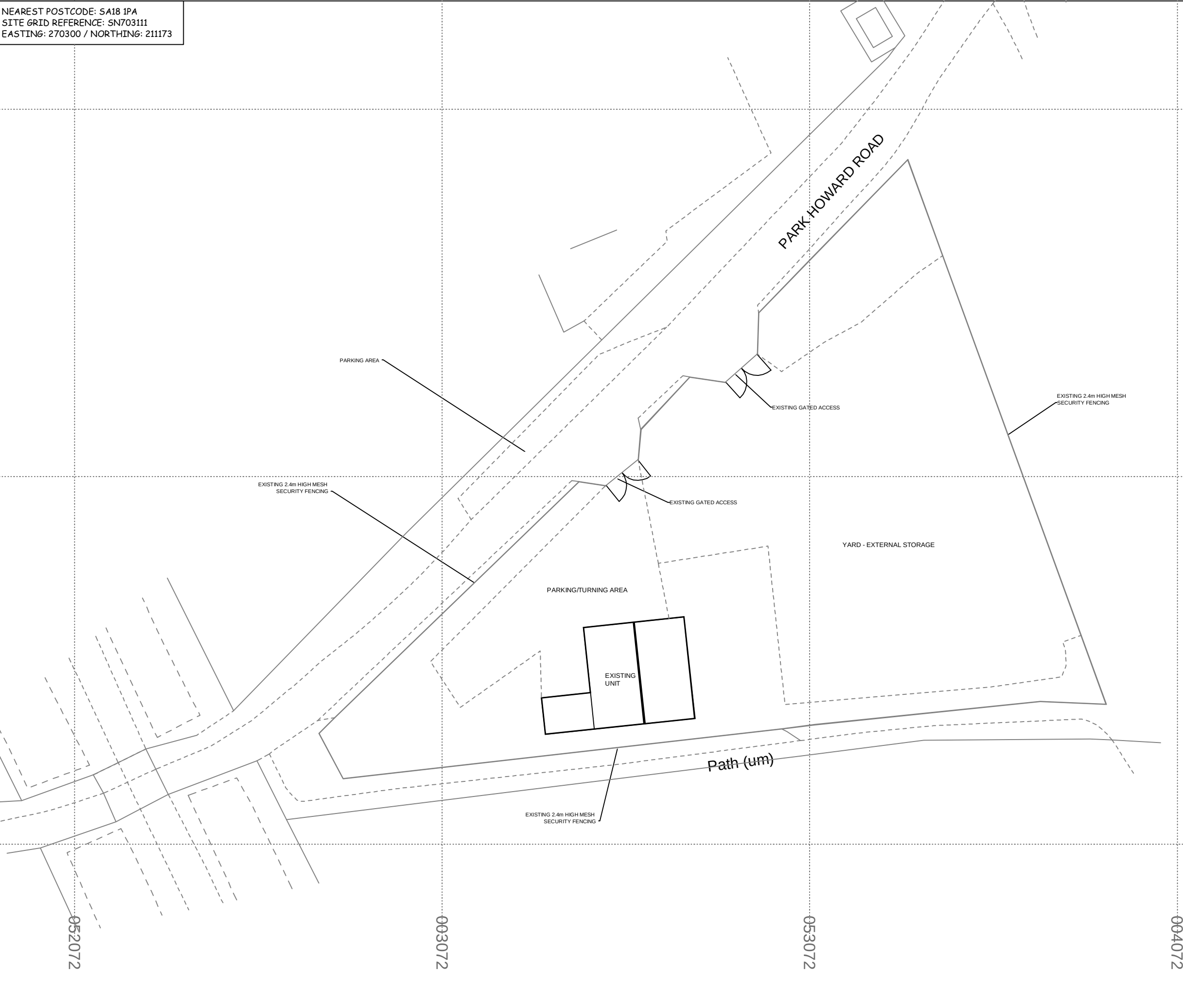
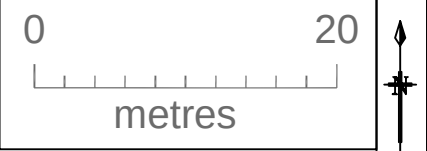
### Site plans

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EASTING: 270300 / NORTHING: 211173



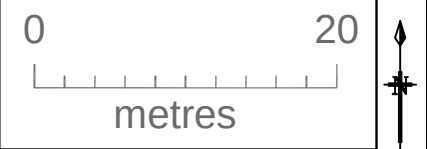
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| <b>Project</b><br>PARK HOWARD ROAD, CWMGORS,<br>GWAEN CAE GURWEN                                                                                                                                                      |             |                          |         |
| <b>Title</b><br>LOCATION PLAN                                                                                                                                                                                         |             |                          |         |
| <b>Drawn</b><br>MIS                                                                                                                                                                                                   |             | <b>Date</b><br>MAR. 2022 |         |
| <b>Scale(s)</b><br>1:1250                                                                                                                                                                                             |             |                          |         |
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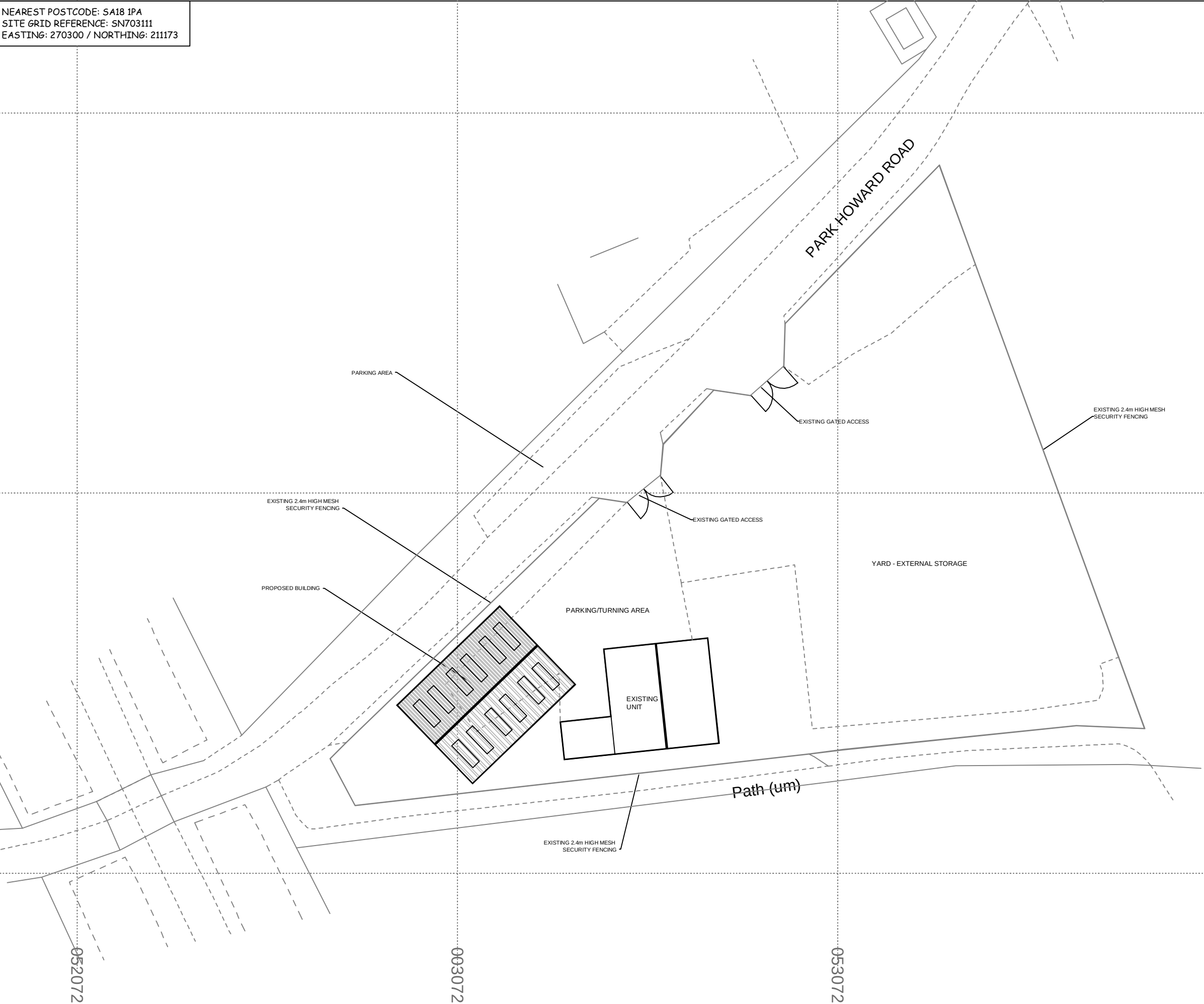
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| <u>Title:</u> EXISTING SITE LAYOUT                                                                                                                                                                                                                                                                                                                                                                     |                         |                  |         |
| <u>Date:</u>                                                                                                                                                                                                                                                                                                                                                                                           | APRIL 2022              | <u>Drawn:</u>    | MIS     |
| <u>Scales(s):</u>                                                                                                                                                                                                                                                                                                                                                                                      | 1:200 @ A3              | <u>Issue:</u>    |         |
| <u>Dwg No:</u>                                                                                                                                                                                                                                                                                                                                                                                         | 22/884/02               | <u>Revision:</u> |         |
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EASTING: 270300 / NORTHING: 211173



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211200



| Rev                                                                                    | Description             | Date      | Initial |
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| Project: PROPOSED LIGHT INDUSTRIAL UNIT AT PARK HOWARD ROAD, CWMGORS, GWAEN-CAE-GURWEN |                         |           |         |
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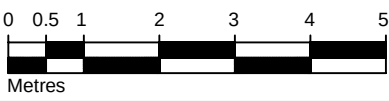
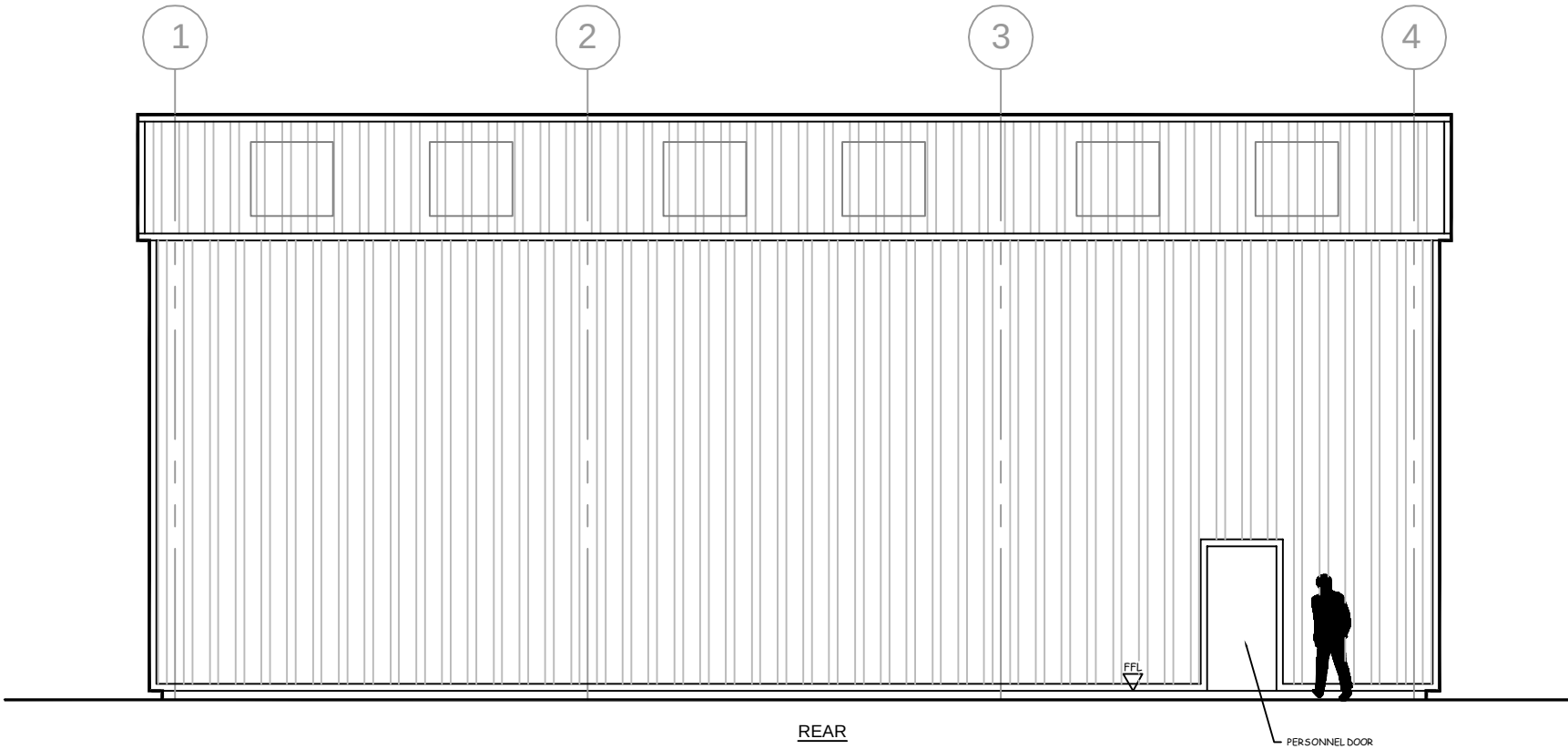
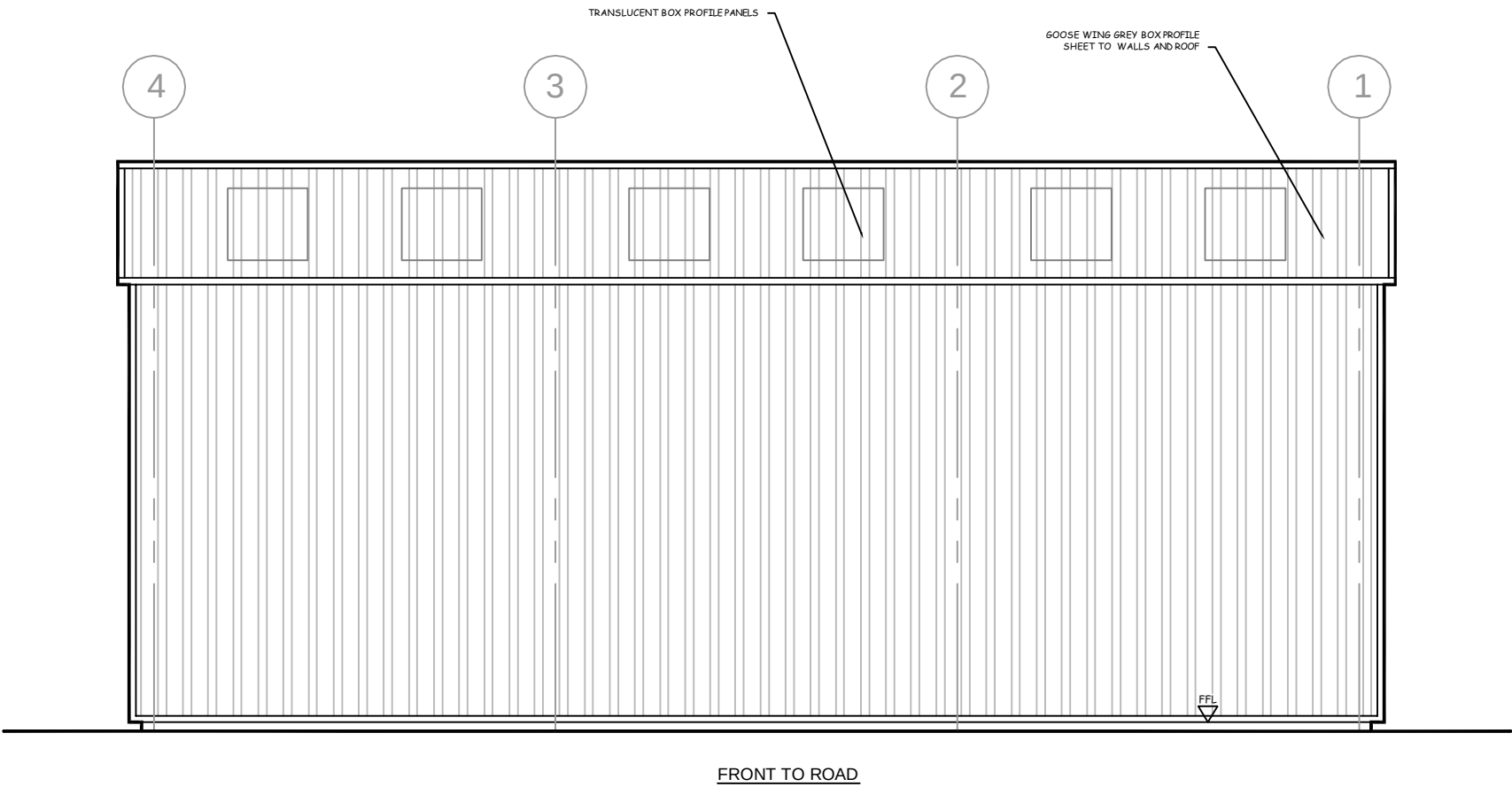


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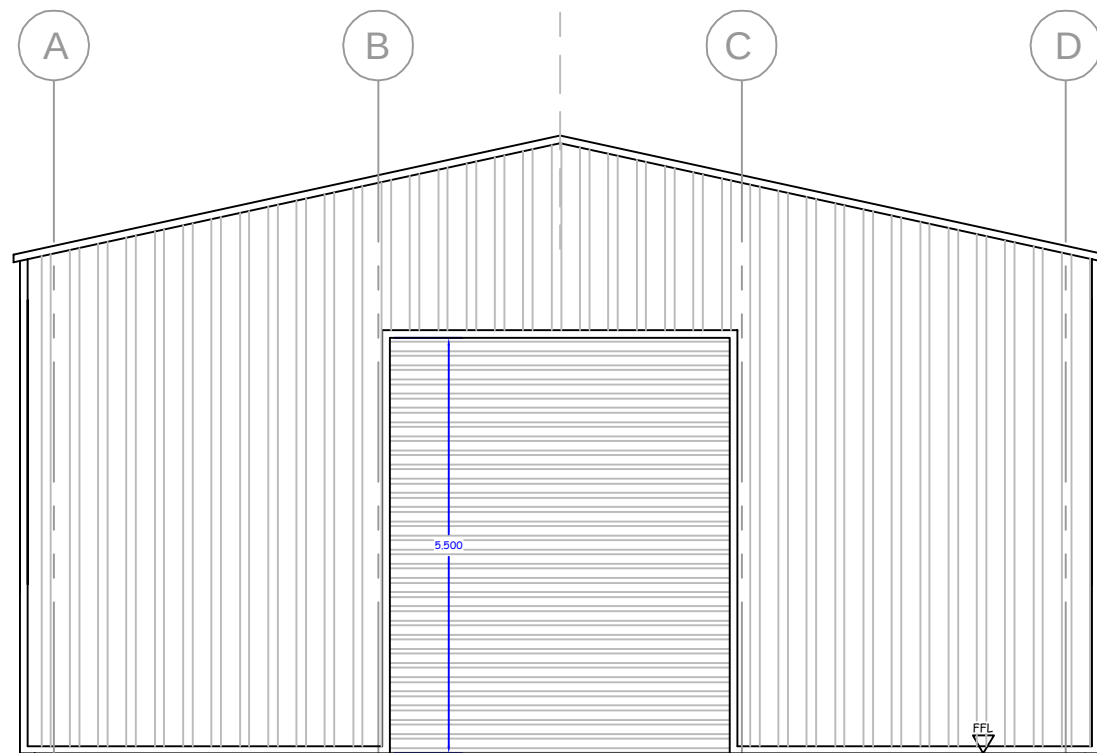
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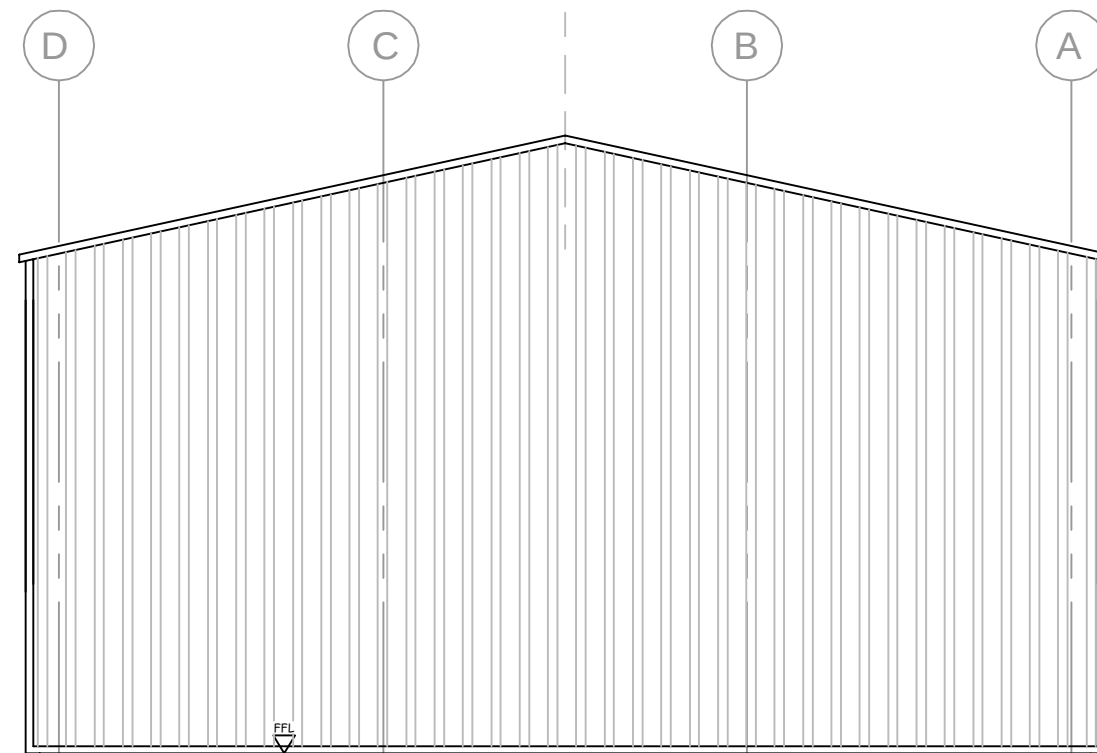
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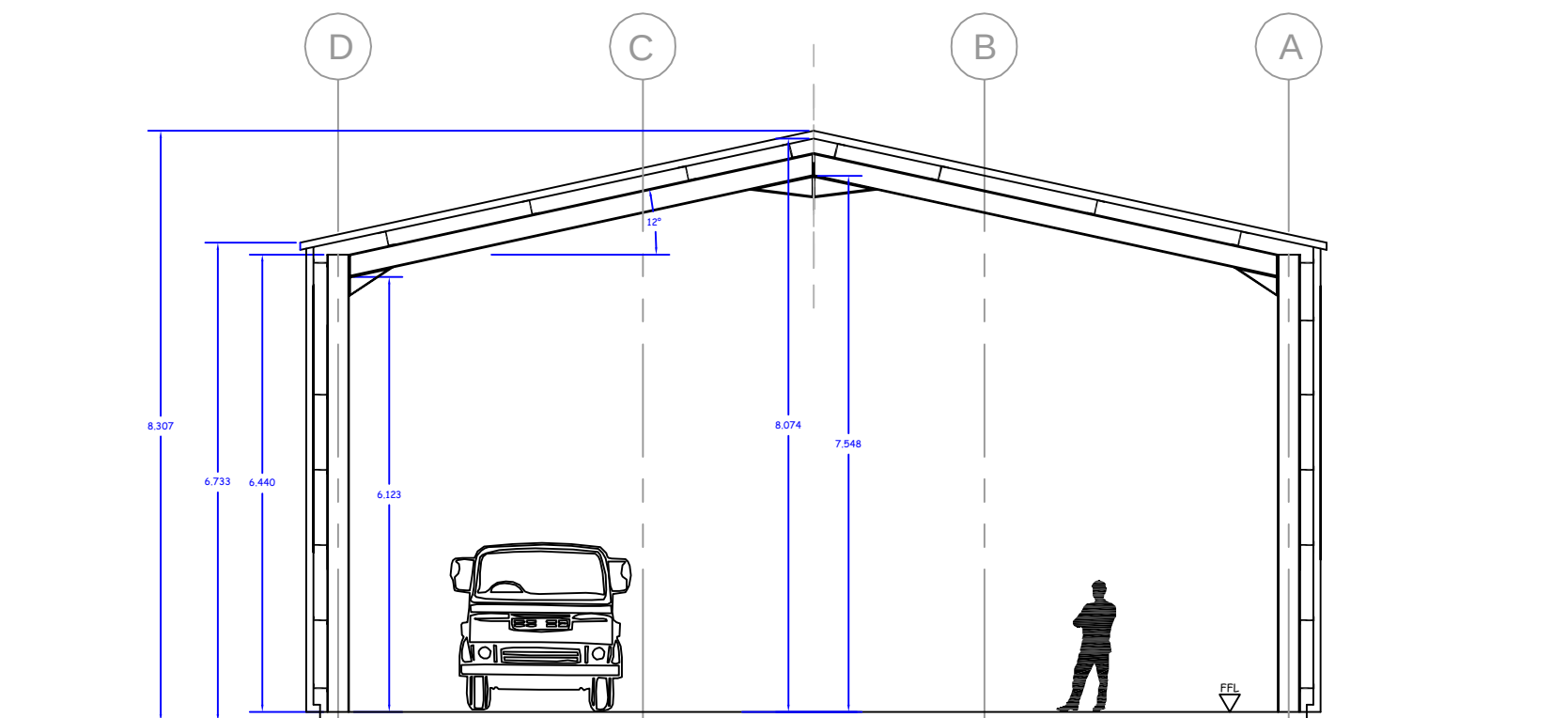
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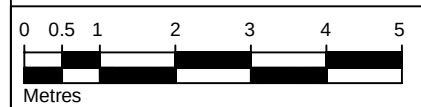
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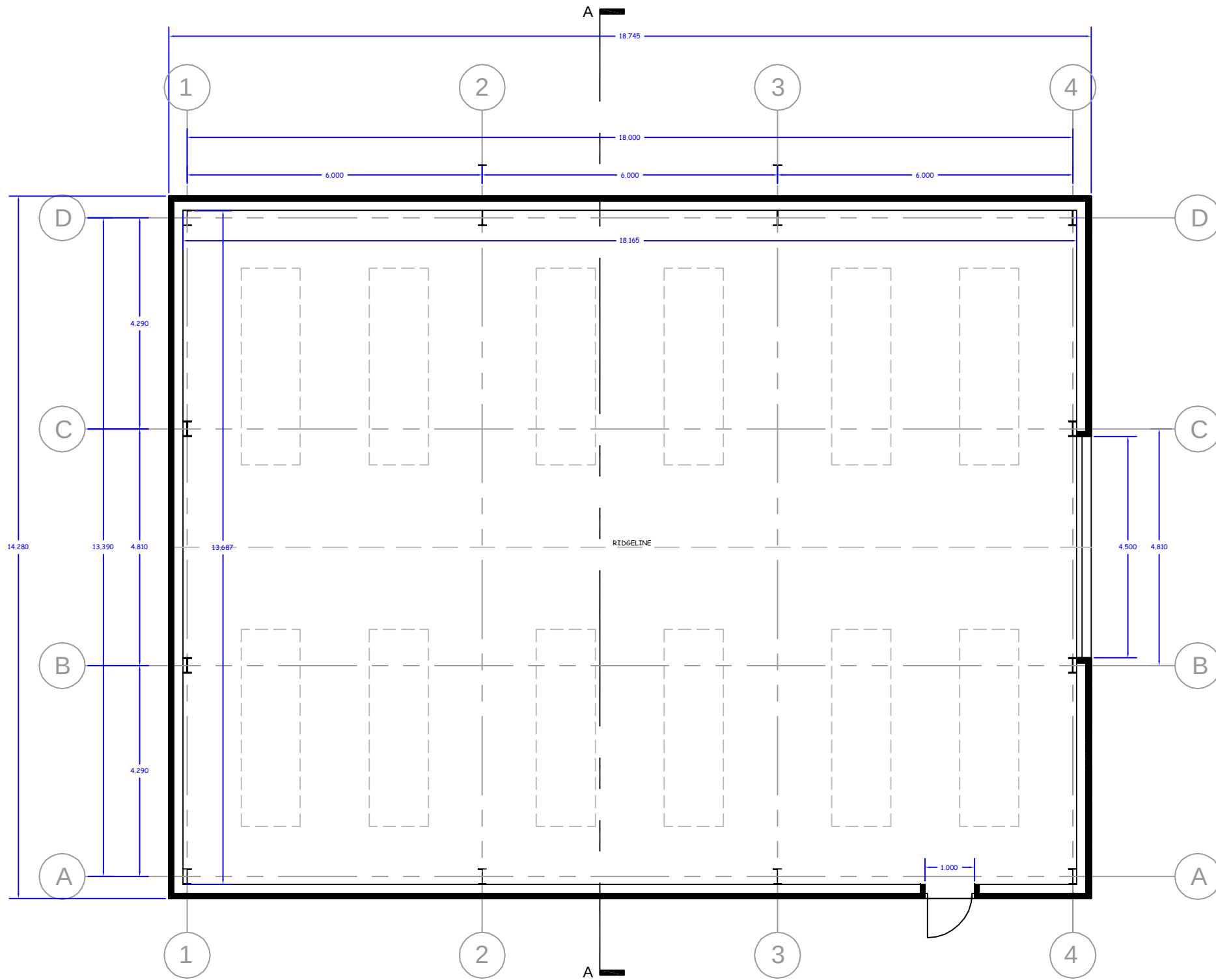
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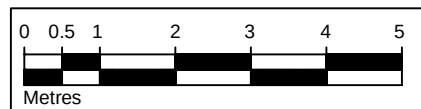
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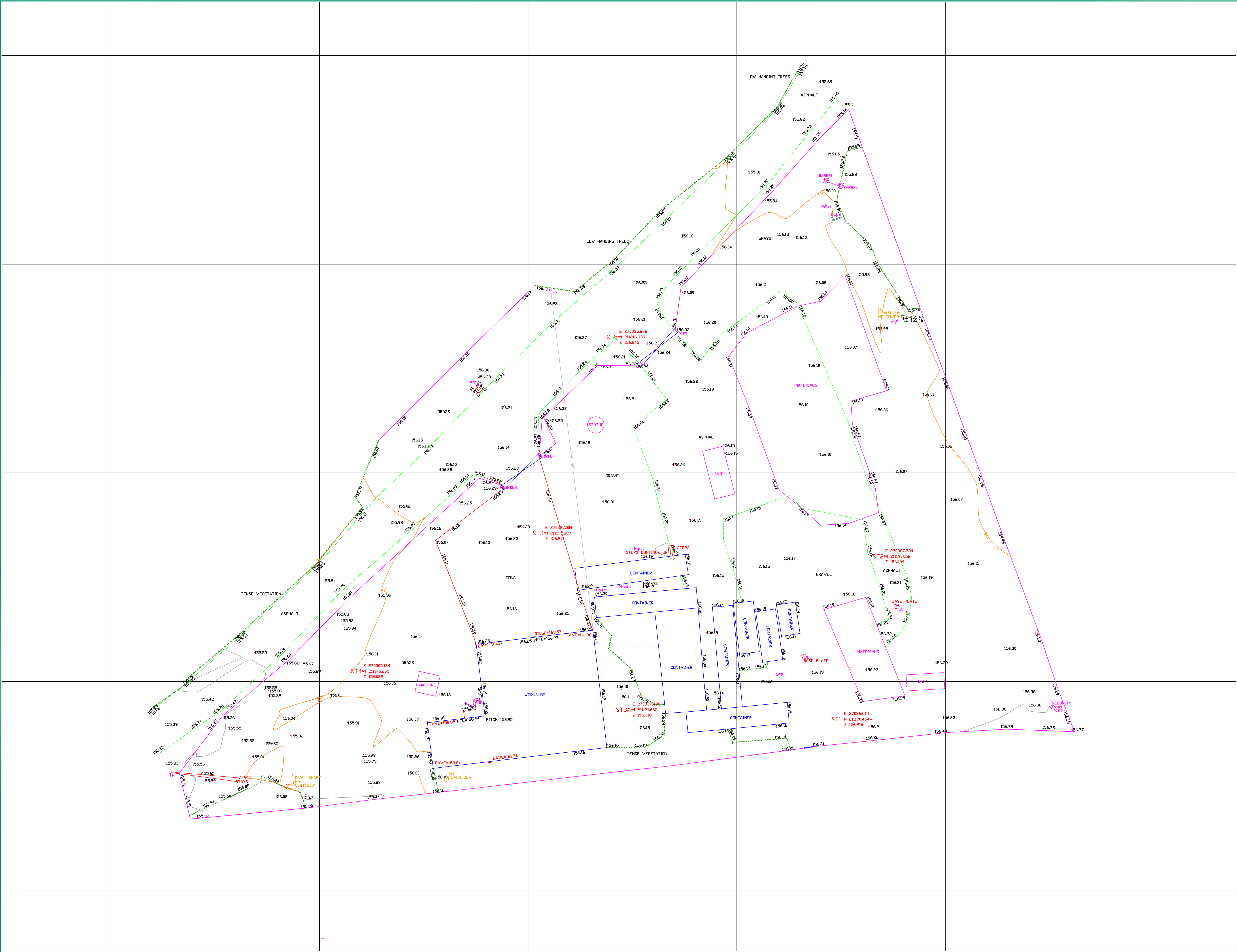
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FLOOR LAYOUT



|                                                                                                                                                                                                                                                                                                                                                                                                                 |                              |           |         |
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| A3                                                                                                                                                                                                                                                                                                                                                                                                              |                              |           |         |



| Rev | Amendments | Date | By |
|-----|------------|------|----|
|     |            |      |    |

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**NOTES:**

1. SITE GRID AND LEVELS ARE BASED UPON  
ORDNANCE SURVEY VIA THE ACTIVE GPS  
NETWORK.

**KEY**

|  |                      |  |                  |
|--|----------------------|--|------------------|
|  | BOTTOM OF BANK       |  | SURVEY STATION   |
|  | CONTOURS             |  | TREE HEIGHT      |
|  | CABINET              |  | POST BOX SQUARE  |
|  | TREE                 |  | POST BOX ROUND   |
|  | FIRE HYDRANT         |  | GRILLE SQUARE    |
|  | BRITISH TELECOM      |  | GRILLE ROUND     |
|  | CABLE TV             |  | BOLLARD ROUND    |
|  | OVERHEAD LINE        |  | BOLLARD SQUARE   |
|  | GAS VALVE            |  | BIN SQUARE       |
|  | BLOCK WALL           |  | BIN ROUND        |
|  | CLOSE BOARD          |  | SPOT LEVEL       |
|  | POST RAIL FENCE      |  | ASPHALT          |
|  | HERAS FENCE          |  | GRASS            |
|  | POST WIRE FENCE      |  | GRAV             |
|  | DROPPED KERB         |  | H/S              |
|  | KERB CHANNEL         |  | BELLISH BEACON   |
|  | RIDGE LEVEL          |  | ROAD SIGN        |
|  | EAVE LEVEL           |  | INSPECTION COVER |
|  | FINISHED FLOOR LEVEL |  | MANHOLE SQUARE   |
|  | FLAT ROOF LEVEL      |  | MANHOLE ROUND    |
|  |                      |  | MARKER POST      |
|  |                      |  | TELEGRAPH POLE   |
|  |                      |  | LIGHTING COLUMN  |
|  |                      |  | GULLY            |
|  |                      |  | WATER METER      |
|  |                      |  | SLUICE VALVE     |
|  |                      |  | STOP TAP         |

**Alpine Land Surveyors Ltd.**  
Tower Business Centre,  
Hirwaun Industrial Estate,  
Hirwaun,  
Aberdare,  
CF44 9UP  
Tel. 01895 814544  
Mob. 07980 404208  
j.price@alpinelandsurveyors.co.uk

**CUSTOMER**  
SGW PLANNING

**PROJECT**  
TOPOGRAPHICAL SURVEY AT  
AMMAN VALLEY WELDERS,  
PONTARDAWE

|                       |            |          |            |
|-----------------------|------------|----------|------------|
| Surveyed by           | BM         | Date     | 11/08/2022 |
| Drawn                 | EJ         | Date     | 12/08/2022 |
| Scales                | 1:200@A1   | Checked: | TC         |
| Project Reference No. | ALS/4761   |          |            |
| Drawing Number        | SGW/AWW/01 |          |            |

## Appendix B



### Natural Resource Wales data

Maes Y Ffynnon,  
Penrhosgarnedd,  
Bangor,  
Gwynedd  
LL572DW

Ms. Jasmine Spender  
GeoSmart Information Ltd.  
Suite 9-11  
Old Bank Buildings  
Bellstone  
Shrewsbury  
SY1 1HU

ebost/email:  
swplanning@cyfoethnaturiolcymru.gov.uk

12/10/2022

Annwyl Ms. Spender / Dear Ms. Spender

## **PRELIMINARY PRE-APPLICATION ADVICE**

### **BWRIAD / PROPOSAL: STORAGE UNITS**

### **LLEOLIAD / LOCATION: PARK HOWARD ROAD, GWAUN-CAE-GURWEN, NEATH PORT TALBOT, SA18 1NZ**

Thank you for consulting Cyfoeth Naturiol Cymru / Natural Resources Wales about the above pre-application enquiry, which we received on 19<sup>th</sup> August 2022.

We have considered your enquiry in relation to our Development Planning [Consultations Topics](#) document (September 2018). We advise that the following matters are relevant to your site / proposed development and suggest you consider these further prior to the submission of any planning application:

### **Flood Risk Management**

Our Flood Risk Map confirms the application site lies partially within Zone C2 of the Development Advice Maps (DAM) as contained in TAN15 and the Flood Map for Planning (FMfP) identifies the application site to be at risk of flooding and falls into Flood Zone 2 and 3 Rivers.

Section 6 of TAN15 requires the Local Planning Authority to determine whether the development at this location is justified. Therefore, we refer you to the tests set out in section 6.2 of TAN15. If the Local Planning Authority consider the proposal meets the tests set out in criteria (i) to (iii), then the final test (iv) is for you, the applicant to demonstrate through the submission of an FCA that the potential consequences of flooding can be managed to an acceptable level.

We refer you to our [website](#) and [Guidance Note 028 Modelling for Flood Consequence Assessments](#) for further advice.

### **European Protected Species (EPS)**

Our records show there may be protected species in the vicinity of the site. We advise liaison with the LPA ecologist to discuss and agree the scope of any surveys required.

We refer you to our [website](#) for further advice.

### **Groundwater protection and land contamination**

Advice on environmental considerations and the assessments needed to support your planning application can be found on our external website.

- For advice on how to deal with possible land contamination on your development visit: <http://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/advice-for-developers/land-contamination/?lang=en>
- For advice on how to protect groundwater at your development visit: <http://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/advice-for-developers/protecting-groundwater/?lang=en>

### **Provision of Data**

In addition to the above, please note, we can also provide certain data free of charge, as set out in our [Open Data Policy](#). Customers can [access our data via our website](#).

### **Other Matters**

Please note the view expressed in this letter is a response to a pre-planning enquiry only. We trust these comments will prove helpful, but they should not set a precedent for any future Natural Resources Wales' response to any formal application for planning permission or other legal consent. Such applications shall be assessed on the information submitted and regulations of relevance at that time. The details contained in this letter are based on the information available to date.

As part of our discretionary advice service, we can provide further advice relating to land contamination, groundwater and flood risk prior to your planning application being submitted. There is a charge for this service. Further details are available on our website.

If you have any queries on the above, please do not hesitate to contact us.

Yn gywir / Yours faithfully

**A Fracchiolla**

Cynghorydd - Cynllunio Datblygu / Advisor - Development Planning  
Cyfoeth Naturiol Cymru / Natural Resources Wales

# 1 Introduction

## 1.1 Purpose of the Study

Natural Resources Wales (NRW) commissioned JBA Consulting under the Water and Environmental Management (WEM) framework to undertake a 1D/2D Flood Risk Modelling study on the Afon Amman and some of its tributaries across an area that includes the communities of Brynamman, Garnant, Glanaman, Gwaun-Cae-Gurwen and Tairgwaith. The Glanaman study was initiated to provide a greater understanding of the fluvial flood risk in the area (since the current Flood Maps are largely based on broad scale modelling) and provide more information towards a small number of potential flood warning schemes that NRW are currently considering in the area.

## 1.2 Study Objectives

The key objectives of this study are to improve NRW's understanding of the flood mechanisms and threshold of flooding to help to inform their Flood Warning service and to inform the planning and development process. This was achieved by simulating a set of design flows through a new-build, high-definition, 1D-2D (ESTRY-TUFLOW), hydraulic model of the study area. Since there are no formal NRW defences in the Glanaman study area, the flood risk was analysed as an 'As Existing' model (i.e. containing natural banks and potentially some informal 'non-NRW' defences). This scenario is appropriate for defining both the defended and undefended flood maps across the area.

In summary, the study objectives for this commission were:

- To develop a fit for purpose, 1D-2D linked ESTRY-TUFLOW defended and undefended hydraulic model of the Amman and tributaries within the study area. This is to enable improved understanding of flood risk and flood hazard in the study area.
- Produce Flood Risk and Flood Hazard maps for Glanaman, Brynamman and the surrounding areas.
- Produce a project report detailing the findings of the hydraulic modelling, including flood outlines, flood depths and flow routes.
- Review and add recommendations for NRW's understanding of the flood mechanisms and threshold of flooding to help to inform the Flood Warning service
- Produce Model User Reports detailing model construction for future use by NRW staff.

## 1.3 Study Extents

The study extents of the modelled watercourses are illustrated in Figure 1-1, from which it is evident that a number of tributaries to the Afon Amman were also included in this commission. Table 1-1 summarises some of the key features of each of the modelled watercourses but, it should be noted that, following an initial site walkover, NRW decided the Nant Garw, which has a catchment area of around 8.0km<sup>2</sup> and enters the Amman at NGR 271780 214020, should not be included in the model. A brief summary of the modelled watercourse now follows.

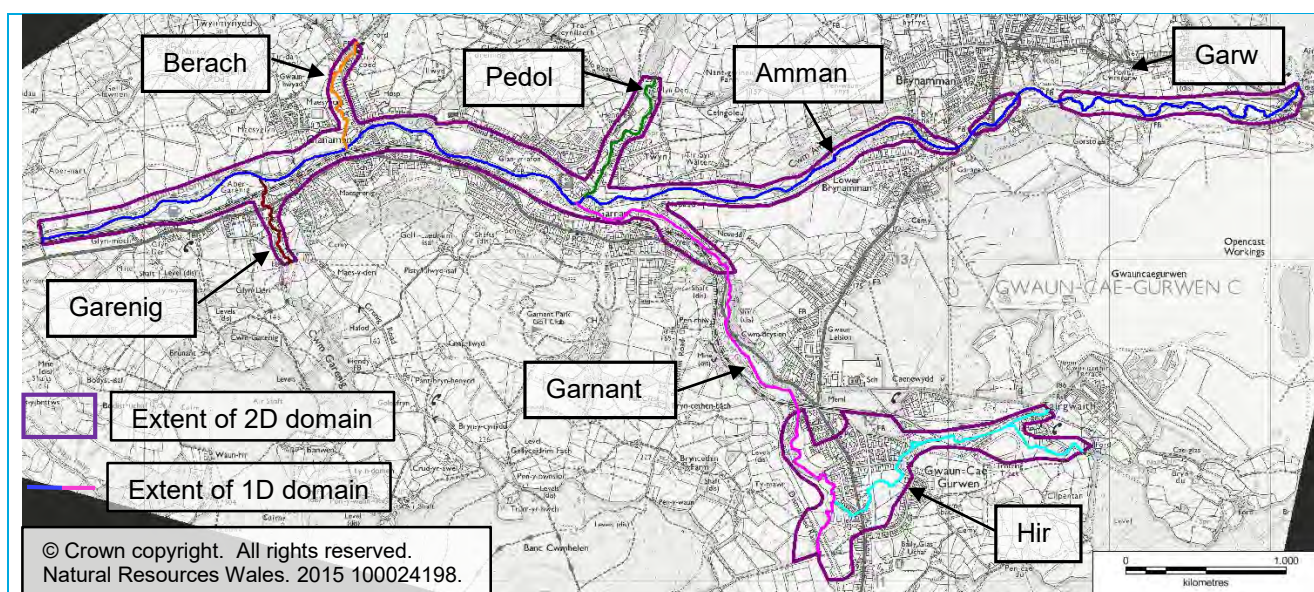


Figure 1-1 Map of the study area highlighting the modelled reaches.

**Table 1-1: Key properties of the modelled river reaches.**

| River Name                | River Length (metres) | Mean Gradient   | No. of surveyed river sections |
|---------------------------|-----------------------|-----------------|--------------------------------|
| Afon Amman                | 9,063                 | 0.012 / 1 in 80 | 91                             |
| Nant Hir (including trib) | 2,428                 | 0.018 / 1 in 55 | 51                             |
| Nant Garnant              | 3,468                 | 0.015 / 1 in 66 | 52*                            |
| Nant Pedol                | 1034                  | 0.029 / 1 in 35 | 20                             |
| Nant Berach               | 880                   | 0.034 / 1 in 30 | 14                             |
| Nant Garenig              | 673                   | 0.030 / 1 in 33 | 12                             |
| <b>Total</b>              | <b>17,546</b>         |                 | <b>240</b>                     |

\*including the reach upstream of the Nant Hir confluence that was surveyed under the reach code ASL.

**Afon Amman:** - The Afon Amman is the main watercourse within the study area. It originates in the Black Mountain and flows in a largely westerly direction through the study area before joining the Afon Loughor just downstream of Ammanford. The Afon Amman study reach extends nine kilometres from Rhosamman in the east to the west of Glanaman ending within a rural location around halfway between Glanaman and Ammanford. The watercourse is typically upland in nature, with steep local gradients and an average gradient of around 1 in 90. The river bed consists largely of boulders with some cobbles. The width of the main river channel increases in size from around 8m at the upstream extent of the model to around 25m at the downstream extent and this increased maturity reflects an increase in catchment area from around 4 to 61km<sup>2</sup> along the study reach. Figure 1-2 shows a view of a typical reach of the watercourse between Garnant and Glanaman. There are some small pockets of open, rural, floodplain in the upstream reach of the Afon Amman but the watercourse opens out into a wider floodplain downstream of Brynamman. This floodplain includes some urbanised areas of Garnant and Glanaman but most of the floodplain would appear to have either an agricultural or recreational use. The Amman is crossed by several man-made structures including weirs, pipe crossings, road, rail and footbridges, some of which could potentially exert a significant influence on flood risk. These structures are individually documented in the Model User Guide within Appendix A.

**Nant Pedol:** - The Nant Pedol drains a catchment of around 8.9km<sup>2</sup> and flows in a Southerly direction from a source at 490m AOD at Blaenpedol. The Nant Pedol channel is typically around 6-8 metres wide, although a few small braided sections near the upstream extent can effectively double this width. This watercourse is very steep with an average gradient of 1 in 35. The river bed consists largely of boulders with some cobbles and the channel is typically deeply incised into a narrow valley floor. However, this valley does open out a little as it approaches the Amman

floodplain. The Pedol channel is artificially constrained by significant retaining walls (particularly on the left bank) in its lower reaches. Figure 1-2 shows a view of the watercourse around 300m upstream of the Amman confluence before the left bank becomes constrained alongside Vicarage Road. The modelled Nant Pedol reach is crossed by three bridges and a pipe crossing and these are documented in the Model User Guide.

**Nant Garnant:** - The Nant Garnant enters the Afon Amman approximately 50 metres downstream of the Afon Amman/ Nant Pedol confluence. The Nant Garnant flows in a North/North Easterly direction, alongside the western extent of the community of Gwaun-Cae-Gurwen, from a source at an elevation of 300m AOD at Cwmgors. This watercourse has an average gradient of 1 in 66 and the river bed consists largely of boulders with some cobbles. Within the study area the Garnant has a catchment area that increases from 5.6km<sup>2</sup> to around 15.1km<sup>2</sup> at the Amman confluence. The channel accordingly increases from around 3m wide, upstream of the Nant Hir confluence, to around 10m wide, close to the Amman confluence. Figure 1-2 shows a view of a typical reach of the watercourse approximately 1.5km upstream of the Amman confluence. The Nant Garnant is typically quite deeply incised and has little floodplain except for small areas near the upstream (i.e. the Park Howard estate) and downstream (i.e. near the Amman confluence) extents. With the exception of the Park Howard estate area, most of Gwaun-Cae-Gurwen would appear to be above the Garnant floodplain. The Nant Garnant is crossed by a number of man-made structures including weirs, pipe crossings, road, rail and footbridges, all of which are documented in the Model User Guide.

**Nant Hir:** - The Nant Hir is the principal tributary of the Nant Garnant and flows in a Westerly/North Westerly direction from a main source at 300m AOD to the south-east of the community of Tairgwaith. An unnamed side branch of the Nant Hir that originating at a culvert exit which drains a sizeable area of opencast coal workings in Tairgwaith is also included in the model. This inflow would appear to convey a regulated flow from an active open cast mine so that the catchment area represented by this unnamed watercourse is uncertain and unnatural. This means that the total catchment area of the Nant Hir is currently uncertain<sup>1</sup>.

This main Nant Hir branch has an average gradient of 1 in 55 and the river bed consists largely of boulders with some cobbles. This main branch varies in width from around 3m at the upstream extent of the study reach to 7m near the Garnant confluence. Figure 1-2 shows this watercourse close to the Garnant confluence and includes some of the gardens behind Ger-yr-Afon that were recorded to have flooded in 1991. The unnamed tributary from the mine workings is partly canalised with a concrete lined along its short reach and there is also a short section of a man-made, by-pass channel that acts as a relief to the culvert through the embankment near Twynrefail Place.

The Nant Hir is crossed by a number of man-made structures including weirs, pipe crossings, road, rail and footbridges and three long culverts, all of which are documented in the Model User Guide.

**Nant Berach:** - The Nant Berach drains a comparatively small upland catchment of around 3.4km<sup>2</sup> and flows in a Southerly direction before joining the Amman in Glanaman. This watercourse is very steep with an average gradient of 1 in 30, the main channel is typically around 6 metres wide and the bed consists largely of boulders with some cobbles. The main channel is typically deeply incised into a steep sided valley with no floodplain except in the vicinity of the Amman confluence. Figure 1-2 shows a typical view of the watercourse within the incised reach. The Nant Berach is crossed by three bridges in the study reach and these are documented in the Model User Guide.

**Nant Garenig:** - The Nant Garenig drains a small upland catchment of around 3.6km<sup>2</sup> and flows in a Northerly direction before joining the Amman in the vicinity of Garenig Bridge on the western outskirts of Glanaman. This watercourse is very steep with an average gradient of 1 in 33, the main channel is typically around 6 to 10 metres wide and the bed consists largely of boulders with some cobbles. As with the other small tributaries, the main channel is typically incised into a steep sided valley with floodplain largely limited to the vicinity of the Amman confluence. Figure 1-2 shows a typical view of the watercourse upstream of Cwmamman Road. The Nant Garenig has one obvious weir in the study reach and is crossed by four bridges. These structures are documented in the Model User Guide.

---

<sup>1</sup> The main branch of the Nant Hir was calculated in the hydrological analysis to have a catchment area of around 3.0km<sup>2</sup> just upstream of the trotting track culvert to which a further 2.5km<sup>2</sup> of lateral inflow was added before the Garnant confluence.



Figure 1-2 Photographs illustrating the general nature of the modelled watercourses.

## 1.4 Flood Defences

Many flood risk mapping studies require the development of both defended and undefended flood models, whereby the undefended model is used to update NRW's Flood Zones and the defended scenario is used to highlight the benefits of any defences; particularly by defining formal 'Areas Benefiting from Defences' polygons. However, since there are no formal flood defences within the Glanamman study area, only a single 'undefended' model scenario was created to define the Flood Zones and no 'Areas Benefiting from Defences' were defined from this study.

## 1.5 Flood Zones and Development Advice Mapping

Welsh Government's Development Advice Map (DAM) shows a corridor within the town of Glanamman to be in Zone C2 meaning that they are at flood risk without significant defences in place. Elsewhere, the DAM illustrates the steep and fast nature of the catchment area with narrow

areas of floodplain. (Figure 1-3) This commission aims to provide improved information to update the mapping used for development and flood risk decisions.



Figure 1-3 Welsh Government Development Advice Map

## 1.6 Previous Studies and Recent Flood History

The existing NRW Flood Maps across the study reach (Figure 1-5) are based upon broad-scale JFLOW mapping and NRW are not aware of any higher definition models across the Glanamman study area.

Flood incidents have been recorded across the catchment in recent years but this flooding is rarely extensive and often attributable to flooding from other sources.

There is little documented evidence of significant flooding in the study area. An event in October 1991 produced some fluvial flooding in Gwaun-Cae-Gurwen but other than this event there is no definitive evidence of flooding from any of the modelled watercourses.

In October 1991, flooding from the Nant Hir was reported to have affected the garden at No. 46 Ger-yr-Afon in Gwaun-Cae-Gurwen, approximately 150 metres upstream of confluence with Nant Garnant (Figure 1-4). Newspaper reports (in the South Wales Evening Post) also indicate that there was a significant depth of water at Cwmamman Road in Glanamman, which was attended by the Fire Service. However, the Cwmamman Road flooding is considered to have been in response to surface water since it occurred at a substantial distance from the nearest watercourse, the Afon Amman. No. 1 Pontamman Road was also flooded in October 1991 but this has been attributed to the partial blockage of a culvert on a non-main watercourse rather than direct flooding from one of the main watercourses.

In addition, NRW observations during a high flow event in October 2002 suggest that there was still a substantial freeboard above the observed water levels in Glanamman. The historic record since 1991 would tend to suggest that properties across the study area should have a relatively high flood threshold.

### 3.2.1 Upper Amman from Rhosaman to Brynamman

The results from the upstream extent of the model at Rhosaman show flooding to impact property at a threshold of the 2% AEP event. There are three properties impacted by the 1% AEP event where depths internally do not exceed 200mm. The flood outline for the 0.1% AEP event shown an additional 5 receptors within the flood outline as shown in Figure 3-2.

The source of flooding is due to the right bank being overtopped just upstream of the disused railway embankment at AMMA\_8854B. The bank overtops during the 20% AEP event. The water then backs up behind the embankment and results in the first property to flood on the right bank during the 1% AEP with the left bank overtopping later and resulting in a further two properties being flooded. Figure 3-1-A shows the properties at risk, looking downstream from the A4068 road bridge.

Further downstream, the embankment that is present along the coal yard on the left bank between Rhosaman and Brynamman is not reached in even the 0.1% AEP event, during which a freeboard of over 2m is evident between maximum water levels and the crest of the embankment.

Just upstream of Brynamman where the Amman makes a sharp right under the A4069 Road Bridge (AMMA\_6657B), the right bank is overtopped during the 0.5% AEP event. The yard on the right bank experiences maximum depths of 600mm during the 0.1% AEP event with no design events causing flooding to the A4069 road at this location.

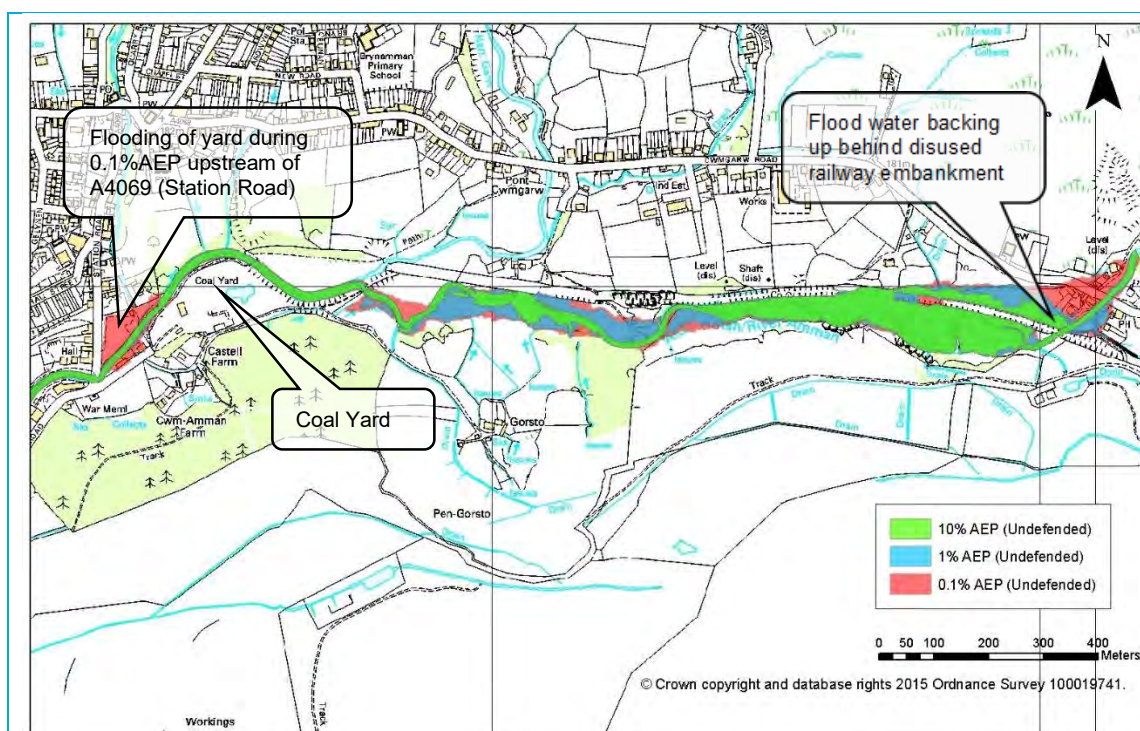


Figure 3-2 Flood outline for 10%, 1% and 0.1% AEP events at the Amman upstream extent

### 3.2.2 The Garnant

There is some uncertainty surrounding the magnitude of the hydrology of the upstream extent of the Garnant as discussed in more detail in the Model User Report. However, the results show that the industrial units, labelled in **Figure 3-3** are affected by a flow route which impacts them at a 5% AEP event threshold. The dominate flow route in the 1% AEP event is via the underpass through the disused railway embankment towards Park Howard Road, due to the backing up of water behind the culvert at GARN\_3356I. The flow route then runs along the

downstream side of the embankment before water travels through the workshops before re-joining the Garnant. This flood mechanism is shown in Figure 3-3. There are up to three further receptors impacted by flooding during the more extreme 0.1% AEP event in this vicinity, upstream of the Nant Hir confluence.

Downstream of the Nant Hir confluence, the Garnant channel, is fairly incised in nature with very little flood risk to property in even the most extreme flood event.

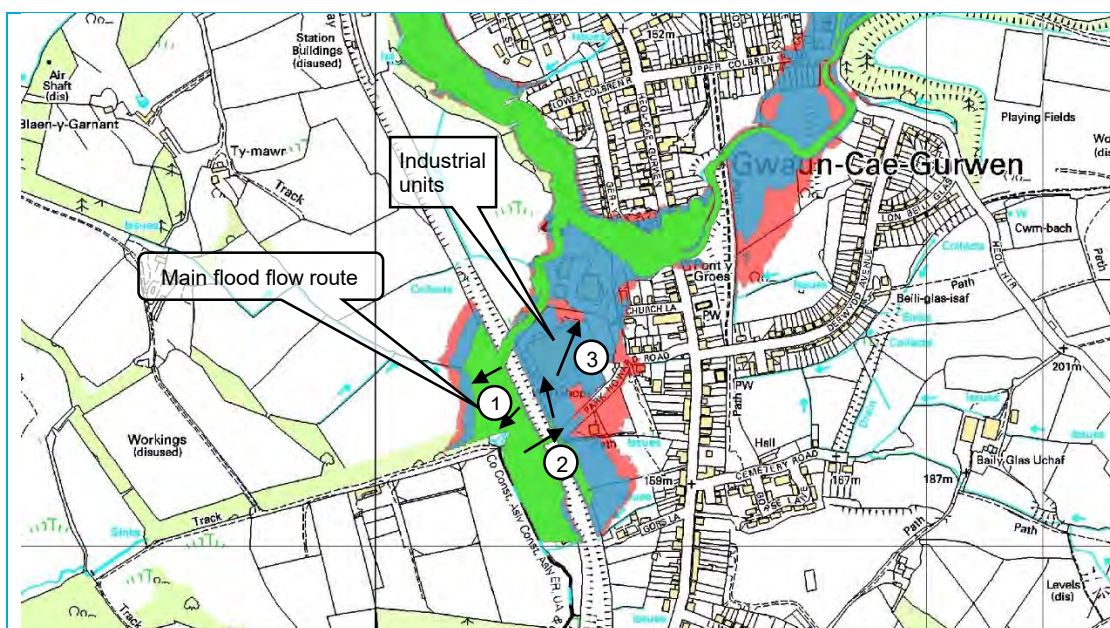


Figure 3-3 Flood outline for 10%, 1% & 0.1% AEP events at the Garnant upstream extent

### 3.2.3 The Nant Hir

The trotting track at Gwaun-cae-Gurwen is a flow route used in even the smallest of design events (50% AEP). The culvert inlet at HIR3\_0175C (Figure 3-1-E), to the east of the trotting track restricts flow causing an overland flow route returning to the channel to the west of the track. In the residential area of Gwaun-cae-Gurwen itself there are a number of locations where out of bank flow results in flooding of roads and property; particularly the culvert and bypass channel at HIR1\_0955C (Figure 3-1-F) and upstream of the Heol-cae-Gurwen road bridge (HIR1\_0213R). The church hall upstream of the Heol-cae-Gurwen road bridge and the row of properties on Ger-yr-Afon, on the downstream side of the road bridge, are modelled to experience depths of between 200-600mm during the 10% AEP event as shown in Figure 3-4. The flow route here is via flood water coming out of bank upstream of the bridge by the hall, crossing the road and returning to the river through the houses.

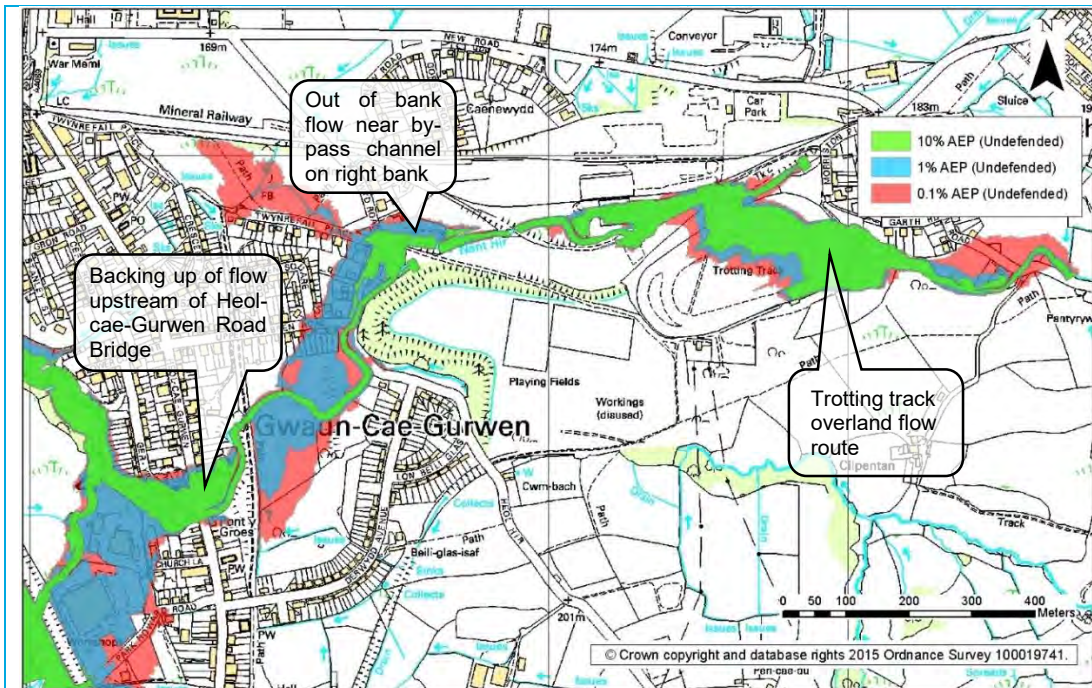


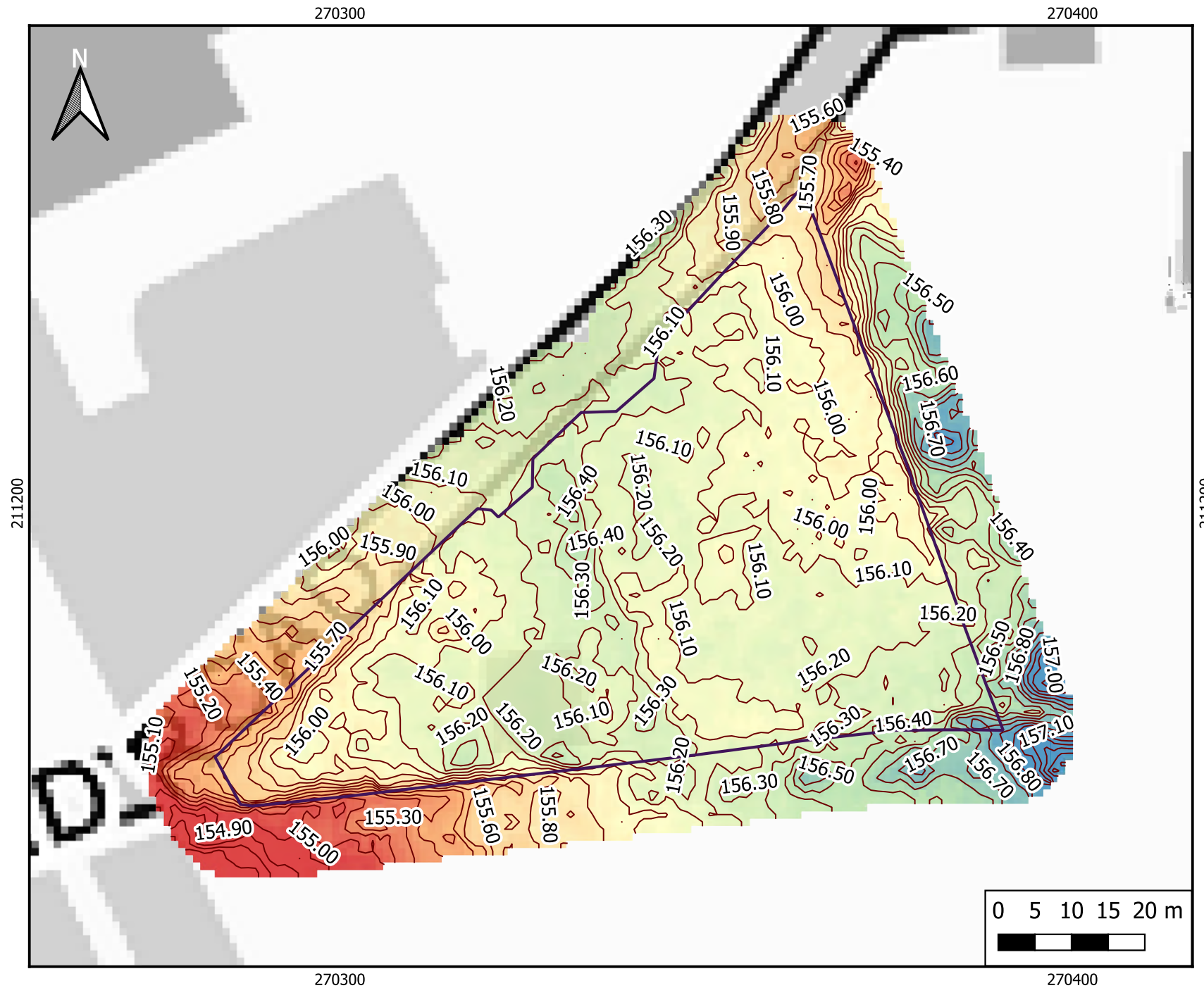
Figure 3-4 Flood outline for 10%, 1% and 0.1% AEP events along the Nant Hir

### 3.2.4 Confluences as Garnant

Garnant is located at the confluence of three of the major tributaries within this study; The Amman, the Garnant and the Pedol. The peak 1% AEP flow on the Amman increases from 90 m<sup>3</sup>/s upstream of the confluences to 211 m<sup>3</sup>/s downstream of the confluences over a distance of 200m. The 10% AEP event is contained within the channel for the most part, with the larger events mostly impacting rural, undeveloped land. The Tan-y-Gelli housing estate is impacted at the 20% AEP threshold due to overtopping of the right bank adjacent to the estate. Approximately 15 properties are flooded during the 10% AEP event here and depths of up to 1m are modelled within properties during the 1% AEP event as shown in Figure 3-6.



## Natural Resource Wales LiDAR ground elevation data



## Elevation on Site (LiDAR Data)

### Legend

Site Boundary

Elevation (mAOD)

155.0000

155.5000

156.0000

156.5000

157.0000

**GeoSmart**  
Information

Date  
10/10/2022

Drawn

Scale  
1:726.717432

Checked

Original

Revision

File Reference

## Appendix D



# British Geological Survey Borehole Database

# BOREHOLE RECORD - Window Sampling

Project OFF PARK HOWARD ROAD CWMGORS  
SWANSEA

Engineer

MOUCHEL PARKMAN SERVICES LIMITED

Borehole  
Project No

WS1B  
PC051776

Client THE COAL AUTHORITY

| Sampling   |             |                          | Properties   |     | Strata                                                                                                                                                                           |       | Scale 1:50 |  |
|------------|-------------|--------------------------|--------------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------|--|
| Depth      | Sample Type | Depth Cased & (to Water) | Strength kPa | w % | Description                                                                                                                                                                      | Depth | Legend     |  |
| 0.00- 0.20 | D           |                          |              |     | Soft occasionally soft to firm dark grey and dark brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium subangular mudstone and sandstone. At 0.40m gravel size. | G.L.  |            |  |
| 0.20- 0.40 | D           |                          |              |     |                                                                                                                                                                                  |       |            |  |
| 0.50- 0.80 | D           |                          |              |     |                                                                                                                                                                                  |       |            |  |
| 0.50- 0.80 | D           |                          | 29           |     |                                                                                                                                                                                  |       |            |  |
| 1.00- 1.30 | D           |                          |              |     | Between 1.00-1.30m, Dark grey slightly gravelly silt. Gravel is fine to coarse subangular to subrounded mudstone, sandstone and coal.                                            |       |            |  |
| 1.65- 1.85 | D           |                          |              | 47  | Below 1.50m, Occasional rootlets. At 1.60m, 5mm thick band of spongy fibrous peat.                                                                                               | 1.65  |            |  |
|            |             |                          |              |     | Very soft grey and brown CLAY with slight organic odour.                                                                                                                         |       |            |  |
|            |             |                          |              |     | Below 2.89m, Becoming soft to firm.                                                                                                                                              |       |            |  |
| 3.50- 3.80 | D           |                          |              |     | Between 3.40-3.90m, Firm to stiff.                                                                                                                                               |       |            |  |
|            |             |                          |              |     | Firm to stiff light grey to grey green slightly sandy slightly gravelly CLAY with occasional pockets of grey silt up to medium gravel size.                                      | 3.90  |            |  |
| 4.50       | D           |                          |              |     |                                                                                                                                                                                  |       |            |  |
|            |             |                          |              |     | Weathered MUDSTONE recovered as dark grey to blue grey slightly clayey fine to coarse subangular gravel, with occasional pockets of silt up to medium gravel size.               | 4.65  |            |  |
| 4.90       | D           |                          |              |     |                                                                                                                                                                                  |       |            |  |
|            |             |                          |              |     | End of Borehole                                                                                                                                                                  | 5.20  |            |  |

| Boring |      |                 |      | Progress      |             |                |          |       | Groundwater  |             |         |         |              |                        |
|--------|------|-----------------|------|---------------|-------------|----------------|----------|-------|--------------|-------------|---------|---------|--------------|------------------------|
| Depth  | Dia  | Technique       | Crew | Depth of Hole | Depth Cased | Depth to Water | Date     | Time  | Depth Struck | Depth Cased | Rose to | in Mins | Depth Sealed | Remarks on Groundwater |
| 2.00   | 0.08 | Window Sampling | SGT  | 5.20          |             |                | 02/06/05 | 08:00 |              |             |         |         |              | Not seepage.           |
| 3.00   | 0.07 | Window Sampling | SGT  | 0.00          |             |                | 02/06/05 | 18:00 |              |             |         |         |              |                        |
| 4.00   | 0.07 | Window Sampling | SGT  |               |             |                |          |       |              |             |         |         |              |                        |
| 5.00   | 0.06 | Window Sampling | SGT  |               |             |                |          |       |              |             |         |         |              |                        |

|                                                                                                                                                                                                                                                       |                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <b>Remarks</b><br>Slight organic smell at 1.65 - 1.85<br>Refusal of WS1B at 4.50m probably due to encountering moderately strong mudstone.<br>Symbols and abbreviations are explained on the accompanying key sheet.<br>All dimensions are in metres. | Logged by CL<br>Checked by DWB<br>Figure 1 of 1<br>04/07/2005<br> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|



# BOREHOLE RECORD - Window Sampling

Project OFF PARK HOWARD ROAD CWMGORS  
SWANSEA

Engineer

MOUCHEL PARKMAN SERVICES LIMITED

Borehole  
Project No

WS3  
PC051776

Client THE COAL AUTHORITY

| Sampling        |             |                          | Properties   |     | Strata                                                                                                                                                                                                                                                                                                    |       | Scale 1:50 |  |
|-----------------|-------------|--------------------------|--------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------|--|
| Depth           | Sample Type | Depth Cased & (to Water) | Strength kPa | w % | Description                                                                                                                                                                                                                                                                                               | Depth | Legend     |  |
| 0.25- 0.40      | D           |                          |              | 31  | Dark brown slightly gravelly spongy fibrous organic clay/silt. [MADE GROUND]                                                                                                                                                                                                                              | G.L.  |            |  |
| 0.64- 0.84      | D           |                          |              |     | Soft dark brown and blue black slightly sandy slightly gravelly CLAY with occasional rootlets and with occasional pockets of gravelly silt up to coarse gravel size. Gravel is medium to coarse subrounded sandstone. Gravel is fine to coarse subangular mudstone.                                       | 0.20  |            |  |
| 0.80- 0.90      | D           |                          |              |     |                                                                                                                                                                                                                                                                                                           | 0.45  |            |  |
| 1.66- 1.90      | D           |                          |              | 12  | Firm to stiff dark grey and light brown slightly sandy slightly gravelly CLAY with rare carbonaceous pockets up to medium gravel size. Gravel is fine to medium subangular to subrounded mudstone and sandstone.                                                                                          | 1.35  |            |  |
|                 |             |                          |              |     | Soft to very soft dark grey slightly sandy very gravelly CLAY. Gravel is fine to coarse subangular to subrounded mudstone and rare fine gravel fo red sandstone. Between 2.62-3.20m, occasional pockets of dark grey slightly gravelly silt up to coarse gravel size. Gravel is fine subangular mudstone. |       |            |  |
| 3.20- 3.55      | D           |                          |              |     | Grey to light grey slightly clayey slightly gravelly SAND with frequent fragments of wood. Sand is fine to coarse. Gravel is fine to medium subrounded sandstone and quartzite.                                                                                                                           | 3.20  |            |  |
| 3.60- 3.90      | D           |                          |              |     | Soft to firm grey fissured CLAY. Fissures are extremely closely spaced smooth horizontal undulating. Apertures are moderately open with infilling of grey silt.                                                                                                                                           | 3.55  |            |  |
|                 |             |                          |              |     | Between 4.65-4.80m, band of grey slightly gravelly silt. Gravel is fine to medium subrounded mudstone.                                                                                                                                                                                                    | 4.80  |            |  |
| 4.90- 5.10      | D           |                          |              |     | Dark grey to blue grey MUDSTONE recorded as slightly sandy gravel with rare coal and frequent pockets of firm to stiff grey clay. Gravel is fine to medium subangular mudstone. [WEATHERED MUDSTONE]                                                                                                      | 5.30  |            |  |
| End of Borehole |             |                          |              |     |                                                                                                                                                                                                                                                                                                           |       |            |  |

| Boring |      |                 |      | Progress      |             |                |          |       | Groundwater  |             |         |         |              |                        |
|--------|------|-----------------|------|---------------|-------------|----------------|----------|-------|--------------|-------------|---------|---------|--------------|------------------------|
| Depth  | Dia  | Technique       | Crew | Depth of Hole | Depth Cased | Depth to Water | Date     | Time  | Depth Struck | Depth Cased | Rose to | in Mins | Depth Sealed | Remarks on Groundwater |
| 1.00   | 0.08 | Window Sampling | SGT  | G.L.          |             |                | 06/06/05 | 08:00 |              |             |         |         |              | Surface water present. |
| 2.00   | 0.07 | Window Sampling | SGT  | 5.30          |             |                | 06/06/05 | 18:00 |              |             |         |         |              |                        |
| 4.00   | 0.06 | Window Sampling | SGT  |               |             |                |          |       |              |             |         |         |              |                        |
| 5.30   | 0.05 | Window Sampling | SGT  |               |             |                |          |       |              |             |         |         |              |                        |

|         |                                                                                                         |                                   |                                   |
|---------|---------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------|
| Remarks | Between 1.00m and 1.35m, no recovery. Window sample refused at 5.30m due to moderately strong mudstone. | Logged by<br>Checked by<br>Figure | CL<br>DWB<br>1 of 1<br>04/07/2005 |
|---------|---------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------|



## Disclaimer

This report has been prepared by GeoSmart in its professional capacity as soil, groundwater, flood risk and drainage specialists, with reasonable skill, care and diligence within the agreed scope and terms of contract and taking account of the manpower and resources devoted to it by agreement with its client and is provided by GeoSmart solely for the internal use of its client.

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This report is confidential to the client. The client may submit the report to regulatory bodies, where appropriate. Should the client wish to release this report to any other third party for that party's reliance, GeoSmart may, by prior written agreement, agree to such release, provided that it is acknowledged that GeoSmart accepts no responsibility of any nature to any third party to whom this report or any part thereof is made known. GeoSmart accepts no responsibility for any loss or damage incurred as a result, and the third party does not acquire any rights whatsoever, contractual or otherwise, against GeoSmart except as expressly agreed with GeoSmart in writing.

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## Important consumer protection information

This search has been produced by GeoSmart Information Limited, Suite 9-11, 1st Floor, Old Bank Buildings, Bellstone, Shrewsbury, SY1 1HU.

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GeoSmart Information Limited is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered search firms maintain compliance with the Code.

### The Search Code:

- provides protection for homebuyers, sellers, estate agents, conveyancers and mortgage lenders who rely on the information included in property search reports undertaken by subscribers on residential and commercial property within the United Kingdom.
- sets out minimum standards which firms compiling and selling search reports have to meet.
- promotes the best practice and quality standards within the industry for the benefit of consumers and property professionals.
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.
- By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you.

### The Code's core principles

Firms which subscribe to the Search Code will:

- display the Search Code logo prominently on their search reports.
- act with integrity and carry out work with due skill, care and diligence.
- at all times maintain adequate and appropriate insurance to protect consumers.
- conduct business in an honest, fair and professional manner.
- handle complaints speedily and fairly.
- ensure that products and services comply with industry registration rules and standards and relevant laws.
- monitor their compliance with the Code.

## Complaints

If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for any complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award compensation of up to £5,000 to you if he finds that you have suffered actual loss as a result of your search provider failing to keep to the Code.

*Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to TPOs or to the PCCB.*

### TPOs contact details:

The Property Ombudsman scheme

Milford House

43-55 Milford Street

Salisbury

Wiltshire SP1 2BP

Tel: 01722 333306

Fax: 01722 332296

Email: [admin@tpos.co.uk](mailto:admin@tpos.co.uk)

You can get more information about the PCCB from [www.propertycodes.org.uk](http://www.propertycodes.org.uk).

Please ask your search provider if you would like a copy of the search code.

## Complaints procedure

GeoSmart Information Limited is registered with the Property Codes Compliance Board as a subscriber to the Search Code. A key commitment under the Code is that firms will handle any complaints both speedily and fairly. If you want to make a complaint, we will:

- Acknowledge it within 5 working days of receipt.
- Normally deal with it fully and provide a final response, in writing, within 20 working days of receipt.
- Keep you informed by letter, telephone or e-mail, as you prefer, if we need more time.
- Provide a final response, in writing, at the latest within 40 working days of receipt.
- Liaise, at your request, with anyone acting formally on your behalf.

If you are not satisfied with our final response, or if we exceed the response timescales, you may refer the complaint to The Property Ombudsman scheme (TPOs): Tel: 01722 333306, E-mail: [admin@tpos.co.uk](mailto:admin@tpos.co.uk).

We will co-operate fully with the Ombudsman during an investigation and comply with his final decision. Complaints should be sent to:

Martin Lucass

Commercial Director

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Bellstone, Shrewsbury, SY1 1HU

Tel: 01743 298 100

[martinlucass@geosmartinfo.co.uk](mailto:martinlucass@geosmartinfo.co.uk)

## 11. Terms and conditions, CDM regulations and data limitations



Terms and conditions can be found on our website:

<http://geosmartinfo.co.uk/terms-conditions/>

CDM regulations can be found on our website:

<http://geosmartinfo.co.uk/knowledge-hub/cdm-2015/>

Data use and limitations can be found on our website:

<http://geosmartinfo.co.uk/data-limitations/>