Vale Consultancy

CONSULTING CIVIL & STRUCTURAL ENGINEERS

FLOOD CONSEQUENCE ASSESSMENT (FCA)

Former Changing Room,
Rhodes Avenue,
Aberavon, Neath Port Talbot
SA12 6UT

Prepared for: CJ Construction
Project Ref: 21698 – FCA – 03

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LIMITATIONS

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All the Natural Resources Wales (NRW) mapping data used is under special license. Data is current as of ***May 2026*** and is subject to change.

The information presented and conclusions drawn are based on statistical data and are for guidance purposes only. The study provides no guarantee against flooding of the study site or elsewhere, nor of the absolute accuracy of water levels, flow rates and associated probabilities.

Constraints

This is the third (3rd) iteration of document 21698-FCA-01 which, following submission and consultation to / with NRW, who have responded with outstanding concerns with regard to flood risk and hence still object to the proposals. NRW comments are included (in full) in **Appendix F**, for reference.

The aims and objectives of this report are to provide NRW with the additional information they require to; and which will hopefully alleviate any further outstanding concerns regarding flood risk to development proposals, over its lifetime expectancy. All changes in this report are in direct response to all the narrative within NRWs comments, unless specified otherwise.

1 INTRODUCTION

1.1 Purpose of Report

Vale Consultancy has been instructed by *CJ Construction to* prepare a Flood Consequences Assessment (FCA) report to accompany a planning application for the proposed redevelopment of Land at Rhodes Avenue, Aberavon, Neath Port Talbot ("The Site ") for residential use.

The aims and objectives of this report are to provide NRW with the additional information they require, and which will hopefully alleviate any further outstanding concerns regarding flood risk to development proposals, over its lifetime expectancy (100-years). All changes in this report are in direct response to the narrative within NRWs comments, unless specified otherwise.

The assessment has been undertaken in accordance with the requirements of Technical Advice Note 15 (TAN 15) dated 31st March 2025.

1.2 Background

A pre-application consultation was sent to Neath Port Talbot (Ref: Q2025/0061) via email on 19th February 2025. The document refers to the use of both the Flood Map for Planning (currently the best available information) and the Development Advice Map (now superseded by the Flood Map for Planning as part of the updated and new TAN15 that was issued by NRW in March 2025).

It notes that that the proposed development is classified as highly vulnerable (HVD). The new Flood Map for Planning (FMfP) indicates that the site is situated in Flood Zone 3 (Rivers and Sea). The site lies within a TAN15 Defended Zone (Rivers and Sea).

Refer to Appendix D.

1.3 Relevant Documents

This assessment has been informed by the following documents, policy and information:

- Technical Advice Note 15: Development, Flooding and Coastal Erosion, Welsh Government, March 2025;
- Planning Policy Wales, Welsh Government, February 2024;
- Flood Consequences Assessments: Climate Change Allowances, Welsh Government, March 2026;
- Future Wales - the National Plan 2040, Welsh Government, February 2021;
- Welsh Government National Marine Plan (November 2019);
- Welsh Government Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems (2018);
- Welsh Government Sustainable Drainage (SuDS) Statutory Guidance (2019)
- Local Development Plan 2011 – 2026: Neath Port Talbot County Borough Council (Adopted January 2016);
- South West Wales – Stage 1 Strategic Flood Consequence Assessment (JBA Consulting, November 2022);
- Neath Port Talbot County Borough Council Flood Risk Management Plan 2015;
- 1m resolution LiDAR data – downloaded April 2026
- Soilscapes, Soil and AgriFood Institute, Cranfield University – accessed online April 2026
- British Geological Survey (BGS) Drift & Geology Maps – accessed online April 2026

2 SITE DETAILS AND PROPOSED DEVELOPMENT

2.1 Site Location

The approximately 0.19 ha (or 1935.8m^2) site is located to the west of Rhodes Avenue, Aberavon at Ordnance Survey National Grid Reference SS75526 90495 (*275526E, 190495N*) as shown in **Figure 1** and **Appendix A.**

Figure 1: *Site Location Satellite Imagery Plan*

2.2 Existing & Proposed Development

The application site currently comprises of a single storey detached former changing rooms building, with hard standing to the front and vegetation to the rear. Provision of site access / egress is from Rhodes Avenue. In its existing state – the site is disused and dilapidated and in need of re-development. The site is in are area surrounded by HVD (i.e. residential, emergency services and a school).

The development proposals are for the erection of 8no Residential Units which consist of 6x one bed flats (assisted living) and 2x two bed Bungalows (100% affordable).

Refer to Appendix B – Existing and Proposed Site Plans

TAN15 classifies residential development as a 'Highly Vulnerable' development (HVD) when considering flood risk.

For the purposes of this report; the site and proposals are considered '*Redevelopment*' which is defined by the new TAN15 as; '*Any development on previously developed land as defined in Planning Policy Wales*'.

2.3 Existing & Proposed Drainage

Welsh Water (DCWW) asset plans have been acquired and are included in **Appendix C**, for reference. A review of the plans indicates a 150mm public combined sewer within Rhodes Avenue flowing in a south easterly direction.

This should be complemented by a CCTV survey (if required) of any existing drainage assets and network serving the site and localised area.

A review of *Google Streetview* online mapping indicates that the existing site and building are served by surface water drainage features including gutters and rainwater downpipes (RWP). Rhodes Avenue is served by an existing surface water drainage network due to the presence of gullies within the highway.

The proposals will be subject to a successful SAB Application which will ensure that surface water flows are managed effectively at their course. The Surface Water Drainage Strategy and associated SAB Application will be in line and adherence with national and regional policy, guidance and legislation and will incorporate SuDS. Furthermore, and moreover; and seeing as the site is defined as a 'Redevelopment' (i.e. *Previously Developed*); the Drainage Strategy will need to provide a betterment in the order of 40% (discharge rates) when compared to the existing site and will take into consideration the potential impacts of climate change.

The relevant statutory SuDS Approving Body (SAB) authority is Neath Port Talbot (NPT) County Council.

The proposed surface water drainage strategy will be efficient and effective at dealing with surface water at its source and in a *SuDS Management Train* fashion and in line with Welsh Government (WG) Statutory standards for SuDS – designing, constructing, operating and maintaining surface water drainage systems (2018).

Section 7. Sustainable drainage from the new TAN15 document states;

'*7.3 The responsibility within the local authority for ensuring SuDS are integrated into new developments sits with the SuDS Approving Body (SAB). The approval of SuDS for a new development by the SAB is independent of the planning process. New developments of more than one dwelling or where the area covered by construction work equals or exceeds 100m² require approval from the SAB before construction can commence. Adoption and management arrangements, including a funding mechanism for maintenance of SuDS infrastructure and all drainage elements, must be agreed by the SAB as part of this approval. This will ensure that SuDS infrastructure is properly maintained and functions effectively for its design life.*' **And;**
'*7.4 SuDS manage rainfall in a similar way to natural processes, making use of the landscape and vegetation to control the flow and volume of surface water. They offer a variety of engineering solutions that can be employed to manage surface water run-off, recognising there are differences in soil structure, water table levels and infiltration rates across Wales. The Statutory National Standards for SuDS7 outline various approved methods of managing surface water; developers will need to design and construct SuDS in accordance with the Standards in order to secure SAB approval*.'

2.4 Existing Topography

A site-specific topographic survey was made available to Vale to inform this report. This drawing was initially issued in November 2025; however, the latest version (Rev. D) is dated February 2026. Upon review of the site-specific topographic survey, site levels are shown to range between 5.505 – 6.471mAOD. This is a difference in ground level of 0.966m. In addition, freely available 1m resolution LiDAR data has been downloaded for the site and local area. A visual representation of the LiDAR is presented within **Figure 2** below.

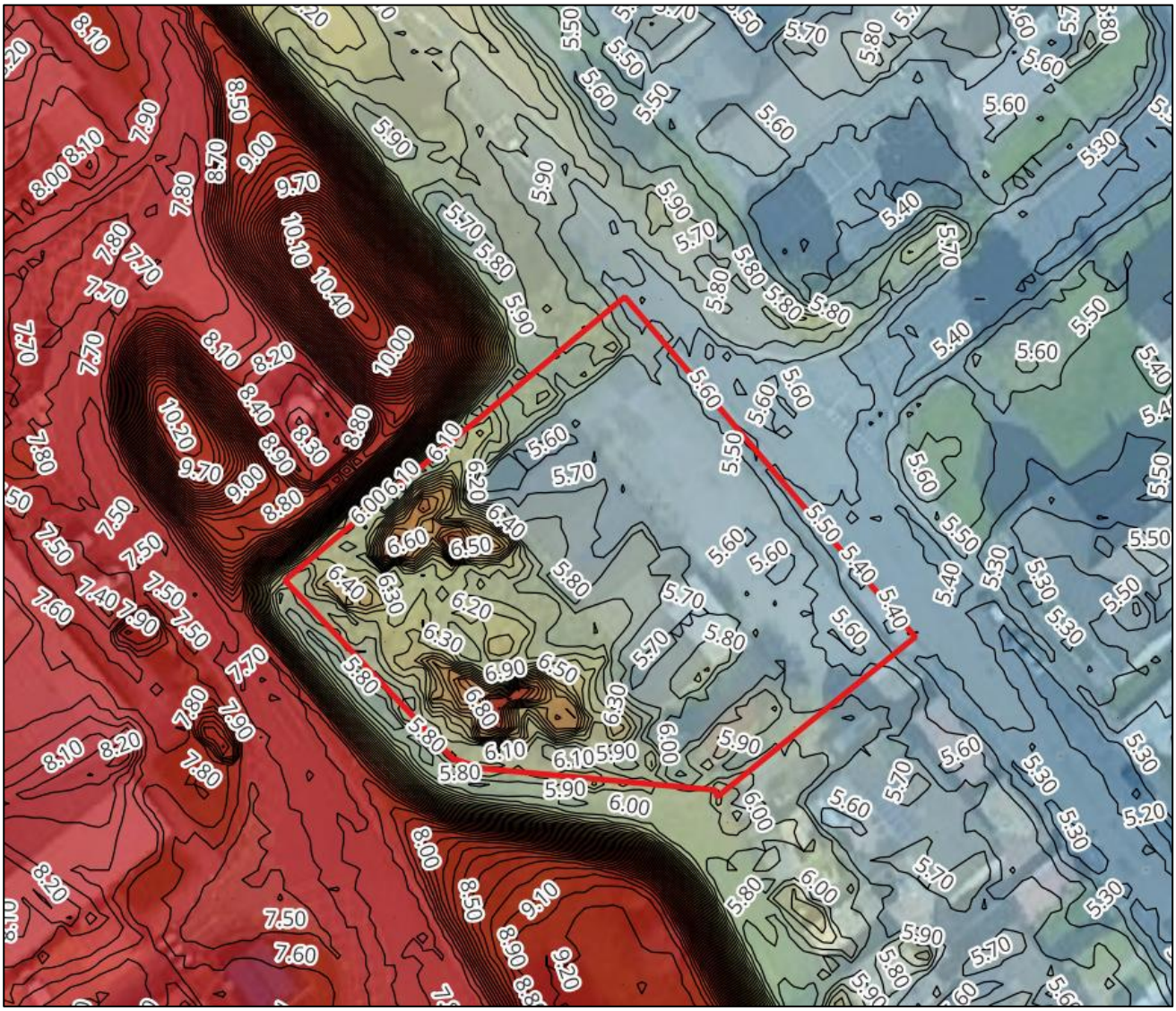


Figure 2: *1m Resolution LiDAR DTM (mAOD)*

From a review of the LiDAR data, it was indicated to concur with the general findings of the site-specific topographic survey.

2.5 Existing Ground Conditions

According to Soilscapes soils dataset produced by the Cranfield Soil and AgriFood Institute, soil conditions at the site and within the surrounding area are described as loamy and clayey soils of coastal flats with naturally high groundwater (*Soilscape 21*) that drains to local groundwater under naturally prevailing conditions.

Online BGS mapping shows the bedrock geology beneath the site to consist of South Wales Middle Coal Measures Formation-Mudstone, siltstone and sandstone. This is defined by NRW as an 'Unproductive' aquifer. These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

The bedrock is overlain by Tidal flat deposits-Clay, silt and sand. This is also defined as an 'Unproductive' aquifer.

According to the BGS Single Onshore Borehole Index; a borehole record has been identified at coordinates: *275520E, 190540N*. This record identifies topsoil between 0.00 – 0.90 m below ground level (BGL), plastic, glass, rotting newspaper with a little dark brown gravel of slag between 0.90 – 2.40 m BGL, A/A mixed with

medium brown clayey fibrous organic silt between 2.40 – 2.70 m BGL with silty, sandy clay underlaying to a depth of 8.25 m BGL. Groundwater was struck at 1.40 m BGL, which rose to 0.80 m after 15 minutes. This supports the above which indicates a presence of Made Ground in the area.

2.6 Local Hydrology

The nearest designated main river to the site is the River Afan (approximately 870m to the southeast), flowing in a south westerly direction towards its discharge into Swansea Bay (approximately 2.1km to the southwest). There are no ordinary watercourses within 250m of the site.

All local hydrology features can be seen in **Figure 3** below.

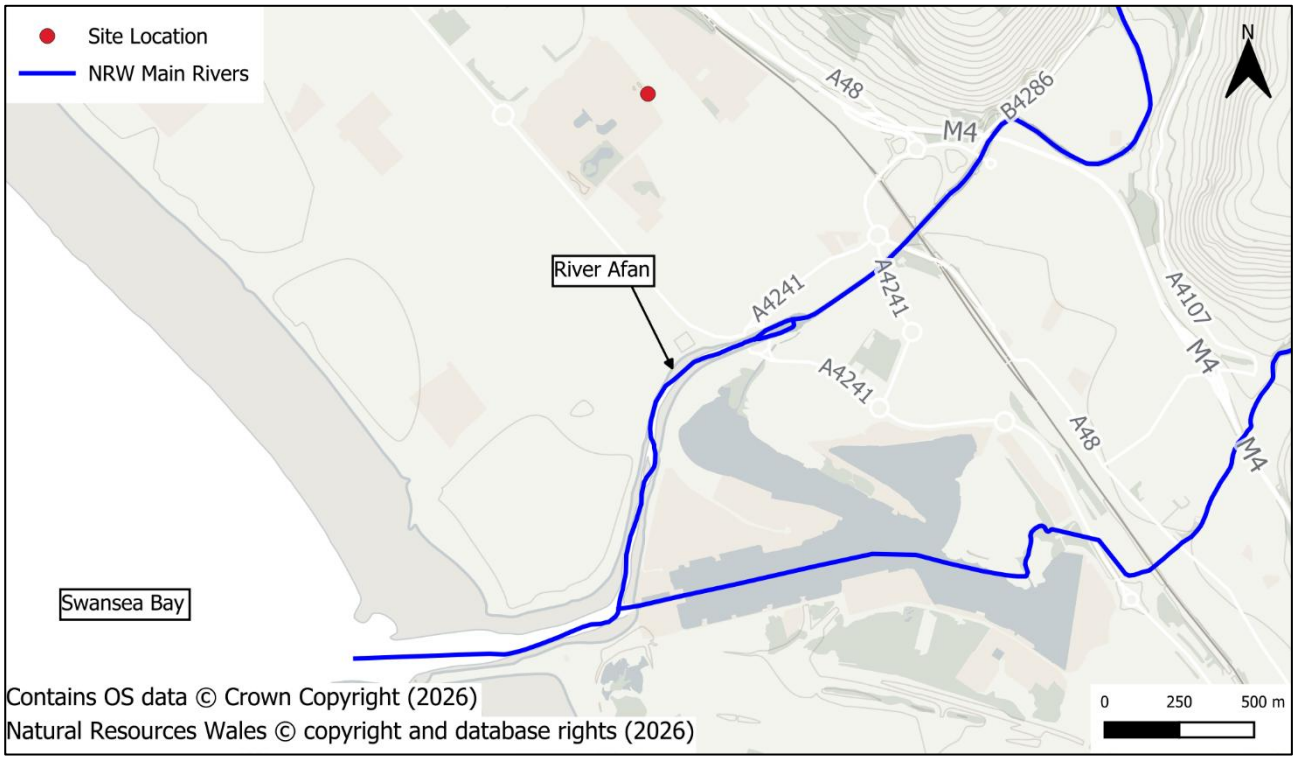


Figure 3: *Local Hydrology*

3 PLANNING POLICY

3.1 National Planning Policy

Future Wales - the National Plan 2040 sets out the national development framework for Wales with a strategy for addressing key national priorities through the planning system, including sustaining and developing a vibrant economy, achieving decarbonisation and climate-resilience, developing strong ecosystems and improving the health and well-being of our communities.

Policy 8 - Flooding states that "flood risk management that enables and supports sustainable strategic growth and regeneration in National and Regional Growth Areas will be supported. The Welsh Government will work with Flood Risk Management Authorities and developers to plan and invest in new and improved infrastructure, promoting nature-based solutions as a priority. Opportunities for multiple social, economic and environmental benefits must be maximised when investing in flood risk management infrastructure. It must be ensured that projects do not have adverse impacts on international and national statutory designated sites for nature conservation and the features for which they have been designated".

Planning Policy Wales (PPW) sets out government's planning policies for Wales and how these are expected to be applied.

TAN15 (2025) provides technical guidance which supplements the policies set out in PPW and Future Wales in relation to flooding and coastal erosion. It provides a framework within which the flood risks arising from rivers, the sea and surface water, and the risk of coastal erosion can be assessed. It also provides advice on the consequences of the risks and adapting to and living with flood risk. It does not take precedence over other Technical Advice Notes and should be considered alongside other planning policies.

The TAN reflects the core principles of the National Strategy for Flood and Coastal Erosion Risk Management in Wales, 9 to adopt a risk-based approach in respect of development in areas at risk of flooding and coastal erosion. Welsh Government policy is that the continual building of flood defences in all areas of need is not sustainable or affordable. However, it is also recognised that there are a large number of significant settlements potentially affected by flood risk where further flood defences will be required. The policies set out in Future Wales provides a context for the prioritisation of flood defence work. The advice in this document seeks to ensure flood risk and coastal erosion are afforded appropriate consideration in the planning system.

When considering the risk associated with flooding and coastal erosion, the term 'risk' encompasses two things: 1 - The likelihood of an event happening, and 2 - The impact that will result if flooding or coastal erosion occurs.

The National Strategy recognises the varying degrees of flood risk, now and in the future. The Flood Risk for Planning Maps categorise land into distinct zones depending on their vulnerability to flooding as described in section 9. The National Strategy is clear that risk needs to be managed appropriately, and the TAN requires a proportionate response depending upon that risk. It is evident that many communities are located in areas at higher risk from flooding, but these communities must be allowed to adapt, change, and regenerate in the knowledge of what the science is showing. Throughout this TAN there are references to new development and redevelopment which is defined below:

New Development: Any development on greenfield land
Redevelopment: Any development on previously developed land as defined in Planning Policy Wales.

The ability to avoid or minimise risk when undertaking development varies according to the type of development proposed.

PPW generally gives preference to the reuse of previously developed land before greenfield land but does recognise that this may not be appropriate in all cases. The TAN does not change this preference.

The approach set out in this TAN is based on:

• A Flood Map for Planning identifying flood zones;
• Defining developments by their vulnerability during flood events;
• Advice on permissible uses in relation to the location of development and the consequences of flooding;
• The preparation of strategic flood consequences and flood consequences assessments at the local level to refine understanding of flood risk;
• Planning authorities incorporating local flood risk considerations into their planning policies and decisions
National policy requires that planning applications for new development proposals should incorporate SuDS to appropriate operational standards and with maintenance arrangements in place unless there is clear evidence that this would be inappropriate.

The risk-based approach recognises that surface water and ordinary watercourse flood risk cannot always be managed and mitigated, particularly as these are increasing sources of risk as a result of climate change. The Flood Map for Planning provides information on these risks to enable planning authorities to develop locally appropriate approaches for areas at risk, or in close proximity to risk. Locally appropriate approaches can be incorporated into the Development Plan through setting local policies, to be used in the decision-making process for planning applications. Development and redevelopment should be avoided where there is a risk of being impacted by coastal erosion over the lifetime of the development. Local planning policies for coastal areas should reflect and complement Planning Policy Wales (PPW), Future Wales - the National Plan 2040, the Welsh National Marine Plan, the National Strategy for Flood and Coastal Erosion Risk Management, Shoreline Management Plans, Area Statements, and other relevant strategies.

Statutory standards for sustainable drainage were published by Welsh Government in October 2018 in relation to the design, construction, operation and maintenance of sustainable drainage systems serving new developments of more than one house or where the construction area is equal to or greater than 100 m2. These standards set out how surface water runoff generated during the 100%, 3.3% and 1% AEP rainfall events and for events exceeding the 1% AEP event should be managed, how peak runoff rates should be restricted and how runoff volumes should be controlled. Approval is subsequently required from the SAB before construction can commence.

Within local authorities, the responsibility for ensuring that Sustainable Drainage Systems (SuDS) are integrated into new developments lies with the SuDS Approving Body (SAB). Approval of SuDS for a new development by the SAB is independent of the planning process. Developments with more than one dwelling or covering an area of 100m² or more require SAB approval before construction can begin. Additionally, arrangements for the adoption and management of SuDS, including a funding mechanism for the maintenance of the infrastructure and all drainage elements, must be agreed upon by the SAB as part of this approval. This ensures that SuDS infrastructure is properly maintained and functions effectively throughout its design life.

3.2 Local Planning Policy

The NPT County Borough Council's Local Development Plan (LDP) for 2011-2026 was adopted in January 2016. This plan serves as the foundation for land use decisions in the area. It outlines the council's land use strategy over a 15-year period, providing a framework to guide future development, specifying where, when, and how much new development can occur. The following policies address flood risk and drainage, and also policies directly related to the application site.

Policy SP1: Climate Change

Climate Change The causes and consequences of climate change will be addressed by implementing the following measures. In relation to the causes of climate change:

1. The efficiency and sustainability of the County Borough's settlements will be enhanced through developing more cohesive and efficient settlements and settlement patterns, and consequently more sustainable travel patterns;
2. Greenhouse gas emissions from transport will be minimised through encouraging freight / commercial transport by alternatives to road (e.g. rail or sea);
3. Dependence on the private car and the need to travel in general will be reduced through promoting alternative means of transport and more efficient use of existing facilities, co-location and joint use of facilities;
4. Provision will be made for the County Borough's appropriate contribution to renewable and low carbon energy generation.

In relation to the consequences of climate change: 1. Likely increased food 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 fooding in the first instance in accordance with the sequential approach set out in national guidance or in locations that could increase the risk of fooding elsewhere;

2. The fragmentation of habitats will be minimised and opportunities made for habitat and species change and migration where possible.

Climate change is likely to affect the environment and future development of Neath Port Talbot in a range of significant ways, some of which are not fully predictable at present. It is also necessary to reduce greenhouse gas production as far as reasonably possible in order to minimise the causes of climate change. These issues are considered to be of fundamental importance to the LDP and have influenced every aspect of the Plan's development. Climate change is consequently seen as an overarching matter to be addressed by all topic areas. The measures outlined in the climate change strategic policy have therefore fundamentally influenced the development of the Plan and will be addressed and implemented through all its policies and proposals. Development allocations have been selected in accordance with sustainable development principles to be in locations that minimise as far as possible dependence on the private care and can benefit from local services and facilities, while encouraging the provision of locally based facilities in order to address the causes of climate change. At the same time, the effects of a changing climate (for example food risk) have been taken into account as far as possible in all the Plan allocations and policies.

Within the LDP, Policy SP7 for Housing Requirement states the need for an additional 8,760 dwellings between 2011-2026. Paragraph 2.5.22 also states that "the housing supply within Neath and Port Talbot will be made up of brownfield redevelopment, greenfield sites and existing commitments, with the regeneration of brownfield land being balanced against the release of greenfield areas", supporting Policy SP16 that requires development to be prioritised on brownfield sites over greenfield sites.

The proposed development therefore meets these criteria by constructing additional residential properties on an unused brownfield site.

It can be concluded that the site and proposals are in alignment with the policies, aims and objectives of the LDP.

The site falls within the Settlement Limit (SC1) for overarching policies.

4 SOURCES OF FLOODING AND PROBABILITY

4.1 Historical Records of Flooding

The Flood Map for Planning – Recorded Flood Extents and associated database indicates that there are no records of flooding at or within the immediate vicinity of the site.

The NRW Recorded Flood Extents (**Figure 4**) indicate that there are no records of historic flooding at or within the immediate vicinity of the site. The nearest recorded flood outline to the site is located approximately 1.3km to the southwest. This event took place in 2008 as a result of tidal flooding.

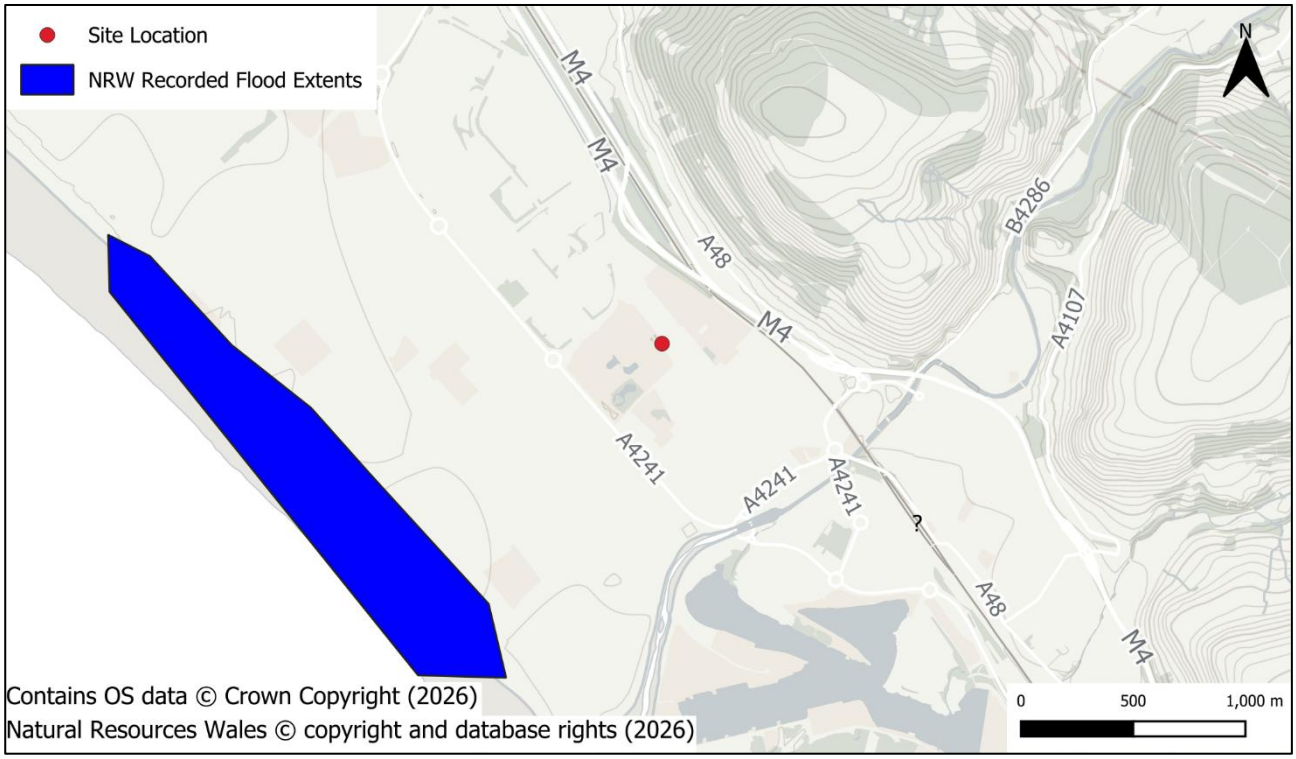


Figure 4: *NRW Recorded Flood Extents*

4.2 Flood Risk Summary

The Flood Map for Planning (FMFP) indicates the site to be located within **Flood Zone 1** (Surface Water and Small Watercourses). Additionally, the site is located within **Flood Zone 3** (Tidal / The Sea and Rivers).

The flood zone definitions are as follows:

Flood Zone 1: Land that has been assessed as having a less than a 0.1% (1 in 1000) chance of flooding in a given year, including the effects of climate change.

Flood Zone 2: Land that has been assessed as having between a 1% and 0.1% chance of river flooding (fluvial) / surface water flooding (pluvial) or between a 0.5% and 0.1% chance of flooding from the sea (tidal) in a given year, including the effects of climate change.

Flood Zone 3: Land that has been assessed as having a greater than 1% chance of river flooding (fluvial) / surface water flooding (pluvial) or a greater than 0.5% chance of flooding from the sea (tidal) in a given year, including the effects of climate change.

4.3 The Sea (Tidal / Coastal) and Rivers (Fluvial)

As seen in **Figure 5**, the site is located within tidal Flood Zone 3; however, the site is also located within a designated NRW TAN15 Defended Zone from sea flooding.

Figure 5: *FMFP Flood Risk from the Sea*

As seen in **Figure 6**, the site is located within fluvial Flood Zone 3; however, the site is also located within a designated NRW TAN15 Defended Zone from river flooding.

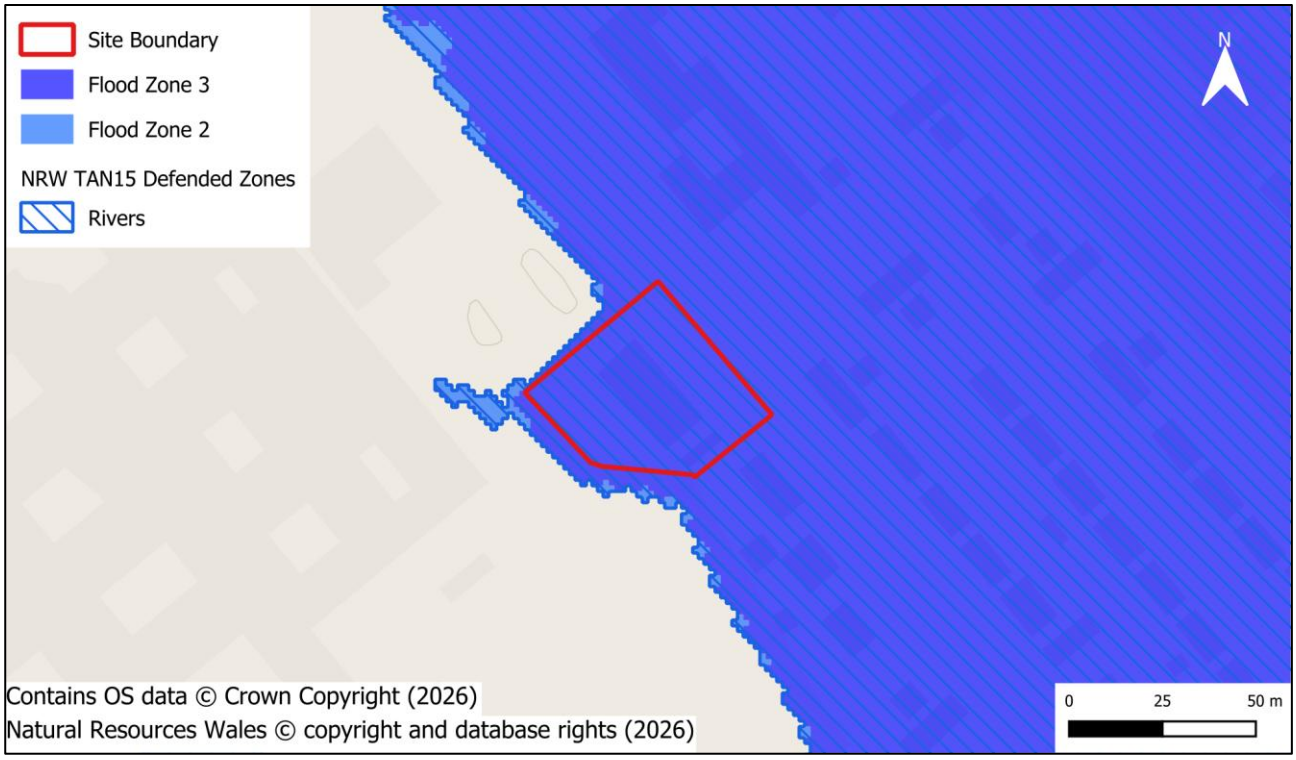


Figure 6: *FMFP Flood Risk from Rivers*

NRW Flood Model Data

To help inform this report, Vale Consultancy has obtained Product 5 and 6 flood model data from NRW. This comprises the ***Port_Talbot_5_V3.1_2021*** and ***Port_Talbot_5_V3.2_2022*** hydraulic models. This model is a 2D TUFLOW model, which allows for a detailed representation of the floodplain, using efficient techniques to modify the baseline ground elevation and model grid to define floodplain features which control flood mechanisms. This model represents the best available detailed hydraulic data for the site and has therefore been used to generate flood extents and peak water levels.

To provide robust information on the nature of flood risk the model was built to enable the simulation of both fluvial and tidal events. The maximum modelled flood extents taken from the Port Talbot Hydraulic Model for both fluvial (Q) and tidal (T) events are shown below in **Figure 7**. It must be noted that the return periods included within this figure are the only return periods in which the site is projected to experience flooding.

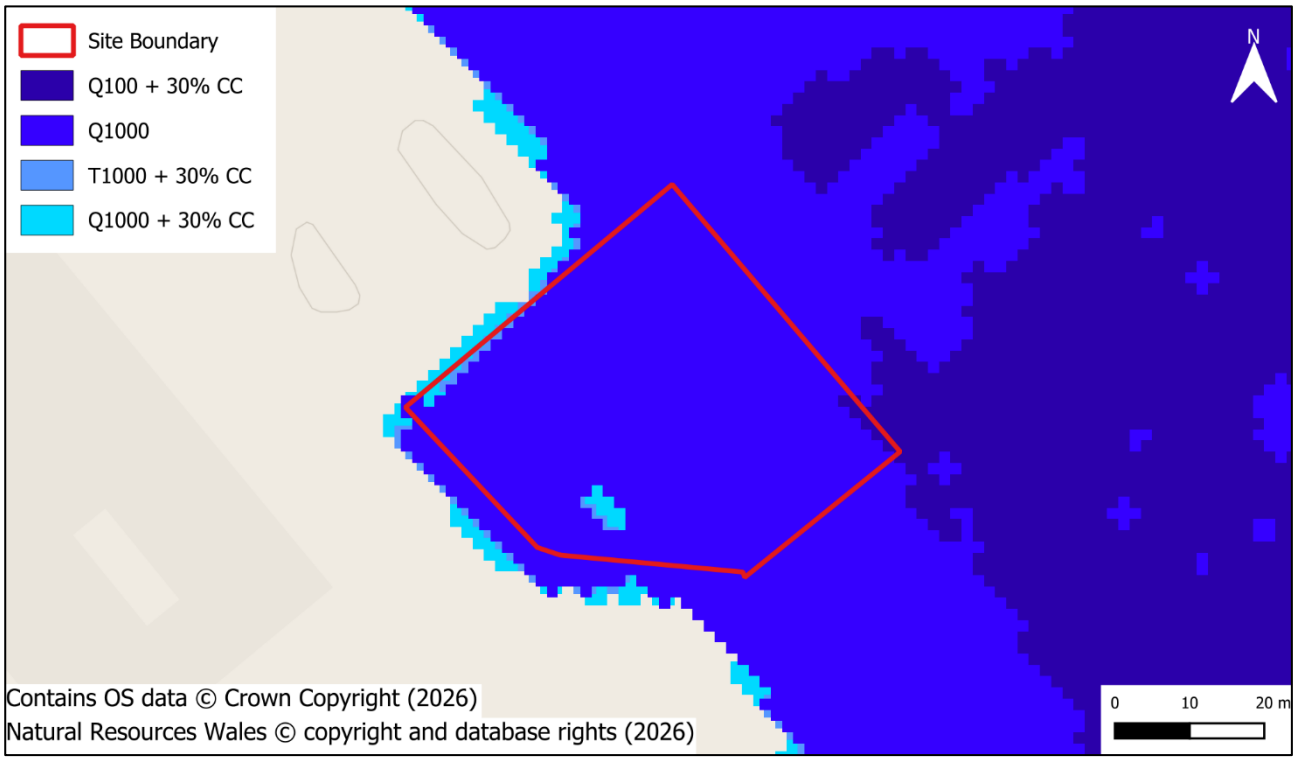


Figure 7: *Modelled Flood Extents*

As seen in **Figure 7**, the site is shown to be flood free in all modelled fluvial return periods up to the 1 in 1000 year event. Moreover, the only return period at which the site is projected to experienced tidal flooding is at the 1 in 1000 + CC event.

Furthermore, as discussed in Section 2.4 of this report, the lowest existing ground level at the site is 5.505mAOD. This level will be compared against the maximum modelled flood level at each return period shown in **Figure 7**. Subsequently, **Table 1** below presents the calculated flood depths at the site.

AEP Modelled Scenario	Max Flood Level (mAOD)	Max Flood Depths (m) under existing conditions	Max Inundation Velocity (m/s)	Speed of Inundation (hours)
Fluvial				
Q100	N/A	N/A	N/A	N/A
Q100 + 30% CC	5.47	0.04*	N/A	N/A
Q1000	6.22	0.71	0 – 0.45 (mean of 0.07)	27 hrs to reach site; 29 to reach max parameters
Q1000 + 30% CC	6.84	1.33	0.007 – 0.586 (mean of 0.12)	16 hrs to reach site; 29 to reach max parameters
Tidal				
T200	N/A	N/A	N/A	N/A
T200 +30% CC	N/A	N/A	N/A	N/A
T1000	N/A	N/A	N/A	N/A
T1000 + 30% CC	6.05	0.54	0 – 0.431 (mean of 0.09)	16.5 hrs to reach site; 17.5 to reach max parameters

Table 1: *Summary of Modelled Results Analysis*

* Green represents the elevation above the maximum modelled flood level.

From a review of **Table 1**, the site is shown to be at risk of fluvial flooding in the present day 1 in 1000 year event up to a depth of 0.71m and during the extreme future 1 in 1000 year + CC event up to a depth of 1.33m. Moreover, the site is shown to be at risk of tidal flooding in the extreme 1 in 1000 year + CC event up to a depth of 0.54m. It must be highlighted that the site is flood free in both design flood events (fluvial 1 in 100 + CC and tidal 1 in 200 + CC).

Flood Defences

The nearest flood defences to the site are located approximately 900m to the southeast. From interrogation of the available flood defence data, this is identified to comprise a flood wall that has a Standard of Protection (SoP) up to a 1 in 100 year flooding event (1% AEP).

Furthermore, as previously mentioned, the site is also indicated to be located within a designated NRW TAN15 Defended Zone from river and sea flooding.

Moreover, when reviewing the available Product 5 flood model reports, the Port Talbot Harbourside PAR Project Report (May 2016) identified a possible overtopping location where there is a low point in the riverbank adjacent to an area known as Burrows Yard; however, since the publication of this report a flood defence scheme was approved in December 2025 (P2025/0560 – see **Appendix D**). This scheme relates to the discharge of Condition 4 (Flood Defence Scheme) associated with planning permission P2025/0633 and confirms that detailed flood mitigation measures for the site have been reviewed and accepted by the Local Planning Authority, in consultation with NRW.

The approved flood defence and drainage strategy is understood to include a combination of finished floor level design, site level adjustments, and surface water management measures to ensure the development is safe for its lifetime and does not increase flood risk elsewhere. In addressing a previously identified topographic low point within the floodplain, the scheme effectively mitigates a localised area of vulnerability highlighted within the 2016 hydraulic modelling.
Whilst the primary purpose of the Burrows Yard flood defence scheme is to make the development site itself compliant with national planning policy, it is reasonable to anticipate that the introduction of mitigation measures at this location may provide some localised betterment to flood routing and storage characteristics.

This could include a reduction in the likelihood of overtopping at this identified low point and more controlled management of surface water within the immediate area.

Given the application site is located approximately 850m from Burrows Yard and within the same wider floodplain system, these improvements are considered to contribute to an incremental strengthening of the local flood defence regime; however, it is acknowledged that the scheme has been designed to serve the Burrows Yard development only and has not been relied upon as a primary mitigation measure for the application site.

Accordingly, the FCA for the proposed development has been undertaken independently of this third-party scheme. Nevertheless, the implementation of mitigation at a previously identified point of weakness provides additional supporting context that flood risk within the wider Port Talbot Harbourside area is being progressively managed and improved.

Flood Alleviation Scheme

NPT Council has approved consultations on a new flood risk management strategy for the area to reduce the risk of flooding to both local communities and businesses. The early-stage plan was approved at a special cabinet meeting held by the authority on December 11, where members were given details of the scheme which aims to protect the county borough from flooding over the next 6 -7 years.

The plans says while it will not be possible to prevent all flooding in the area, as rainfall events become more "unpredictable, intense, and frequent" it will take a more pro-active approach to managing the risks.
This includes a number of steps such as the development of sustainable drainage systems, the maintenance of flood defence and conveyance assets, and the implementation of early warning systems – with a focus also put on developing community resilience.

It will also see the council continuing to provide a 15% contribution to construction costs for flood alleviation schemes and small-scale works, as well as a 25% contribution for the construction of any coastal projects.

A section of the plan read: "This Local Flood Risk Management Strategy and Plan set out how we intend to deal with flood risk from surface water, ordinary watercourses, and groundwater within the Neath Port Talbot County Borough Council.

"It describes how we, as the Lead Local Flood Authority (LLFA) will mitigate the risk of flooding to local communities and businesses across the county, with the aim to improve resilience to our communities, infrastructure, and the wider environment."

Shoreline Management Plan (SMP)

The site falls within SMP 20 – Lavernock Point to St Ann's Head.

The intent is to maintain and upgrade existing defences as necessary to protect the large number of socio-economic assets at risk and to prevent release of potentially contaminated fill into coastal zone.

Although the site is previously developed; there are no issues relating to previous uses and / or the potential for contaminated ground. Furthermore, the proposed development, although HVD, does not pose any pollution / contamination risks in the event of any potential inundation of the site.

Overtopping Assessment

Correspondence with NRW (**Appendix F**) highlighted that analysis of failure of flood defences should be considered as part of this assessment. In previous iterations of the FCA the undefended scenarios were utilised to present a more conservative approach; however, NRW consider this to not be representative of real-world scenarios as flood defences are in place and their failure may cause a different mechanism of flooding.

Subsequently, an assessment of potential overtopping of existing flood defences was undertaken accordance with NRW guidance (GN043 Flood Risk Management: Modelling Blockage and Breach Scenarios) and TAN15 requirements. This is required to determine whether flood defence performance could influence flood risk to the application site under extreme design event conditions, including climate change allowances.

The assessment considered the potential for overtopping of the nearest flood defences to the site (**Figure 8**) under the fluvial 1 in 1000 year (0.1% AEP) event plus an allowance for climate change. It must be noted that focus was placed on this modelled flood event as Table 1 confirmed the greatest flood levels to occur during this event. Therefore, for the purposes of this report the worst-case scenario was assessed.

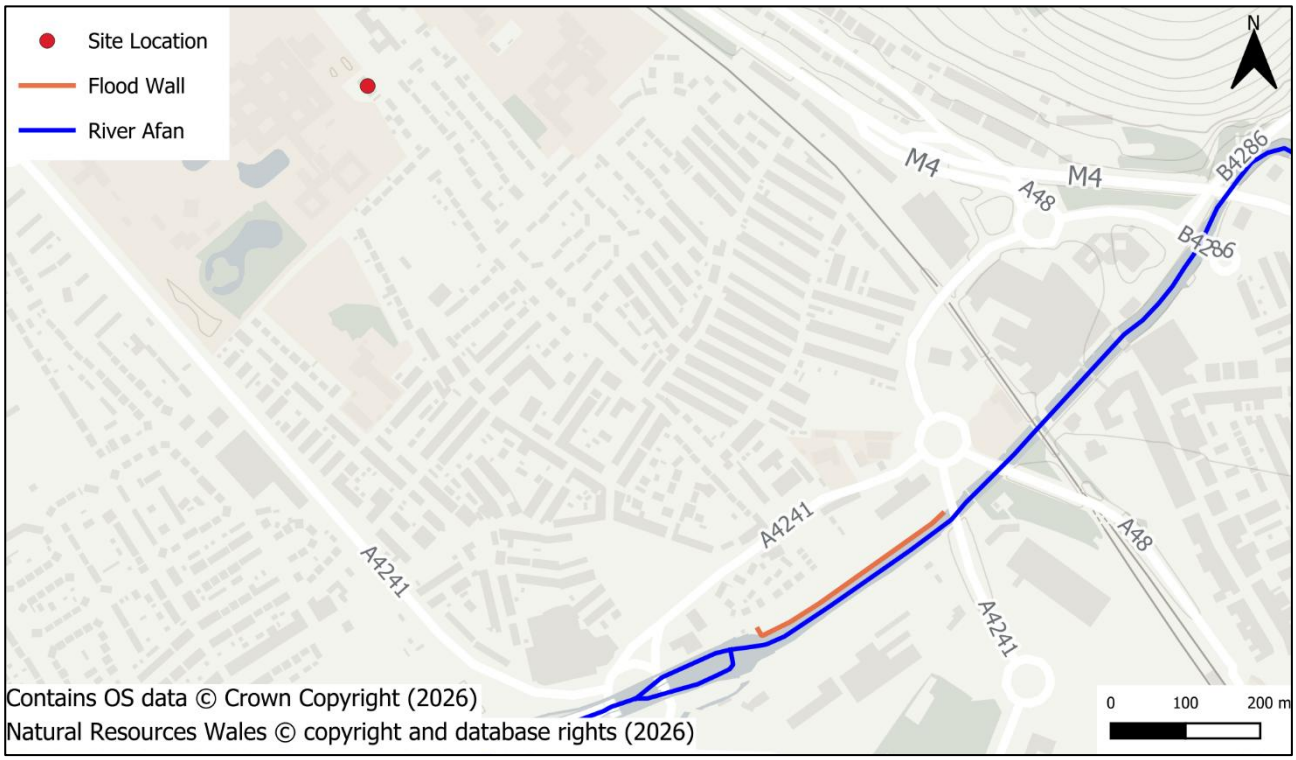


Figure 8: *Location of the assessed Flood Wall in relation to the site*

Methodology

A QGIS-based assessment was undertaken using a comparison between modelled flood water levels and defence crest elevations.

The following datasets and steps were used:

- A high-resolution Digital Surface Model (DSM) (16-bit NRW LiDAR, mAOD) was used to represent defence crest levels.
- A 2D hydraulic model output (ASCII raster) representing peak water levels for the fluvial 1 in 1000 year event plus an allowance for climate change was imported into QGIS.
- A defence line was digitised along the relevant flood defence wall.
- Points were generated at regular intervals (10m spacing) along the defence line.

- Crest elevations were extracted at each point using the DSM.
- Modelled flood water levels were extracted at identical point locations using the ASCII flood level raster.
- Freeboard was calculated as:

Freeboard = Defence Crest Level – Modelled Flood Level

- Overtopping locations were identified where modelled flood levels exceeded defence crest levels (freeboard ≤ 0m).

Results

The assessment identified that overtopping is predicted at five discrete locations out of thirty-one along the defence section under the extreme fluvial 1 in 1000 year event plus an allowance for climate change scenario (see **Figure 9**).

Figure 9: *Overtopping Assessment Results*

The magnitude of overtopping varies spatially, with calculated freeboard values ranging from approximately -0.02m to -1.02m, indicating both marginal and more significant exceedance of the defence crest at different points.

The overtopping locations are spatially clustered, with the majority of exceedance occurring within a localised section of the downstream portion of the defence alignment. Two additional isolated overtopping points were identified further along the structure.

The application site is located approximately 900m inland of the identified overtopping cluster. No direct hydraulic connectivity has been identified between the overtopping locations and the site based on model outputs and topographic analysis.

The site is shown to lie within the modelled flood extent for the extreme fluvial 1 in 1000 year event plus an allowance for climate change; however, inundation at the site is attributed to general floodplain water levels rather than propagation of overtopped flows from the identified downstream defence section.

In conclusion, this assessment confirms that overtopping of the existing flood defence occurs at discrete downstream locations under the extreme fluvial 1 in 1000 year event plus climate change, with exceedance of up to approximately 1.02m above defence crest level.

However, these overtopping locations are spatially separate from the application site and do not form a direct hydraulic pathway to the development. Flood risk at the site is therefore governed by general floodplain inundation under extreme fluvial conditions rather than direct overtopping failure at the nearby defence.

Accordingly, while residual overtopping risk exists within the wider system, it does not materially increase flood risk to the application site through a direct defence failure mechanism.

Overall, based on the analysis conducted within this section, the site is considered to be at a **Moderate to High** risk of flooding from fluvial and tidal sources. Further considerations are made within Section 5 to help mitigate against this identified risk in the long-term.

4.4 Surface Water & Small Watercourses (Pluvial)

Surface water (or pluvial) flooding occurs when rainwater does not drain away through the normal drainage system or soak into the ground. It is usually associated with high intensity rainfall events but can also occur with lower intensity rainfall or melting snow where the ground is saturated, frozen or developed, resulting in overland flow and ponding in depressions in topography. Surface water flooding can occur anywhere without warning. However, flow paths can be determined by consideration of contours and relative levels.

The site is located within Flood Zone 1. Moreover, the NRW Risk of Flooding from Surface Water and Small Watercourses mapping (**Figure 10**) indicates that the site is not shown to be at risk in all probability events. The nearest area of high risk is located approximately 252m to the northwest of the site.

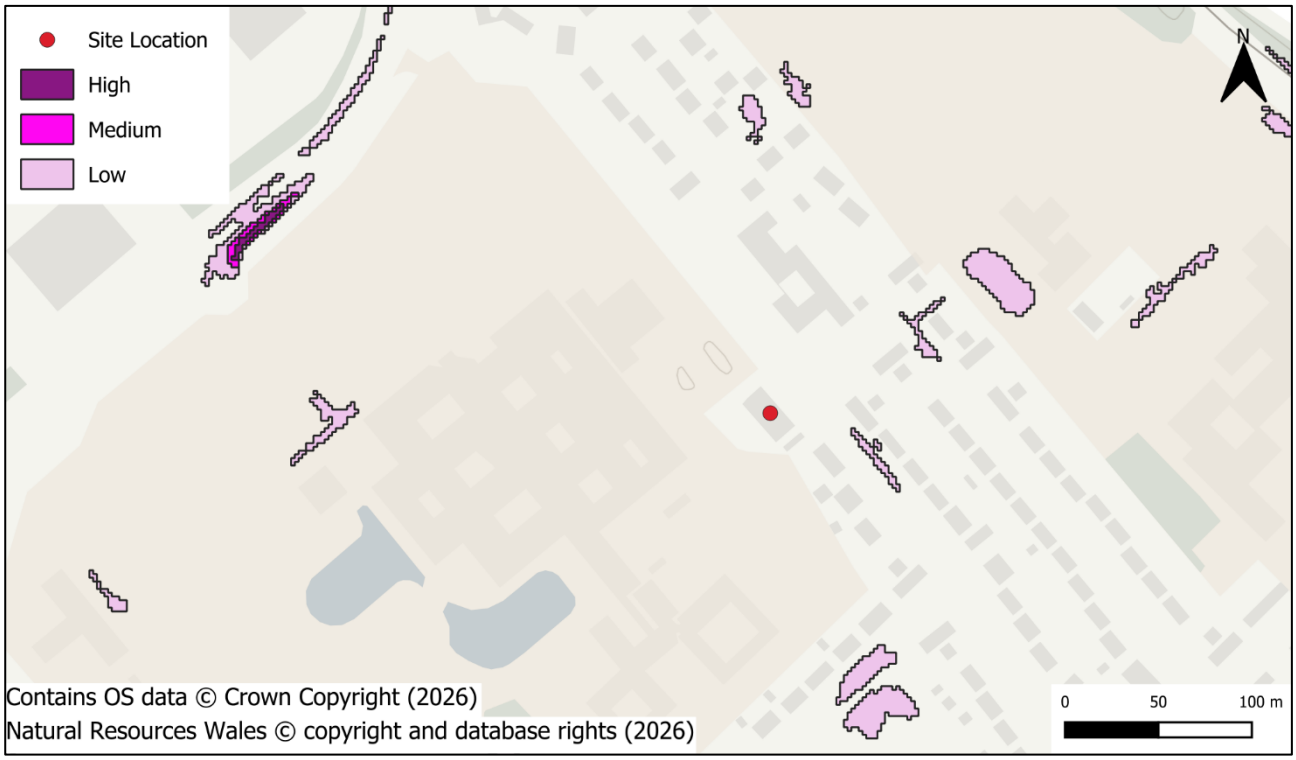


Figure 10: *NRW Flood Risk from Surface Water and Small Watercourses*

The probability definitions can be seen below for reference:

- **High probability** – each year, this area has a chance of flooding of greater than 1 in 30 (3.3%);
- **Medium probability** – each year, this area has a chance of flooding of between 1 in 100 (1%) and 1 in 30 (3.3%); and,
- **Low probability** – each year, the area has a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%).

Overall, based on the available surface water mapping assessed within this report, the site is considered to be at a ***Low*** risk of flooding from pluvial sources. Further considerations are made within Section 5 in relation to keeping this risk to a low designation in the long-term.

4.5 Groundwater Flooding

Groundwater flooding occurs when water levels underneath the ground rise above normal levels. Prolonged heavy rainfall soaks into the ground and can cause the ground to become saturated. This results in rising groundwater levels which leads to flooding above ground.

Groundwater as a sole flooding mechanism is often regarded as low risk as it often relies on a coinciding rainfall, or flood event from an additional source to become a flood risk. The main contributory factor that will enhance the risk of groundwater flooding, is prolonged periods of high rainfall, which results in the groundwater saturation levels rising to the point where it reaches the surface.

Upon review of the relevant documents outlined in Section 1.3 of this report, it was indicated that there have been no reportable instances of historic groundwater flooding at or within the vicinity of the site. Furthermore, no further information regarding the susceptibility of groundwater flooding at the site was provided within any of the listed documents.

Overall, the site is considered to be at a **Low** risk of groundwater flooding. No further consideration is deemed necessary as part of this report.

4.6 Artificial Sources

Flood risk from artificial sources would include the failure of man-made drainage or water supply network. Although the likelihood of such an occurrence is highly unpredictable, it is recommended that any proposed designs for the site take into account the location of any existing below ground services, in order to avoid any inadvertent flooding taking place during the construction phase and in the future.

Neath Port Talbot County Borough Council Flood Risk Management Strategy states that there has been a total of 430 sewer flooding events recorded by the water companies within Neath Port Talbot, of which 355 properties were identified as being at 'high-risk', with 34 suffering from internal flooding. One notable event occurred at Victoria Road approximately 1km from the site. However, due to the topography and distance between Victoria Road and the site, it is unlikely sewer flooding could or would travel to the site, from here.

Overall, the site is considered to be at a **Low** risk of flooding from artificial sources. Further considerations are made within Section 5 in relation to keeping this risk to a low designation in the long-term.

4.7 Reservoir Failure

Assessment of risk of a reservoir failure may be interpreted as the extent of flooding that would occur, should any reservoir that has a capacity larger than 25,000m³, suffer a catastrophic failure. Mapping of this nature is described by Natural Resources Wales as a very worst-case scenario, with a flood event of this type being extremely unlikely to occur.

The NRW Risk of Flooding from Reservoirs map (**Figure 11**) shows that the site is not at risk of flooding from reservoirs. The risk of flooding from reservoirs is extremely unlikely to happen. For instance, all large reservoirs must be inspected and supervised by a reservoir panel engineer, as the enforcement agency the NRW ensure that reservoirs are inspected regularly, and essential safety / maintenance work is carried out.

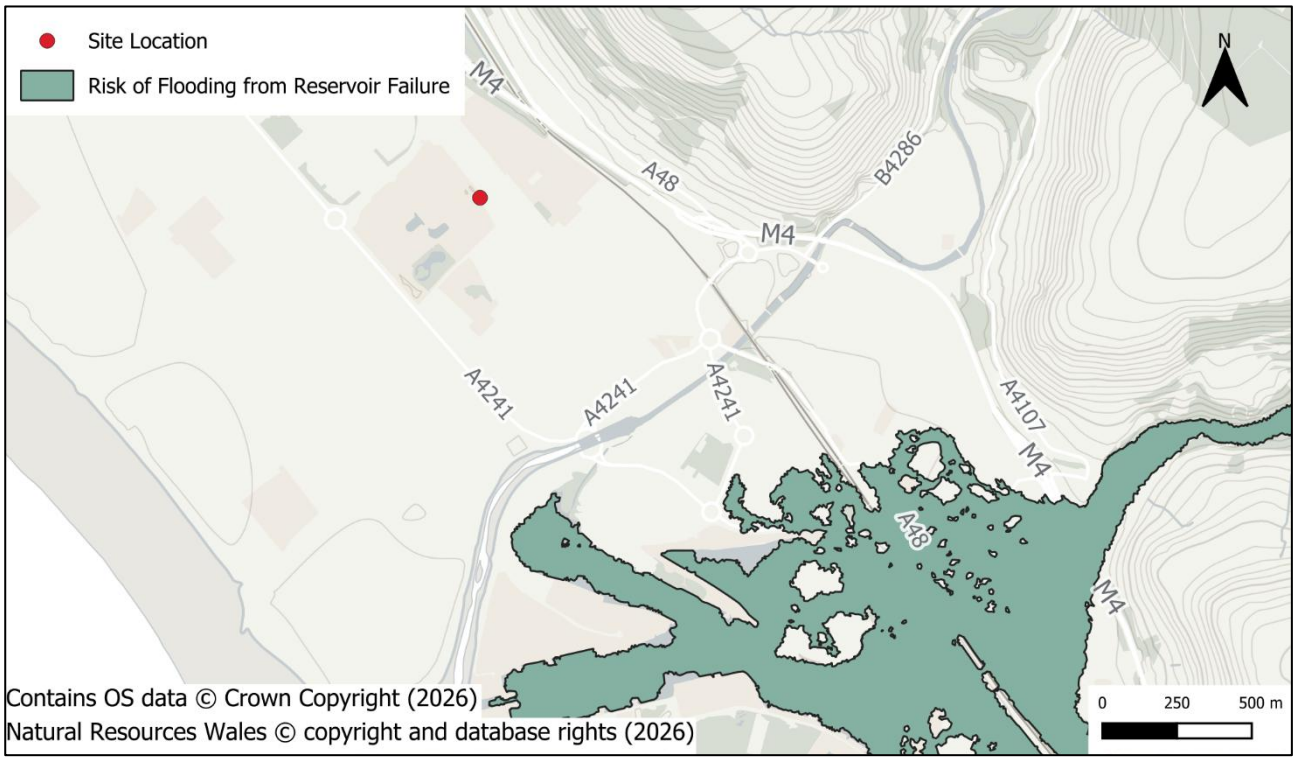


Figure 11: *NRW Risk of Flooding from Reservoir Failure*

Current legislation states that all reservoirs are inspected regularly and the likelihood of failure occurring is considered to be low. Therefore, the site is at a **Negligible** risk of flooding from reservoir failure. No further consideration is deemed necessary as part of this report.

5 FLOOD RISK MITIGATION

This report has so far evaluated all potential flood risk sources that may affect the site. The following sections describe the identified flood risks in the context of the proposed development and provide recommendations, where required, for the mitigation or reduction of those risks to enable safe development and comply with local and national guidance.

5.1 Design Flood Event

Planning Policy Wales and TAN15 guidance identifies that new developments should be designed to provide adequate flood risk management, mitigation, and resilience against the 'design flood' for their lifetime. The source of the risk at the development is tidal and fluvial and therefore, based on government guidance, development should be designed to be flood free during the 0.5% AEP (tidal) and 1% AEP (fluvial) and therefore, based on government guidance, the development should be designed to be flood free during both events.

The site is protected by flood defences up to and including the 1% flood event and therefore follows the guidance. Figure 6 of TAN 15 states that within the extreme 0.1% CC flood event, development would be expected to flood up to tolerable limits (600mm). Moreover, the site isn't shown to be at risk of tidal flooding in the design event (0.5% AEP) nor fluvial flooding in the design event (1% AEP).

Welsh Government guidance (2026) for assessing climate change indicates that developments should be assessed against the 70th percentile to inform design levels of the lifetime of the development (+100 years for residential). The guidance also states that an assessment should also be made against the 95th percentile to inform mitigation measures, access and egress routes and emergency evacuation plans.

5.2 Acceptability of Flood Consequences

The previous iteration of this FCA considered floodplain displacement on the basis of the increase in proposed building footprint, adopting a conservative approach consistent with earlier concept-stage design. That assessment identified potential localised displacement of floodwaters under extreme events, based on a simplified footprint–depth methodology.

The site lies entirely within the modelled 1 in 1000 year + 30% climate change fluvial flood extent, with a representative flood level of 6.84mAOD. This represents the worst-case fluvial flood scenario considered within this assessment. The site is not at risk in the design flood events; however, it is fully hydraulically active under this extreme event scenario.

The proposed development has since been refined to incorporate a site-wide cut and fill strategy (see **Appendix E**) to achieve ground levels of approximately 6.24mAOD, with finished floor levels set 150mm above this, providing resilience within the extreme flood event in accordance with TAN15.

The earthworks balance indicates a total cut volume of 93.59m³ and a total fill volume of 341.86m³, resulting in a net reduction in floodplain storage of 248.27m³ within the active flood extent.

When considered in the context of the site area, this equates to an average notional change in flood storage depth of approximately 0.13m across the development footprint, derived by dividing the net loss of floodplain storage (248.27m³) by the site area (1,935.8m²). This is small relative to the typical flood depth across the site during the extreme event (circa 0.6m) and represents a minor perturbation within the overall floodplain system.

Given the scale of the development relative to the wider hydraulic model domain, and the limited magnitude of net volumetric change, the development is not considered to result in a material alteration to

flood levels or conveyance routes. The proposal is therefore considered compliant with TAN15 in terms of managing flood risk and avoiding unacceptable impacts elsewhere.

5.3 Design Principles for Development

It is recommended that, based on the current design proposals, the following design principles should be incorporated to demonstrate its long-term resilience to flood risk in the future.

This FCA has been informed by a site-specific topographical survey, which has informed the level discussed in **Table 2**.

Design Flood Level	The design flood level is the 1% AEP for a 100-year Lifetime.
Finish Floor Level (FFL)	The proposed FFL is 6.39mAOD, which: A) Provides an additional freeboard of 0.93m above the fluvial design flood level and a freeboard of 0.34m above the extreme tidal 0.1% AEP. B) Reduces the maximum flood depth at the fluvial 0.1% AEP event to 0.45m (within the tolerable limits set out in TAN15).
External Levels	External levels should be profiled away from the proposed building footprint and towards the nearest drainage point.

Table 2 – *Design Flood Level and FFL(s)*

Furthermore, below are a series of recommendations which should be considered to demonstrate the long-term resilience of the site and ensure recoverability in the event of flooding. Property Flood Resilience (PFR) measures are recommended along all external elevations (up to 0.6m) and internally of the building footprint.

This includes measures such as:

- **Floor Finish:** The floor finish on the ground floor should be kept as flood resilient as possible (resin/ceramic/concrete tiles as opposed to lino/vinyl/carpet) so the floor can be easily cleaned down following any future flooding.
- **Critical Infrastructure/Electrical Sockets:** Raise all electronic control units and sockets (0.6m) above external ground levels to mitigate against any future flooding.
- **Drainage Systems:** Routinely maintained, inspected and cleared (ensuring it is performing to optimal capacity).
- **Duct Sealing:** Seal all cables and pipes entries up to 0.6m with duct sealing.
- **Non-Return Valves (NRV):** NRVs could be installed to all drainage outlets to mitigate against future risk of the local drainage network surcharging.
- **Airbricks:** Utilise self-closing airbricks where possible

These mitigation measures should be applied as far as is practically possible.

Additionally, external alterations such as commercial flood guards (barriers) are available and could be fitted to the doorways. They can be applied and removed as and when by site owners / occupants and can provide a protection and freeboard to inundation waters of up to 0.6m and will help prevent the ingress of waters to units thus minimising and avoiding internal damage. Other products which would protect the dwellings from inundation and could be considered; include flood fences and flood doors.

Flood Awareness

The site is located within two Flood Alert Areas (Swansea Bay and the Gower coast – ref: 102WABT04 and Rivers Afan and Kenfig – ref: 102WAFF19) (**Figure 12**) and a Flood Warning Area (River Afan at Port Talbot – ref: 102FWF109B). The site owner and occupants should register[1] to receive both.

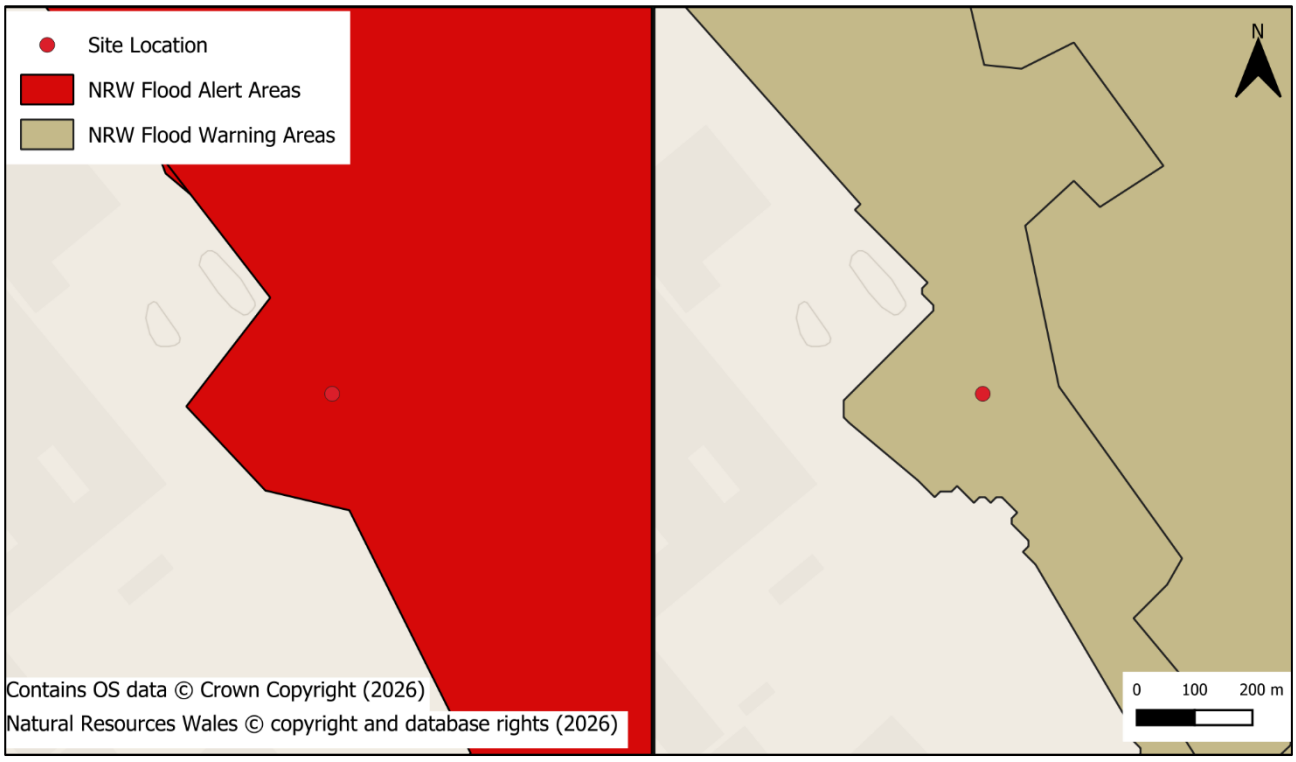


Figure 12: *NRW Flood Alert and Warning Areas*

Flood Warnings Direct is a free service that provides prior warnings of a fluvial / tidal flood event. Areas at risk of flooding from rivers (fluvial) and the sea (tidal) are warned, which relies on direct measurements of rainfall, river levels, tide levels, in-house predictive models, rainfall data and information from the Met Office. This service operates 24 hours / day 365 days a year. If flooding is forecast, warnings are issued using a set of easily recognisable codes.

Appropriate documentation should be displayed to inform any users of the site of the potential flood risk. Documentation will be displayed at an appropriate position. The documentation will indicate the risk of flooding and contain information on how prior warnings will be sent. Further information on the documentation will comprise of the Floodline Warnings Direct telephone number, emergency services numbers and exit plans and egress directions, as identified in the evacuation procedure for the site.

The site owner should undertake a Flood Evacuation Management Plan (FEMP) for implementation during an extreme event. This should be done in conjunction with the appropriate professional bodies including and in particular Neath Port Talbot Emergency Planning Department. The FEMP should be a written document which should outline the course of action to all occupants during a flood.

The evacuation procedure should address (but not be limited to) the following topics:

- A list of important contacts, building services, suppliers and evacuation contacts for officers and users;

[1] Natural Resources Wales / Sign up to receive flood warnings

- A description or plan showing locations of key property, protective materials and service shut-off points;
- Basic strategies for protecting property and assisting recovery;
- Checklist of procedures that can be quickly accessed by users during a flood;
- Safe exit-plan (building and site);
- Safe exit route to higher ground outside the flood risk area (building and site), kept and displayed on site.

5.4 SAB

The site and proposed development will be subject to a successful SAB Application to ensure that surface water is managed effectively, efficiently and at its source in line with guidelines and regulations as per Welsh Government Standards for SUDS. The proposed surface water drainage strategy will be in line and accordance with national, regional and local standards, policy, guidance and legislation.

5.5 Access and Egress

Safe access / egress is provided by heading initially north along Rhodes Avenue and the southwest along Ffordd Baglan towards Victoria Park which provides and area of safe refuge which is outside the extreme flood extents for all sources considered; is away from the potential sources of flooding and toward higher ground. An alternative refuge can be found by heading towards the Neath Port Talbot Hospital grounds, located immediately to the west of the site. This area is at a significantly higher elevation than the surrounding land, providing safe refuge for occupants during a flood, as well as a large, designated space for residents in the Rhodes Avenue area. Evacuation should only be undertaken if safe to do so and sufficient time is allowed between the receipt of Flood Alerts / Warnings and inundation of the site, for evacuation / safe refuge to be sought. Refer to **Figure 13**, below.

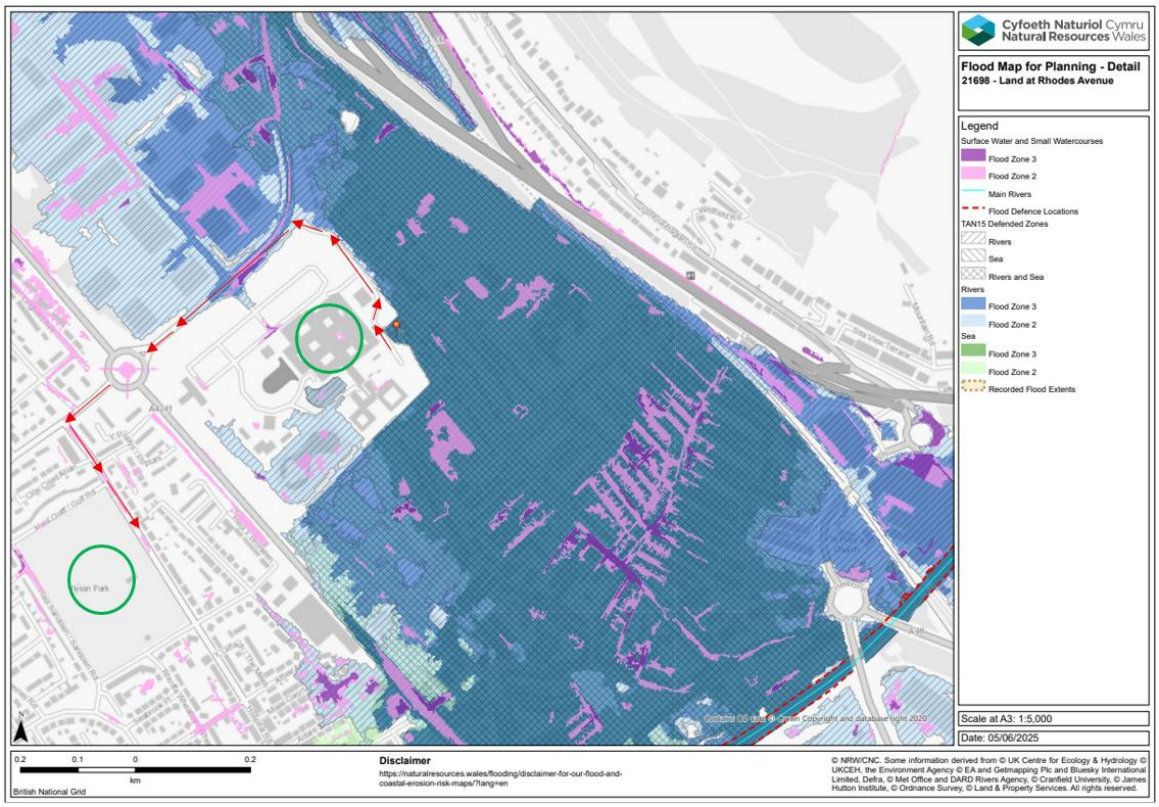


Figure 13: *Proposed and Potential Flood Evacuation Route Plan (Depicted by Red Arrows)*

5.6 Safe Refuge and Flood Procedure

In the unlikely event that the site floods the competent warning authority is NRW and a lead time of several hours in advance of flooding is typically provided, excluding potential breaches of defences. When a flood is expected NPT council and the local emergency services will be responsible for public care and safety.

In the event of the site flooding before site users have an opportunity to evacuate via the route specified - the occupants should seek refuge on the upper floors as and where possible until flood waters have receded and it is safe to evacuate the site.

The adjacent Hospital could provide safe refuge to evacuees during the event of the local community flooding.

6 CONCLUSION

Vale Consultancy has been instructed by *CJ Construction to* prepare a Flood Consequences Assessment (FCA) report to accompany a planning application for the proposed redevelopment of Land at Rhodes Avenue, Aberavon, Neath Port Talbot ("The Site ") for residential use.

The application site currently comprises of a single storey detached former changing rooms building, with hard standing to the front and vegetation to the rear. Provision of site access / egress is from Rhodes Avenue. In its existing state – the site is disused and dilapidated and in need of re-development. The site is in are area surrounded by HVD (i.e. residential, emergency services and a school).

The Site currently comprises a disused single-storey building and associated hardstanding and lies within an area of existing urban development. The site is not shown to be at risk from tidal or fluvial flooding in the design flood events; however, it is fully encompassed by the modelled 1 in 1000 year + 30% climate change fluvial flood extent and therefore experiences hydraulic interaction under this extreme scenario.

The development has been designed in accordance with TAN15 principles, with finished floor levels set at 6.39mAOD, to ensure compliance with TAN15 and that the proposed development remains resilient to flood risk over its lifetime.

To achieve this, a site-wide cut and fill strategy has been incorporated. The earthworks balance results in a net fill of 248.27m³ within the flood extent; however, when assessed in the context of the site area, this equates to an average notional change in flood storage depth of approximately 0.13m, which is small relative to the overall flood depth during the extreme event.

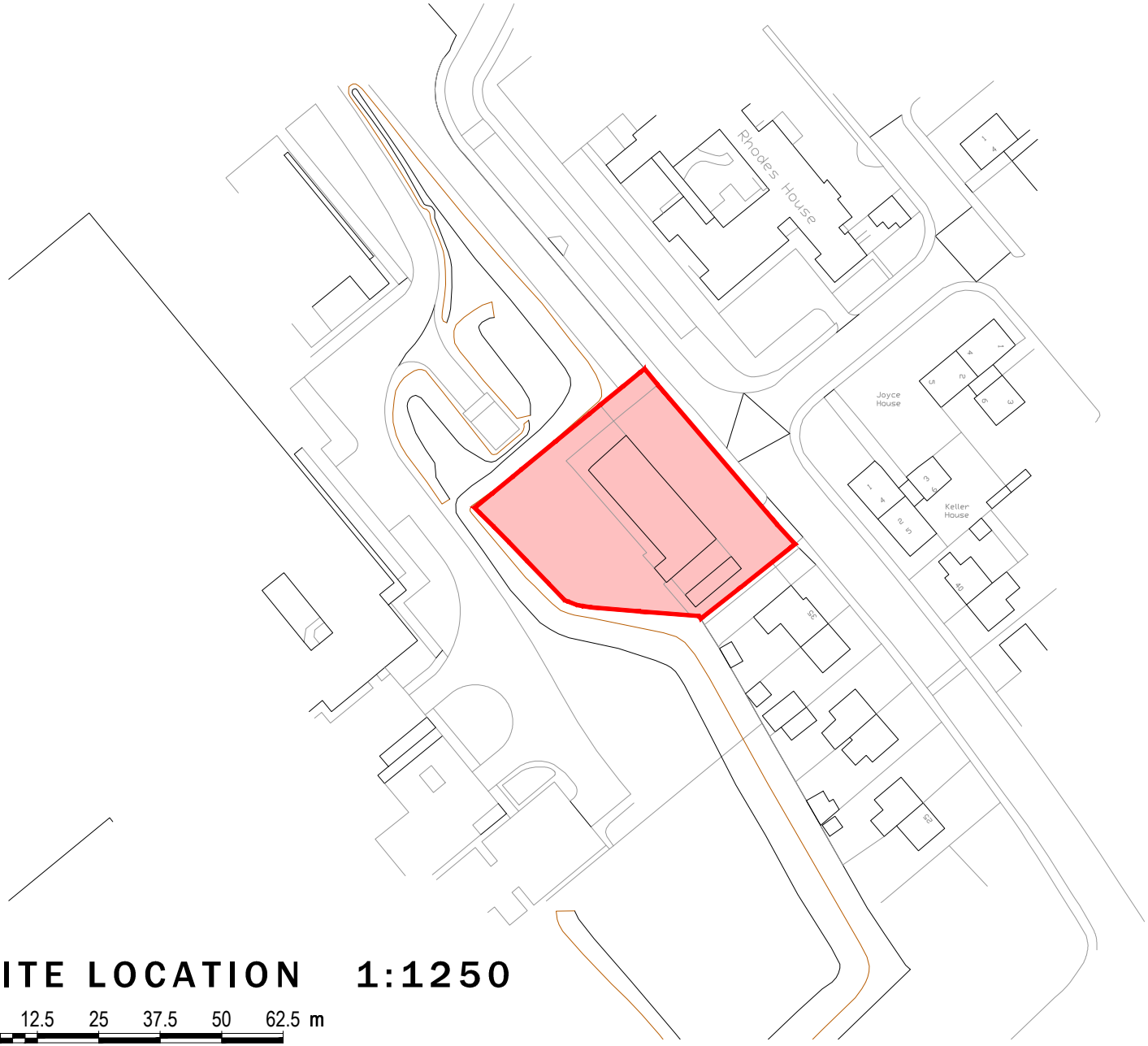
Given the scale of the development and the limited magnitude of net volumetric change the proposal is not considered to result in a material increase in flood risk elsewhere and therefore considered compliant with TAN15 in terms of flood risk management and residual flood consequences.

Appropriate PFR measures and detailed design mitigation, as set out in Section 5.3, will further ensure that residual risks remain manageable over the lifetime of the development.

Overall, the FCA demonstrates that the proposed development can be safely accommodated within the site without increasing flood risk elsewhere and with residual risks remaining acceptable in accordance with national and local planning policy requirements.

APPENDIX A:

Site Location



SITE LOCATION 1:1250

0 12.5 25 37.5 50 62.5 m

SCALE 1:1250

NORTH

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Revisions

Revision	Checked
	KML

Scale	Date
1:1250 @ A4	Feb 25

Drawing No	Drawing Title
LTS409.00.01	Site Location Plan

Client	Job Title
C J Construction	Rhodes Avenue, Port Talbot

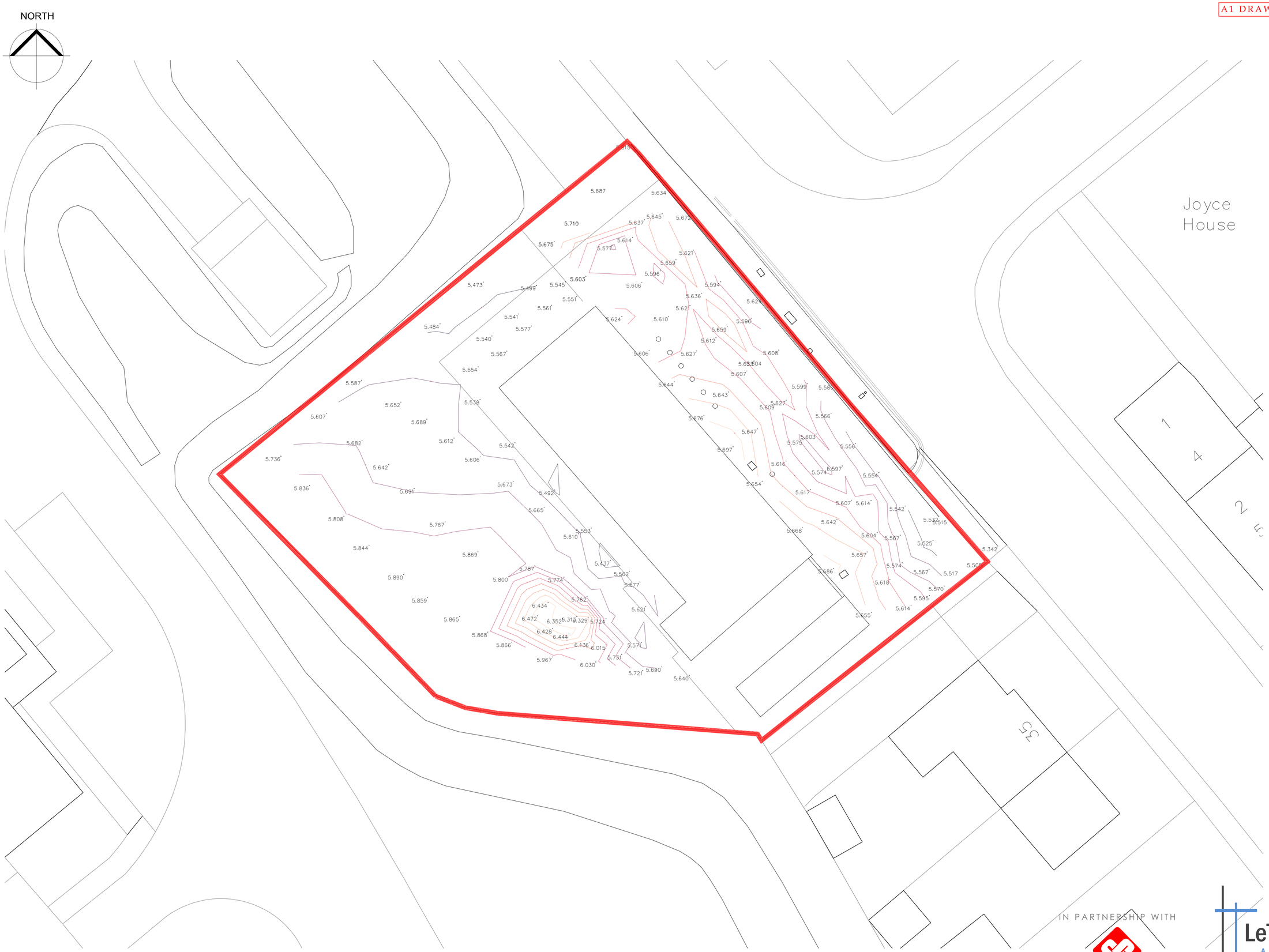
Drawing Purpose
PLANNING

LeTruccodesign
ARCHITECTURE
Suite 7, 35 Stow Park Circle
Newport, NP20 4HF
Tel: 07710390800 / 07710390801
info@letruccodesign.co.uk www.letruccodesign.co.uk

APPENDIX B:

Existing & Proposed Plans

A1 DRAWING SHEET



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Revisions

Revision	Scale
	1:150@A1
Checked	**Date**
KML	May 25

Drawing Purpose
PLANNING

Client	C J Construction
Drawing No	LT2504.00.02
Job Title	Rhodes Avenue, Port Talbot
Drawing Title	Existing Site Layout

IN PARTNERSHIP WITH

CJ Construction

LeTruccodesign
ARCHITECTURE
Suite 7, 35 Stow Park Circle
Newport, NP20 4HF
Tel: 07710390800 / 07710390801
info@letruccodesign.co.uk
www.letruccodesign.co.uk

EXISTING SITE LAYOUT [TOPO]

0 2 4 6 8 10 m
SCALE 1:150

A1 DRAWING SHEET

PROPOSED SITE LAYOUT

KEY SCHEDULE

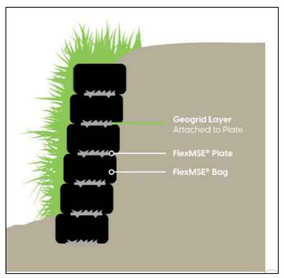
REFER TO BOUNDARY TREATMENTS & BOUNDARY IDENTIFICATION DRAWINGS FOR FURTHER DETAIL.

- SITE APPLICATION BOUNDARY
- DENOTES 1800MM HIGH TREATED CLOSE BOARDED FENCE.
- DENOTES 900MM HIGH GALVANIZED FLAT TOP RAILINGS.
- DENOTES FACING BRICK RETAINING/BOUNDARY WALL WITH 1.8M HIGH CLOSE BOARDED FENCE ON TOP- REFER TO ENGINEERS DRAWINGS FOR R.WALL DETAILS
- DENOTES TOBERMORE PERMEABLE PAVING SYSTEM PARKING BAYS WITH 50MM X 100MM PC CONCRETE PATH EDGING TO DELINEATE BAYS.
- DENOTES AREAS OF 450 X 450MM P.C CONC. PAVING SLABS TO FORM PATIO AREAS AND 1000/1200MM MIN FOOTPATHS TO TO CURTILAGE OF HOUSES AND FLATS
- DENOTES AREAS OF LANDSCAPE WITHIN CURTILAGE OF DWELLINGS AND ADJOINING AREAS, INCORPORATING SHRUBS/NATIVE SHRUB SPECIES AS PER SEPARATE LANDSCAPING DRAWINGS BY OTHERS - REFER TO SCHEME SPEC FOR FURTHER DETAILS & WORKMANSHIP
- DENOTES AREAS OF TURFED GRASS TO REAR GARDENS
- DENOTES GEOBAG / FLEXMSE HYDRO SEED ETAINING WALL
- DENOTES 1.8M HIGH - 900MM WIDE TIMBER CLOSE BOARDED GATE WITH A SECURITY LOCK - NOTE GATE TO BE SIMILAR HEIGHT TO ADJACENT WALL/GATE IF APPLICABLE.
- DENOTES NEW TREE PLANTING (REFER TO LANDSCAPE ARCHITECTS DRAWINGS FOR TYPES AND SCHEDULES)
- DENOTES 2.9M DIAMETER ROTARY DRYER SET IN CONCRETE. - PROVIDING 4M MIN. OF LINE FOR 2 BED DWELLINGS, 6M MIN. FOR 3 BED DWELLINGS.
- DENOTES PAVED CONCRETE HARDSTANDING FOR INDIVIDUAL BIN STORAGE, HOSTING REFUSE BINS TO SUIT LA REQUIREMENTS
- SB — DENOTES POSITION OF IBSTOCK OR SIMILAR SWIFT BOX IN SMOOTH RED - TO BE INSTALLED AT MIN. 5M FROM EXTERNAL GROUND LEVEL - TO BE APPROVED BY CC&C TO SATISFY CONDITION 8 OF PLANNING APPROVAL.
- BB — DENOTES POSITION OF IBSTOCK BAT BRICK (TYPE A) OR SIMILAR - REFER TO INDIVIDUAL ELEVATIONS FOR EXACT LOCATION - TO BE APPROVED BY CC&C TO SATISFY CONDITION 9 OF PLANNING APPROVAL.
- EV — DENOTES POSITION OF ELECTRIC METER CHARGING POINT

PROPOSED STREET ELEVATION

0 2 4 6 8 10 m

SCALE 1:150



GEOBAG RETAINING WALL DETAILS

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Revisions
REV. A JUNE 23
DRAWING UPDATED TO INCLUDE STREET ELEVATION, BIN AND BIKE STORES RELOCATED AND RETAINING WALLS INDICATED
REV. B NOV 25
DRAWING UPDATED TO ALLOW FOR RAISED FFL'S, EXTERNAL WALL & FENCE HEIGHTS.
REV. C NOV 25
FURTHER UPDATES TO LEVELS AND RAMPS.

REV. D FEB 26
LAYOUT UPDATED TO SUIT PLANNERS COMMENTS.
REV. E FEB 26
FURTHER CHANGES TO LAYOUT TO SUIT HIGHWAYS COMMENTS.

Revision	Scale	Drawing No	Client
E	1:150@A1	LT2504.04.01	CJ Construction
Checked	**Date**	**Drawing Title**	**Job Title**
KML	May 25	Proposed Site Layout	Rhodes Avenue, Port Talbot

Drawing Purpose
PLANNING

IN PARTNERSHIP WITH

CJ Construction

LeTruccodesign
ARCHITECTURE
Suite 7, 35 Stow Park Circle
Newport, NP20 4HF
Tel: 07710390800 / 07710390801
info@letruccodesign.co.uk
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A1 DRAWING SHEET

NORTH

STREET ELEVATION

2.4 x 25m VISION SPLAY

2.4 x 2.4m VISION SPLAY

EXISTING YELLOW LINES ADJUSTED AND NEW DROP KERBS PROVIDED TO SERVE NEW PARKING BAY LOCATIONS

RHODES AVENUE

Joyce House

SECTION A - A

POTENTIAL SUDDS BASIN AREA - ALL TO CIVIL ENGINEERS DESIGN AND DETAILS

SECTION B - B

EXISTING ENTRANCE REVISED AND UPGRADED TO REPRESENT ADOPTABLE FOOTPATH EITHER SIDE, TO SEPARATE S278 APPLICATION.

2.4 x 2.4m VISION SPLAY

2.4 x 25m VISION SPLAY

STREET ELEVATION

RAIN GARDEN

POTENTIAL SUDDS

PROPOSED TIMBER BIKE STORE FOR MIN 6No BIKES

RESIDENCE GARDEN

EXISTING ESTABLISHED HEDGEROW TO REAR BOUNDARY RETAINED

BENCH SEATING FOR RESIDENCE

PROPOSED TIMBER BIN STORE FOR 6NO BINS, LOCATED AT MAX 5M FROM BUILDING LINE.

PLOT 7

PLOT 8

SECTION A - A

SECTION B - B

EXISTING ESTABLISHED HEDGEROW TO REAR BOUNDARY RETAINED

IN PARTNERSHIP WITH

CJ Construction

PROPOSED SITE LAYOUT + TOPO

0 2 4 6 8 10 m

SCALE 1:150

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Revisions

REV. A NOV 25
DRAWING UPDATED TO ALLOW FOR RAISED FFLS, EXTERNAL WALLS ETC REVISED.

REV. B NOV 25
FURTHER UPDATES TO LEVELS AND RAMPS.

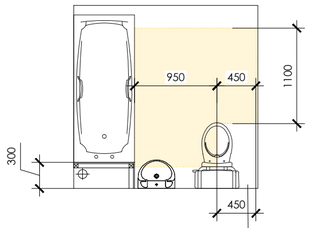
REV. C FEB 26
LAYOUT UPDATED TO SUIT PLANNERS COMMENTS.

REV. D FEB 26
FURTHER CHANGES TO LAYOUT TO SUIT HIGHWAYS COMMENTS.

Drawing Purpose
PLANNING

Client	Drawing No	Scale	Revision
CJ Construction	LT2504.04.02	1:150@A1	D
Job Title	**Drawing Title**	**Date**	**Checked**
Rhodes Avenue, Port Talbot	Proposed Site Layout + Topo	May 25	KML

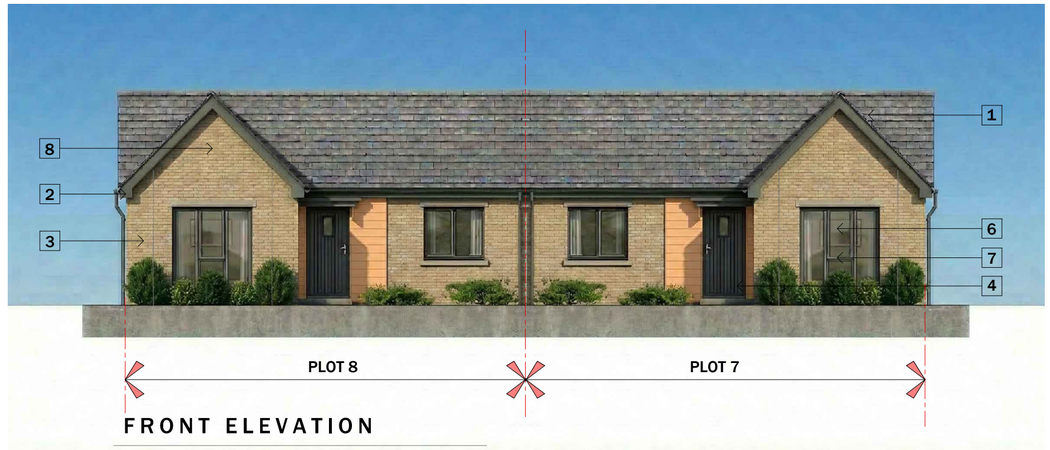
A2 DRAWING SHEET



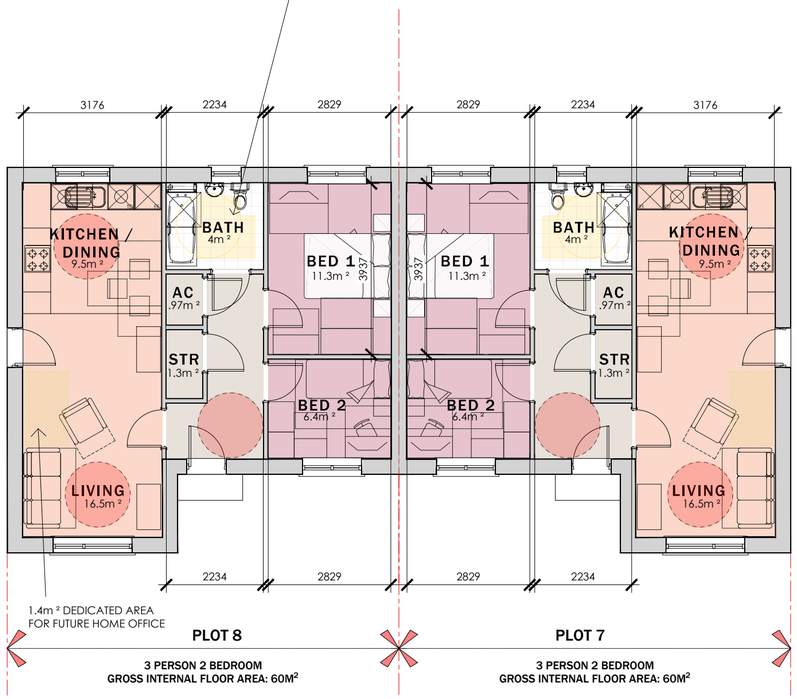
BATHROOM
[LTH CRITERION 14]

ELEVATION KEY

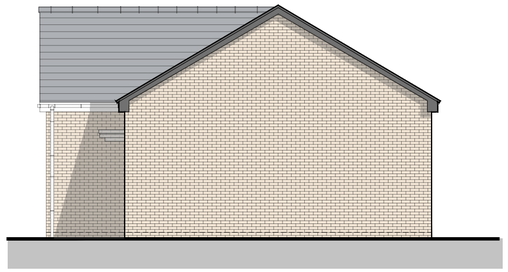
1	GREY CONCRETE TILE WITH MATCHING RIDGE.
2	WHITE UPVC FASCIAS, SOFFITES & BARDGEBOARDS WITH BLACK RAINWATER GOODS.
3	LIGHT BUFF CLAY FACING BRICKWORK
4	HARDIE PLANK FIBRE CEMENT BOARD LAID HORIZONTALLY - COLOUR 'HEATHERED MOSS'
5	BRICKWORK PIERS TO CORNERS- EXPRESSED BY 10mm
6	SBD GOLD STANDARD WHITE UPVC WINDOWS AND DOOR SETS
7	RECON STONE CILLS/HEADS TO FRONT AND KEY SIDE ELEVATIONS.
8	PV PANELS (EXACT LOCATIONS DEPENDANT)
9	SBD COMPLIANT GRP DOOR SETS - VARYING COLOURS THROUGH DEVELOPMENT
10	GREY HIGH PERFORMANCE ROOFING FELT AND PRESSED METAL CAPPING TO FLAT ROOFS.



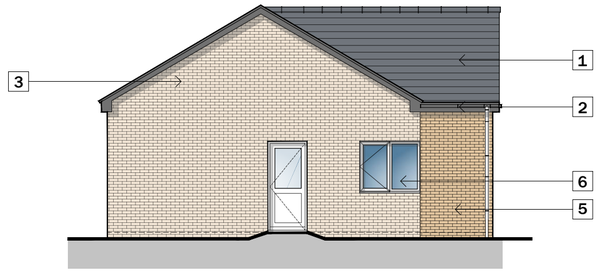
FRONT ELEVATION



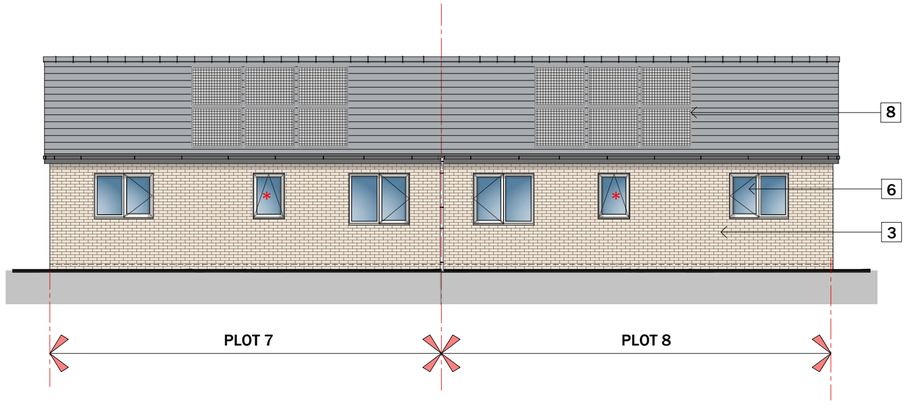
GROUND FLOOR PLAN



SIDE ELEVATION



SIDE ELEVATION



REAR ELEVATION

STORAGE SCHEDULE: 3P2B

AC: 0.97M²
STORE: 1.3M²

TOTAL STORAGE PROVIDED - 2.35M²

TOTAL STORAGE REQUIRED - 2.0M²

TOTAL STORAGE EXCESS - 0.35M²

PROPOSED FLOOR PLANS + ELEVATIONS
PLOTS 7 - 8

0 1000 2000 3000 4000 5000 mm
SCALE 1:100

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Revisions
REV.A JUNE 25
PLANS UPDATED FOLLOWING CLIENTS COMMENTS.
REV.B JUNE 25
FLOOR PLANS SHOWN AS SEMI DETACHED.
REV.C JUNE 25
ELEVATIONS UPDATED FOLLOWING CLIENTS COMMENTS.
REV. D FEB 26
ELEVATIONS UPDATED.

Revision	D
Checked	kml
Scale	1:100@A2
Date	May 2025
Drawing No	LT2504.04.200
Drawing Title	Plans + Elevations-PLOTS 7-8
Client	C J Construction
Job Title	Rhodes Avenue, Port Talbot
Drawing Purpose	PLANNING

IN PARTNERSHIP WITH

CJ Construction

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APPENDIX C:

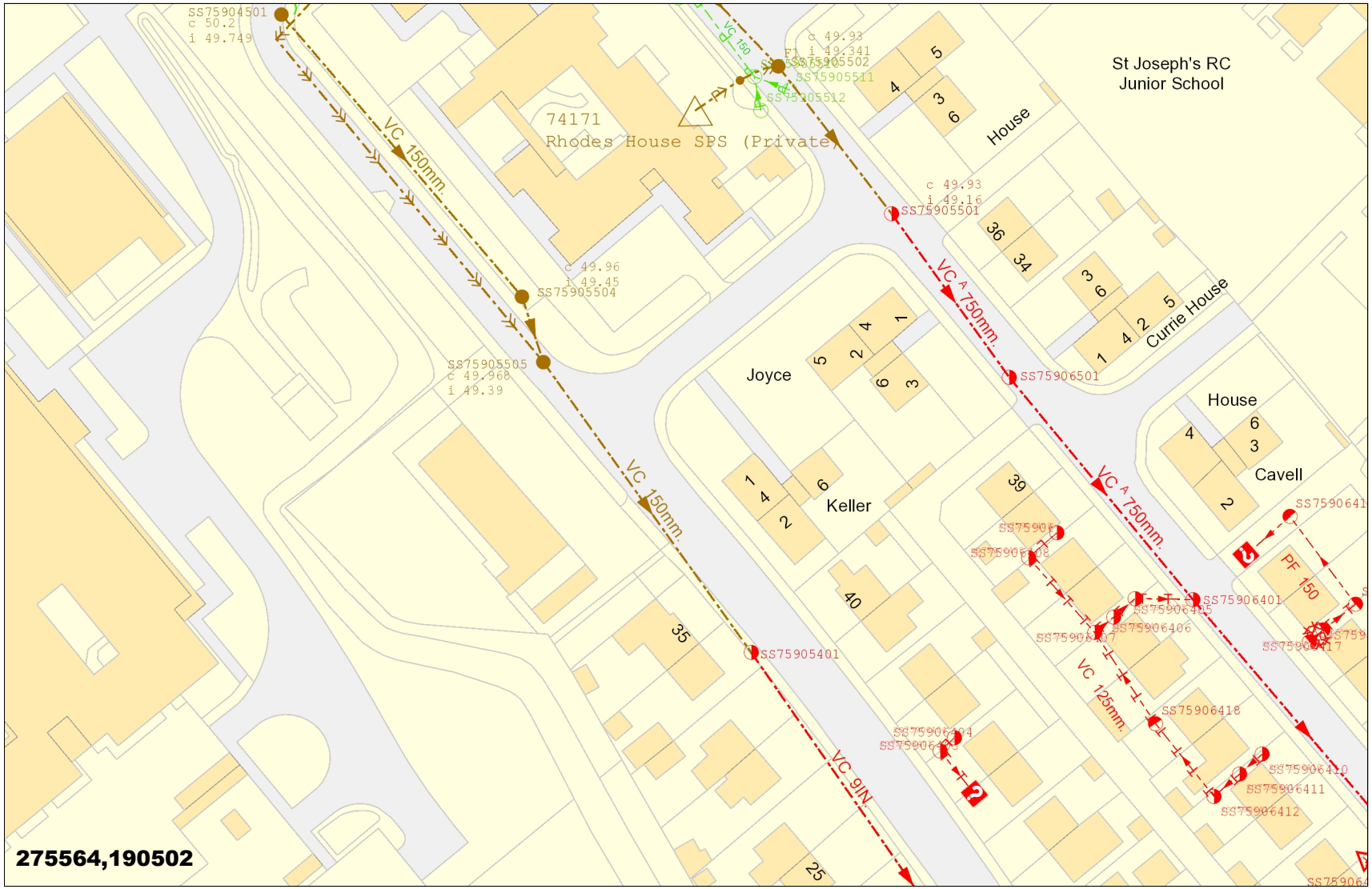
DCWW Wastewater Asset Plan

Dŵr Cymru
Welsh Water

21698 - Rhodes Avenue

02/06/2025

Scale: 1: 1051



LEGEND

Clean Water

- Sluice Val
- Air Val, SINGLE
- Tap
- Pressure Reducing Valve
- Meter
- BULK Meter
- FH
- Cap
- Existing Main
- NON COMPANY

Sewerage External

- Foul
- Surface Water
- Combined
- Rising Main
- Private
- Treatment Works
- Pumping Station
- Special Purpose
- Unknown End
- Change, Combined Overflow
- Outfall, FOUL
- Lamp Hole, Foul
- Private Sewer Transfer
- Lateral Drain
- Inspection Chamber

Dwr Cymru Cyfyngedig ('the Company') gives this information as to the position of its underground apparatus by way of general guidance only and on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon In the event of excavations or other works made in the vicinity of the company's apparatus and any onus of locating the apparatus before carrying out any excavations rests entirely on you. The information which is supplied hereby the company, is done so in accordance with statutory requirements of sections 198 and 199 f the water industry Act 1991 based upon the best Information available and in particular, but without prejudice to the generality of the foregoing, it should be noted that the records that are available to the Company may not disclosure the existence of a drain sewer or disposal main laid before 1 September 1989, or if they do, the particulars thereof including their position underground may not be accurate. It must be understood that the furnishing of this information us entirely without prejudice to the provision of the New Roads and Street Works Act 1991 and the company's right to be compensated for any damage to its apparatus.

EXACT LOCATION OF ALL APPARATUS TO BE DETERMINED ON SITE

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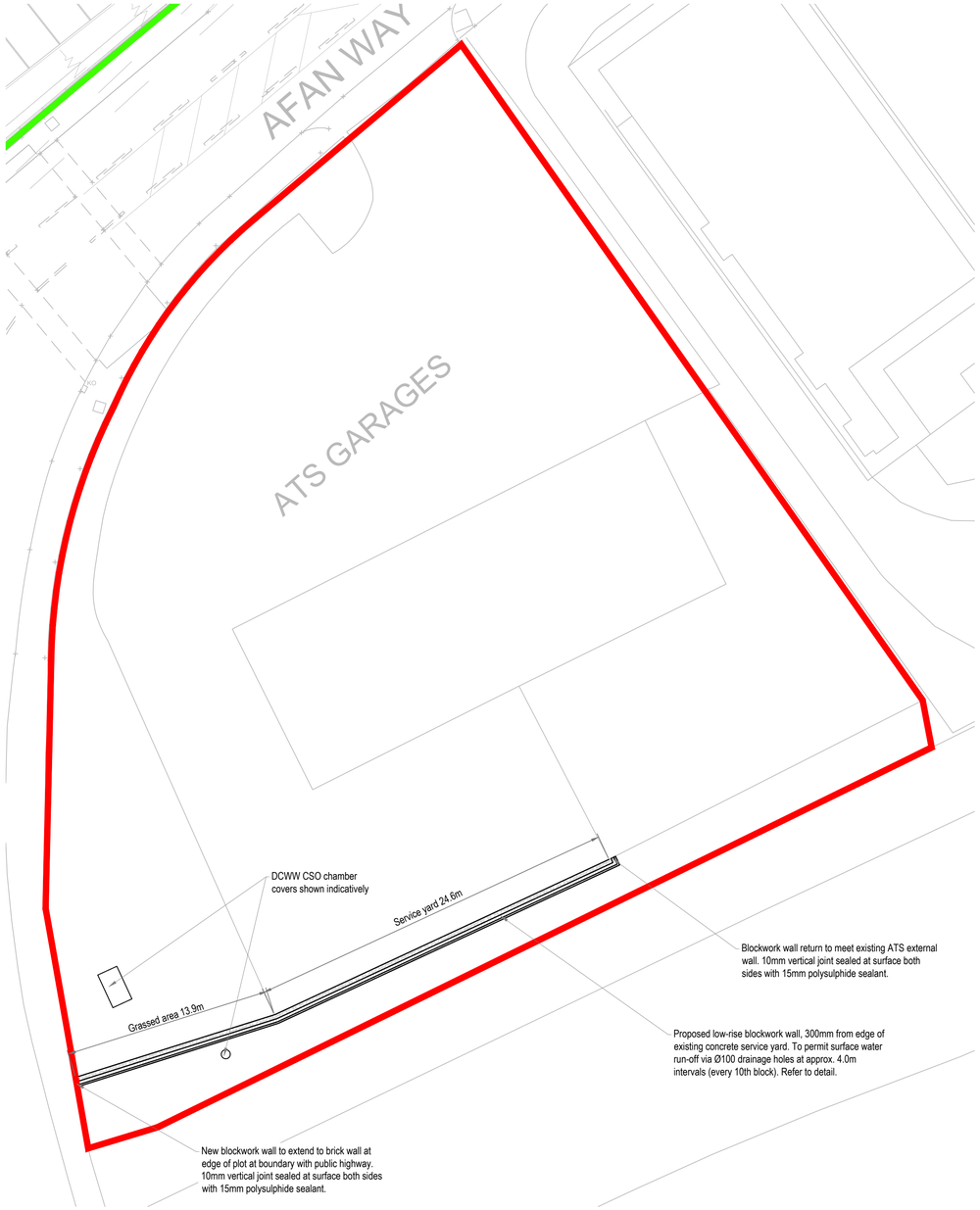
Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases pipe material (other than Asbestos Cement or Pitch Fibre) may be found to be Asbestos Cement (AC) or Pitch Fibre (PF). It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation

APPENDIX D:

Flood Defence Scheme



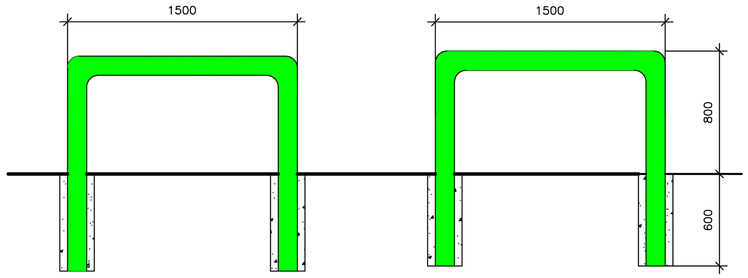
ATS SITE
Scale 1:200

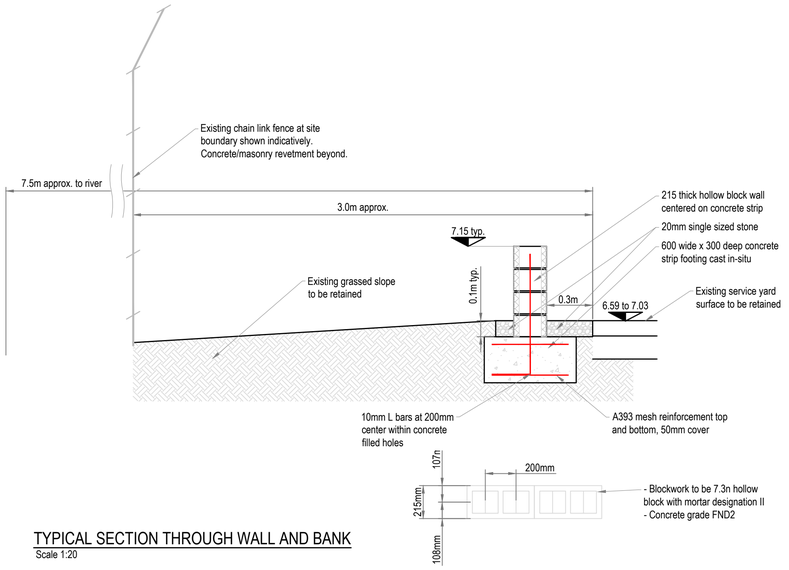
BARRIER DETAIL.

900mm spaces between each hoop.
Hoops to be positioned centrally about car parking bays, otherwise set at equal distances over the boundary length.
See general arrangement drawing for detail.

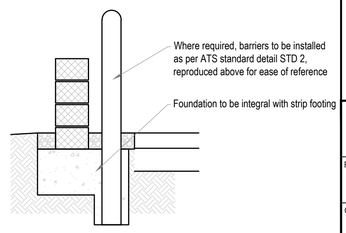
Provide and fix o/a 1500mm wide by min 1400mm deep, with 800mm above ground level, by 125mm dia RHS tube barriers with radius bends.
All to be primed and painted with 1 undercoat and 2 gloss coats green RAL 6029.

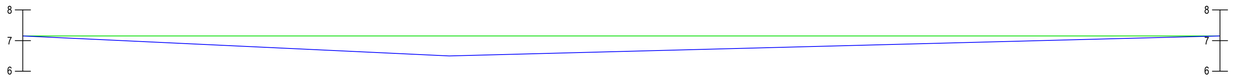
To set barriers in ground drill 225mm core hole and fill with concrete before setting barrier in position. Minimum barrier depth to be 600mm. Make good surface area to match existing finishes.





TYPICAL SECTION THROUGH WALL AND BANK
Scale 1:20



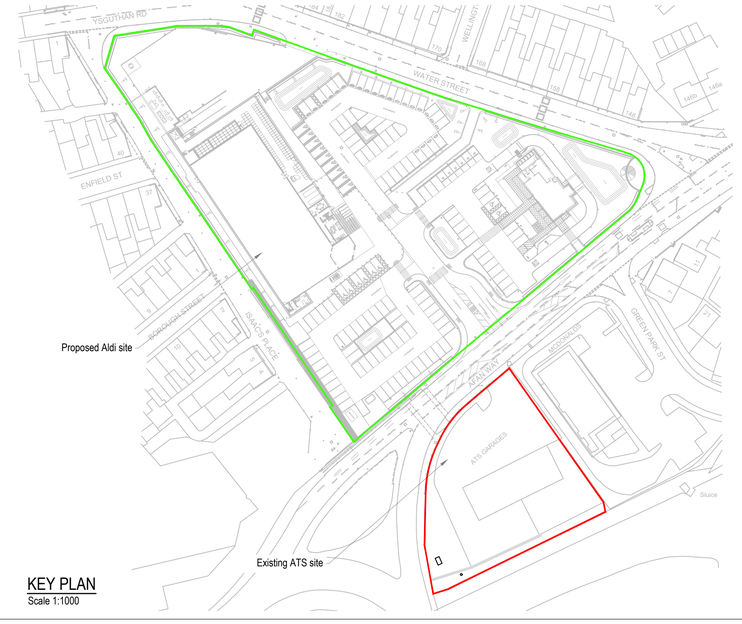


RETAINING WALL ELEVATION
Scale 1:100

Elevation key :

Top of wall

Bottom of wall



KEY PLAN
Scale 1:1000

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GENERAL NOTES

DRAWINGS AND SPECIFICATIONS: This drawing is to be read in conjunction with all relevant Architects, Engineers and Specialists drawings together with the specification.

C D M : SIGNIFICANT HAZARDS

THE FOLLOWING HEALTH AND SAFETY HAZARDS ARE IDENTIFIED BY THE DESIGNER AS ABNORMAL IN PURSUANCE OF THE CURRENT CONSTRUCTION DESIGN AND MANAGEMENT REGULATIONS.

RISKS DURING CONSTRUCTION:
- No abnormal risks have been identified relating to this design element.

OPERATION / MAINTENANCE RISKS:
- No abnormal risks have been identified relating to this design element.

RISKS DURING DEMOLITION / DECOMMISSIONING / DISMANTLING / ALTERATIONS:
- No abnormal risks have been identified relating to this design element.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY COMPETENT & ADEQUATELY RESOURCED CONTRACTOR(S) WORKING TO SAFE SYSTEMS OF WORK.

REV	REVISION DETAILS	BY	DATE
E	UPDATED TO HOLLOW BLOCK WALL DETAIL, ADDED RETAINING WALL ELEVATION.	JJH	04.09.25
D	VEHICLE BARRIER ADDED	WAH	09.02.24
C	GENERAL REFINEMENTS FOLLOWING DESIGN TEAM MEETING	WAH	31.01.24
B	UPDATES TO SUIT REQUIRED LEVEL	WAH	22.12.23
A	FIRST ISSUE	WAH	06.12.23

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PROJECT TITLE
COMMERCIAL DEVELOPMENT
AFAN WAY
PORT TALBOT

DRAWING TITLE
PROPOSED ENABLING WORKS
AT NEIGHBOURING ATS SITE

CLIENT
ALDI STORES LTD

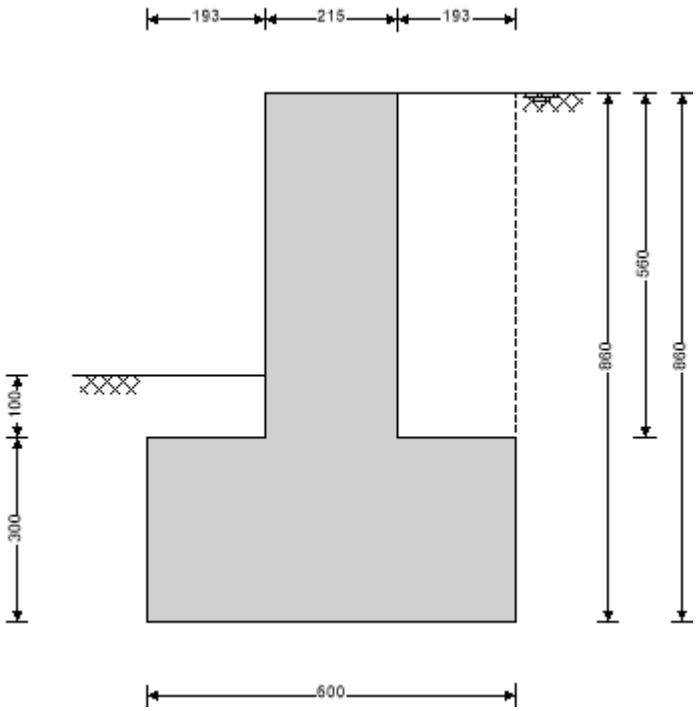
STATUS
INFORMATION

SCALE AT A1	DRG SIZE	DRAWN	CHECKED	APPROVED
AS NOTED	A1	WAH	RAG	RAG

JOB NO.	DRAWING NUMBER	REV
10985	sk0012	E

RETAINING WALL ANALYSIS (BS 8002:1994)

TEDDS calculation version 1.2.01.08



Wall details

Retaining wall type	**Unpropped cantilever**
Height of retaining wall stem	h_{stem} = **560** mm
Thickness of wall stem	t_{wall} = **215** mm
Length of toe	l_{toe} = **193** mm
Length of heel	l_{heel} = **193** mm
Overall length of base	$l_{base} = l_{toe} + l_{heel} + t_{wall}$ = **600** mm
Thickness of base	t_{base} = **300** mm
Depth of downstand	d_{ds} = **0** mm
Position of downstand	l_{ds} = **1** mm
Thickness of downstand	t_{ds} = **300** mm
Height of retaining wall	$h_{wall} = h_{stem} + t_{base} + d_{ds}$ = **860** mm
Depth of cover in front of wall	d_{cover} = **100** mm
Depth of unplanned excavation	d_{exc} = **0** mm
Height of ground water behind wall	h_{water} = **860** mm
Height of saturated fill above base	$h_{sat} = \max(h_{water} - t_{base} - d_{ds}, 0\text{ mm})$ = **560** mm
Density of wall construction	γ_{wall} = **17.5** kN/m^3
Density of base construction	γ_{base} = **23.6** kN/m^3
Angle of rear face of wall	α = **90.0** deg
Angle of soil surface behind wall	β = **0.0** deg
Effective height at virtual back of wall	$h_{eff} = h_{wall} + l_{heel} \times \tan(\beta)$ = **860** mm

Retained material details

Mobilisation factor	M = **1.5**
Moist density of retained material	γ_m = **1.0** kN/m^3

Saturated density of retained material γ_s = **10.0** kN/m^3

Design shear strength ϕ' = **0.0** deg

Angle of wall friction δ = **1.0** deg

Base material details

Moist density γ_{mb} = **18.0** kN/m^3

Design shear strength ϕ'_b = **24.2** deg

Design base friction δ_b = **18.6** deg

Allowable bearing pressure $P_{bearing}$ = **50** kN/m^2

Using Coulomb theory

Active pressure coefficient for retained material

$$K_a = \sin(\alpha + \phi')^2 / (\sin(\alpha)^2 \times \sin(\alpha - \delta) \times [1 + \sqrt{(\sin(\phi' + \delta) \times \sin(\phi' - \beta) / (\sin(\alpha - \delta) \times \sin(\alpha + \beta)))}]^2) = \mathbf{1.000}$$

Passive pressure coefficient for base material

$$K_p = \sin(90 - \phi'_b)^2 / (\sin(90 - \delta_b) \times [1 - \sqrt{(\sin(\phi'_b + \delta_b) \times \sin(\phi'_b) / (\sin(90 + \delta_b)))}]^2) = \mathbf{4.187}$$

At-rest pressure

At-rest pressure for retained material $K_0 = 1 - \sin(\phi') = \mathbf{1.000}$

Loading details

Surcharge load on plan Surcharge = **0.0** kN/m^2

Applied vertical dead load on wall W_{dead} = **0.0** kN/m

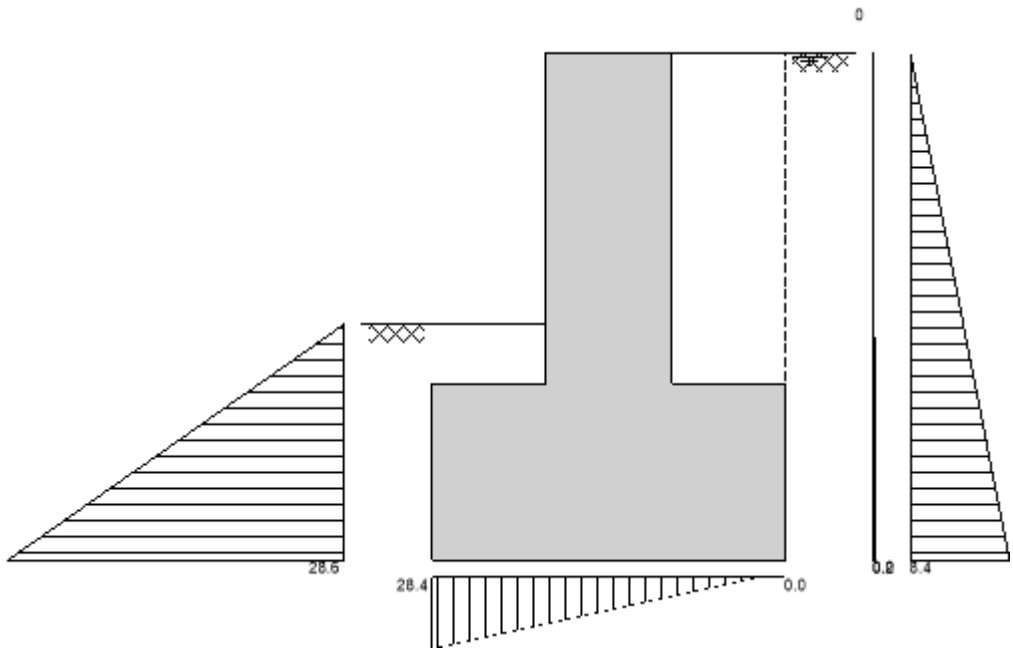
Applied vertical live load on wall W_{live} = **0.0** kN/m

Position of applied vertical load on wall l_{load} = **0** mm

Applied horizontal dead load on wall F_{dead} = **0.0** kN/m

Applied horizontal live load on wall F_{live} = **0.0** kN/m

Height of applied horizontal load on wall h_{load} = **0** mm



Loads shown in kN/m, pressures shown in kN/m^2

Vertical forces on wall

Wall stem $w_{wall} = h_{stem} \times t_{wall} \times \gamma_{wall}$ = **2.1** kN/m

Wall base $w_{base} = l_{base} \times t_{base} \times \gamma_{base}$ = **4.2** kN/m

Saturated backfill $w_s = l_{heel} \times h_{sat} \times \gamma_s$ = **1.1** kN/m

Soil in front of wall $w_p = l_{toe} \times d_{cover} \times \gamma_{mb}$ = **0.3** kN/m

Total vertical load $W_{total} = w_{wall} + w_{base} + w_s + w_p$ = **7.8** kN/m

Horizontal forces on wall

Moist backfill below water table $F_{m_b} = K_a \times \cos(90 - \alpha + \delta) \times \gamma_m \times (h_{eff} - h_{water}) \times h_{water}$ = **0** kN/m

Saturated backfill $F_s = 0.5 \times K_a \times \cos(90 - \alpha + \delta) \times (\gamma_s - \gamma_{water}) \times h_{water}^2$ = **0.1** kN/m

Water $F_{water} = 0.5 \times h_{water}^2 \times \gamma_{water}$ = **3.6** kN/m

Total horizontal load $F_{total} = F_{m_b} + F_s + F_{water}$ = **3.7** kN/m

Calculate stability against sliding

Passive resistance of soil in front of wall $F_p = 0.5 \times K_p \times \cos(\delta_b) \times (d_{cover} + t_{base} + d_{ds} - d_{exc})^2 \times \gamma_{mb}$ = **5.7** kN/m

Resistance to sliding $F_{res} = F_p + (W_{total} - w_p) \times \tan(\delta_b)$ = **8.2** kN/m

PASS - Resistance force is greater than sliding force

Overturning moments

Moist backfill below water table $M_{m_b} = F_{m_b} \times (h_{water} - 2 \times d_{ds}) / 2$ = **0** kNm/m

Saturated backfill $M_s = F_s \times (h_{water} - 3 \times d_{ds}) / 3$ = **0** kNm/m

Water $M_{water} = F_{water} \times (h_{water} - 3 \times d_{ds}) / 3$ = **1** kNm/m

Total overturning moment $M_{ot} = M_{m_b} + M_s + M_{water}$ = **1.1** kNm/m

Restoring moments

Wall stem $M_{wall} = w_{wall} \times (l_{toe} + t_{wall} / 2)$ = **0.6** kNm/m

Wall base $M_{base} = w_{base} \times l_{base} / 2$ = **1.3** kNm/m

Saturated backfill $M_{s_r} = w_s \times (l_{base} - l_{heel} / 2)$ = **0.5** kNm/m

Total restoring moment $M_{rest} = M_{wall} + M_{base} + M_{s_r}$ = **2.4** kNm/m

Check stability against overturning

Total overturning moment M_{ot} = **1.1** kNm/m

Total restoring moment M_{rest} = **2.4** kNm/m

PASS - Restoring moment is greater than overturning moment

Check bearing pressure

Soil in front of wall $M_{p_r} = w_p \times l_{toe} / 2$ = **0** kNm/m

Total moment for bearing $M_{total} = M_{rest} - M_{ot} + M_{p_r}$ = **1.4** kNm/m

Total vertical reaction $R = W_{total}$ = **7.8** kN/m

Distance to reaction $x_{bar} = M_{total} / R$ = **183** mm

Eccentricity of reaction $e = \text{abs}((l_{base} / 2) - x_{bar})$ = **117** mm

Reaction acts outside middle third of base

Bearing pressure at toe $p_{toe} = R / (1.5 \times x_{bar})$ = **28.4** kN/m^2

Bearing pressure at heel p_{heel} = 0 kN/m^2 = **0** kN/m^2

PASS - Maximum bearing pressure is less than allowable bearing pressure

RETAINING WALL DESIGN (BS 8002:1994)

TEDDS calculation version 1.2.01.08

Ultimate limit state load factors

Dead load factor γ_{f_d} = **1.4**

Live load factor γ_{f_l} = **1.6**

Earth and water pressure factor γ_{f_e} = **1.4**

Factored vertical forces on wall

Wall stem $w_{wall_f} = \gamma_{f_d} \times h_{stem} \times t_{wall} \times \gamma_{wall}$ = **2.9** kN/m

Wall base $w_{base_f} = \gamma_{f_d} \times l_{base} \times t_{base} \times \gamma_{base}$ = **5.9** kN/m

Saturated backfill $w_{s_f} = \gamma_{f_d} \times l_{heel} \times h_{sat} \times \gamma_s$ = **1.5** kN/m

Soil in front of wall $w_{p_f} = \gamma_{f_d} \times l_{toe} \times d_{cover} \times \gamma_{mb}$ = **0.5** kN/m

Total vertical load $W_{total_f} = w_{wall_f} + w_{base_f} + w_{s_f} + w_{p_f}$ = **10.9** kN/m

Factored horizontal at-rest forces on wall

Moist backfill below water table $F_{m_b_f} = \gamma_{f_e} \times K_0 \times \gamma_m \times (h_{eff} - h_{water}) \times h_{water}$ = **0** kN/m

Saturated backfill $F_{s_f} = \gamma_{f_e} \times 0.5 \times K_0 \times (\gamma_s - \gamma_{water}) \times h_{water}^2$ = **0.1** kN/m

Water $F_{water_f} = \gamma_{f_e} \times 0.5 \times h_{water}^2 \times \gamma_{water}$ = **5.1** kN/m

Total horizontal load $F_{total_f} = F_{m_b_f} + F_{s_f} + F_{water_f}$ = **5.2** kN/m

Passive resistance of soil in front of wall $F_{p_f} = \gamma_{f_e} \times 0.5 \times K_p \times \cos(\delta_b) \times (d_{cover} + t_{base} + d_{ds} - d_{exc})^2 \times \gamma_{mb}$ = **8** kN/m

Factored overturning moments

Moist backfill below water table $M_{m_b_f} = F_{m_b_f} \times (h_{water} - 2 \times d_{ds}) / 2$ = **0** kNm/m

Saturated backfill $M_{s_f} = F_{s_f} \times (h_{water} - 3 \times d_{ds}) / 3$ = **0** kNm/m

Water $M_{water_f} = F_{water_f} \times (h_{water} - 3 \times d_{ds}) / 3$ = **1.5** kNm/m

Total overturning moment $M_{ot_f} = M_{m_b_f} + M_{s_f} + M_{water_f}$ = **1.5** kNm/m

Restoring moments

Wall stem $M_{wall_f} = w_{wall_f} \times (l_{toe} + t_{wall} / 2)$ = **0.9** kNm/m

Wall base $M_{base_f} = w_{base_f} \times l_{base} / 2$ = **1.8** kNm/m

Saturated backfill $M_{s_r_f} = w_{s_f} \times (l_{base} - l_{heel} / 2)$ = **0.8** kNm/m

Soil in front of wall $M_{p_r_f} = w_{p_f} \times l_{toe} / 2$ = **0** kNm/m

Total restoring moment $M_{rest_f} = M_{wall_f} + M_{base_f} + M_{s_r_f} + M_{p_r_f}$ = **3.5** kNm/m

Factored bearing pressure

Total moment for bearing $M_{total_f} = M_{rest_f} - M_{ot_f}$ = **2** kNm/m

Total vertical reaction $R_f = W_{total_f}$ = **10.9** kN/m

Distance to reaction $x_{bar_f} = M_{total_f} / R_f$ = **183** mm

Eccentricity of reaction $e_f = \text{abs}((l_{base} / 2) - x_{bar_f})$ = **117** mm

Reaction acts outside middle third of base

Bearing pressure at toe $p_{toe_f} = R_f / (1.5 \times x_{bar_f})$ = **39.7** kN/m^2

Bearing pressure at heel p_{heel_f} = 0 kN/m^2 = **0** kN/m^2

Rate of change of base reaction rate = $p_{toe_f} / (3 \times x_{bar_f})$ = **72.36** kN/m^2/m

Bearing pressure at stem / toe $p_{stem_toe_f} = \max(p_{toe_f} - (\text{rate} \times l_{toe}), 0 \text{ kN/m}^2)$ = **25.8** kN/m^2

Bearing pressure at mid stem $p_{stem_mid_f} = \max(p_{toe_f} - (\text{rate} \times (l_{toe} + t_{wall} / 2)), 0 \text{ kN/m}^2)$ = **18** kN/m^2

Bearing pressure at stem / heel $p_{stem_heel_f} = \max(p_{toe_f} - (\text{rate} \times (l_{toe} + t_{wall})), 0 \text{ kN/m}^2)$ = **10.2** kN/m^2

Design of reinforced concrete retaining wall toe (BS 8002:1994)

Material properties

Characteristic strength of concrete f_{cu} = **30** N/mm²

Characteristic strength of reinforcement f_y = **500** N/mm²

Base details

Minimum area of reinforcement k = **0.13** %

Cover to reinforcement in toe c_{toe} = **30** mm

Calculate shear for toe design

Shear from bearing pressure $V_{toe_bear} = (p_{toe_f} + p_{stem_toe_f}) \times l_{toe} / 2$ = **6.3** kN/m

Shear from weight of base $V_{toe_wt_base} = \gamma_{f_d} \times \gamma_{base} \times l_{toe} \times t_{base}$ = **1.9** kN/m

Shear from weight of soil $V_{toe_wt_soil} = w_{p_f} - (\gamma_{f_d} \times \gamma_m \times l_{toe} \times d_{exc})$ = **0.5** kN/m

Total shear for toe design $V_{toe} = V_{toe_bear} - V_{toe_wt_base} - V_{toe_wt_soil}$ = **3.9** kN/m

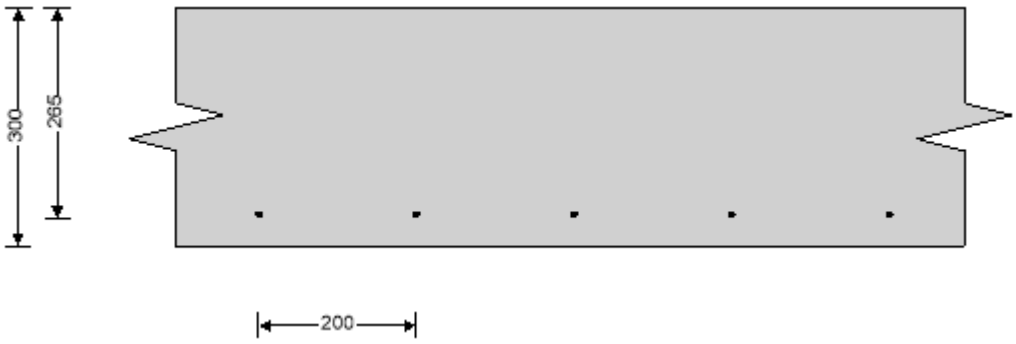
Calculate moment for toe design

Moment from bearing pressure $M_{toe_bear} = (2 \times p_{toe_f} + p_{stem_mid_f}) \times (l_{toe} + t_{wall} / 2)^2 / 6$ = **1.5** kNm/m

Moment from weight of base $M_{toe_wt_base} = (\gamma_{f_d} \times \gamma_{base} \times t_{base} \times (l_{toe} + t_{wall} / 2)^2 / 2)$ = **0.4** kNm/m

Moment from weight of soil $M_{toe_wt_soil} = (w_{p_f} - (\gamma_{f_d} \times \gamma_m \times l_{toe} \times d_{exc})) \times (l_{toe} + t_{wall}) / 2$ = **0.1** kNm/m

Total moment for toe design $M_{toe} = M_{toe_bear} - M_{toe_wt_base} - M_{toe_wt_soil}$ = **0.9** kNm/m



Check toe in bending

Width of toe b = **1000** mm/m

Depth of reinforcement $d_{toe} = t_{base} - c_{toe} - (\phi_{toe} / 2)$ = **265.0** mm

Constant $K_{toe} = M_{toe} / (b \times d_{toe}^2 \times f_{cu})$ = **0.000**

Compression reinforcement is not required

Lever arm $z_{toe} = \min(0.5 + \sqrt{(0.25 - (\min(K_{toe}, 0.225) / 0.9))}, 0.95) \times d_{toe}$

z_{toe} = **252** mm

Area of tension reinforcement required $A_{s_toe_des} = M_{toe} / (0.87 \times f_y \times z_{toe})$ = **8** mm²/m

Minimum area of tension reinforcement $A_{s_toe_min} = k \times b \times t_{base}$ = **390** mm²/m

Area of tension reinforcement required $A_{s_toe_req} = \mathrm{Max}(A_{s_toe_des}, A_{s_toe_min})$ = **390** mm²/m

Reinforcement provided **A393 mesh**

Area of reinforcement provided $A_{s_toe_prov}$ = **393** mm²/m

PASS - Reinforcement provided at the retaining wall toe is adequate

Check shear resistance at toe

Design shear stress $v_{toe} = V_{toe} / (b \times d_{toe})$ = **0.015** N/mm²

Allowable shear stress $v_{adm} = \min(0.8 \times \sqrt{(f_{cu} / 1\ \mathrm{N/mm^2})}, 5) \times 1\ \mathrm{N/mm^2}$ = **4.382** N/mm²

PASS - Design shear stress is less than maximum shear stress

From BS8110:Part 1:1997 – Table 3.8

Design concrete shear stress v_{c_toe} = **0.394** N/mm²

v_{toe} < v_{c_toe} - No shear reinforcement required

Design of reinforced concrete retaining wall heel (BS 8002:1994)

Material properties

Characteristic strength of concrete — f_{cu} = **30** N/mm²

Characteristic strength of reinforcement — f_y = **500** N/mm²

Base details

Minimum area of reinforcement — k = **0.13** %

Cover to reinforcement in heel — c_{heel} = **30** mm

Calculate shear for heel design

Shear from bearing pressure — $V_{heel_bear} = p_{stem_heel_f} \times ((3 \times x_{bar_f}) - l_{toe} - t_{wall}) / 2$ = **0.7** kN/m

Shear from weight of base — $V_{heel_wt_base} = \gamma_{f_d} \times \gamma_{base} \times l_{heel} \times t_{base}$ = **1.9** kN/m

Shear from weight of saturated backfill — $V_{heel_wt_s} = w_{s_f}$ = **1.5** kN/m

Total shear for heel design — $V_{heel} = -V_{heel_bear} + V_{heel_wt_base} + V_{heel_wt_s}$ = **2.7** kN/m

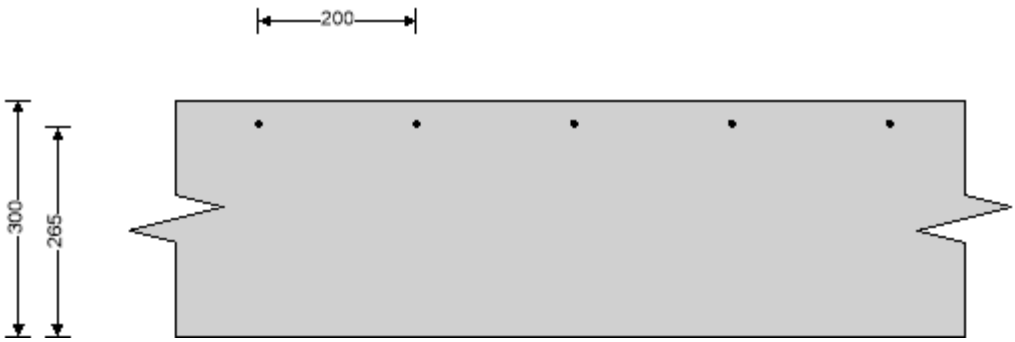
Calculate moment for heel design

Moment from bearing pressure — $M_{heel_bear} = p_{stem_mid_f} \times ((3 \times x_{bar_f}) - l_{toe} - t_{wall} / 2)^2 / 6$ = **0.2** kNm/m

Moment from weight of base — $M_{heel_wt_base} = (\gamma_{f_d} \times \gamma_{base} \times t_{base} \times (l_{heel} + t_{wall} / 2)^2 / 2)$ = **0.4** kNm/m

Moment from weight of saturated backfill — $M_{heel_wt_s} = w_{s_f} \times (l_{heel} + t_{wall}) / 2$ = **0.3** kNm/m

Total moment for heel design — $M_{heel} = -M_{heel_bear} + M_{heel_wt_base} + M_{heel_wt_s}$ = **0.6** kNm/m



Check heel in bending

Width of heel — b = **1000** mm/m

Depth of reinforcement — $d_{heel} = t_{base} - c_{heel} - (\phi_{heel} / 2)$ = **265.0** mm

Constant — $K_{heel} = M_{heel} / (b \times d_{heel}^2 \times f_{cu})$ = **0.000**

Compression reinforcement is not required

Lever arm — $z_{heel} = \min(0.5 + \sqrt{(0.25 - (\min(K_{heel}, 0.225) / 0.9))}, 0.95) \times d_{heel}$

z_{heel} = **252** mm

Area of tension reinforcement required — $A_{s_heel_des} = M_{heel} / (0.87 \times f_y \times z_{heel})$ = **5** mm²/m

Minimum area of tension reinforcement — $A_{s_heel_min} = k \times b \times t_{base}$ = **390** mm²/m

Area of tension reinforcement required — $A_{s_heel_req} = \mathrm{Max}(A_{s_heel_des}, A_{s_heel_min})$ = **390** mm²/m

Reinforcement provided — **A393 mesh**

Area of reinforcement provided — $A_{s_heel_prov}$ = **393** mm²/m

PASS - Reinforcement provided at the retaining wall heel is adequate

Check shear resistance at heel

Design shear stress — $v_{heel} = V_{heel} / (b \times d_{heel})$ = **0.010** N/mm²

Allowable shear stress — $v_{adm} = \min(0.8 \times \sqrt{(f_{cu} / 1\ \mathrm{N/mm^2})}, 5) \times 1\ \mathrm{N/mm^2}$ = **4.382** N/mm²

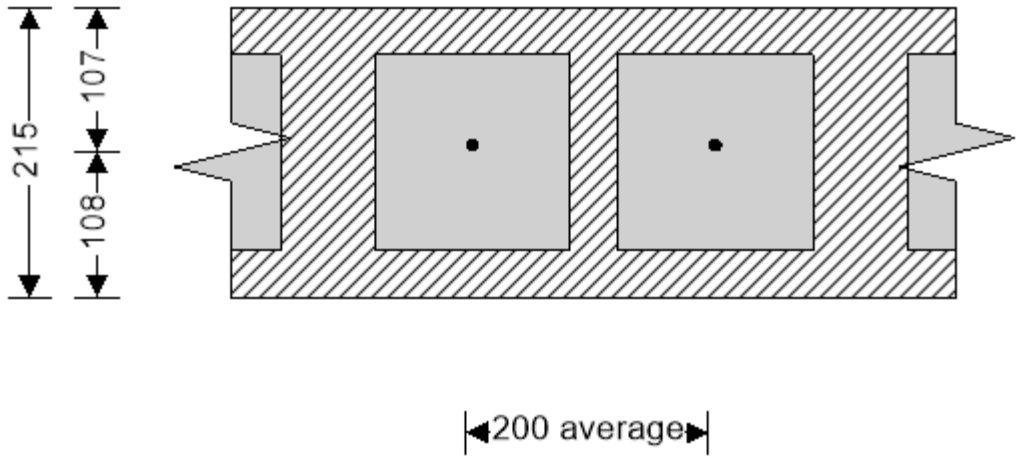
PASS - Design shear stress is less than maximum shear stress

From BS8110:Part 1:1997 – Table 3.8

Design concrete shear stress v_{c_heel} = **0.394** N/mm^2

v_{heel} < v_{c_heel} - No shear reinforcement required

Design of hollow reinforced masonry retaining wall stem - BS5628-2:2000



Wall details

Thickness of wall t_{wall} = **215** mm

Depth of stem reinforcement d_{stem} = **107** mm

Masonry details

Masonry type **Aggregate concrete blocks no voids**

Compressive strength of units p_{unit} = **7.3** N/mm^2

Mortar designation **(ii)**

Category of manufactoring control of units **Category II**

Partial safety factor for material strength γ_{mm} = **2.3**

Characteristic compressive strength of masonry

Least horizontal dimension of masonry units b_{unit} = **215.0** mm

Height of masonry units h_{unit} = **215.0** mm

Ratio of height to least horizontal dimension ratio = h_{unit} / b_{unit} = **1.0**

From BS5628:2 Table 3c, mortar ii

Characteristic compressive strength $f_{0.6}$ = f_k = **3.2** N/mm^2

From BS5628:2 Table 3d, mortar ii

Characteristic compressive strength $f_{2.0}$ = f_k = **6.4** N/mm^2

By interpolation $f_k = f_{0.6} + ((f_{2.0} - f_{0.6}) \times (\text{ratio} - 0.6) / 1.4)$ = **4.1** N/mm^2

Factored horizontal at-rest forces on stem

Saturated backfill $F_{s_s_f} = 0.5 \times \gamma_{f_e} \times K_0 \times (\gamma_s - \gamma_{water}) \times h_{sat}^2$ = **0** kN/m

Water $F_{s_water_f} = 0.5 \times \gamma_{f_e} \times \gamma_{water} \times h_{sat}^2$ = **2.2** kN/m

Calculate shear for stem design

Shear at base of stem $V_{stem} = F_{s_s_f} + F_{s_water_f}$ = **2.2** kN/m

Calculate moment for stem design

Saturated backfill $M_{s_s} = F_{s_s_f} \times h_{sat} / 3$ = **0** kNm/m

Water $M_{s_water} = F_{s_water_f} \times h_{sat} / 3$ = **0.4** kNm/m

Total moment for stem design $M_{stem} = M_{s_s} + M_{s_water}$ = **0.4** kNm/m

Check maximum design moment for wall stem

Width of wall — b = **1000** mm/m

Maximum design moment — $M_{d_stem} = 0.4 \times f_k \times b \times d_{stem}^2 / \gamma_{mm}$ = **8.2** kNm/m

PASS - Applied moment is less than maximum design moment

Check wall stem in bending

Moment of resistance factor — $Q = M_{stem} / d_{stem}^2$ = **0.036** N/mm²

$Q = 2 \times c \times (1 - c) \times f_k / \gamma_{mm}$

Lever arm factor — c = **0.990**

Lever arm — $z_{stem} = \min(0.95, c) \times d_{stem}$ = **101.6** mm

Area of tension reinforcement required — $A_{s_stem_des} = M_{stem} \times \gamma_{ms} / (f_y \times z_{stem})$ = **9** mm²/m

Minimum area of tension reinforcement — $A_{s_stem_min} = k \times b \times t_{wall}$ = **280** mm²/m

Area of tension reinforcement required — $A_{s_stem_req} = \mathrm{Max}(A_{s_stem_des}, A_{s_stem_min})$ = **280** mm²/m

Reinforcement provided — **10 mm dia.bars @ 200 mm centres**

Area of reinforcement provided — $A_{s_stem_prov} = \pi \times \phi_{stem}^2 / (4 \times s_{stem})$ = **393** mm²/m

PASS - Reinforcement provided at the retaining wall stem is adequate

Check shear resistance at wall stem

Design shear stress — $v_{stem} = V_{stem} / (b \times d_{stem})$ = **0.021** N/mm²

Basic characteristic shear strength of masonry — $f_{vbas} = \min[0.35 + (17.5 \times A_{s_stem_prov} / (b \times d_{stem})), 0.7] \times 1$ N/mm²

f_{vbas} = **0.414** N/mm²

Shear span — $a = M_{stem} / V_{stem}$ = **186.7** mm

Characteristic shear strength of masonry — $f_v = \mathrm{Min}(f_{vbas} \times \max(2.5 - 0.25 \times (a / d_{stem}), 1), 1.75$ N/mm²$)$

f_v = **0.855** N/mm²

Allowable shear stress — $v_{adm} = f_v / \gamma_{mv}$ = **0.427** N/mm²

PASS - Design shear stress is less than maximum shear stress

Check limiting dimensions

Limiting span/effective depth ratio — $ratio_{max}$ = **18.00**

Actual span/effective depth ratio — $ratio_{act} = (h_{stem} + d_{stem} / 2) / d_{stem}$ = **5.73**

PASS - Span to depth ratio is acceptable

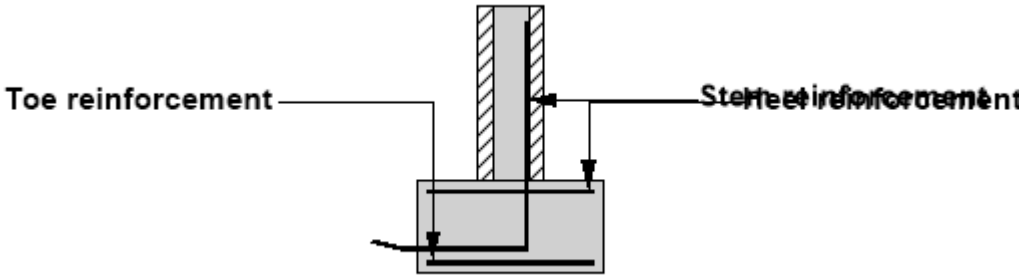
Axial load check

Factored axial load on wall — $N_{wall} = ([t_{wall} \times h_{stem} \times \gamma_{wall} + W_{dead}] \times \gamma_{f_d}) + (W_{live} \times \gamma_{f_l})$ = **2.9** kN/m

Limiting axial load — $N_{limit} = 0.1 \times f_k \times t_{wall}$ = **88.5** kN/m

Applied axial load may be ignored - calculations valid

Indicative retaining wall reinforcement diagram

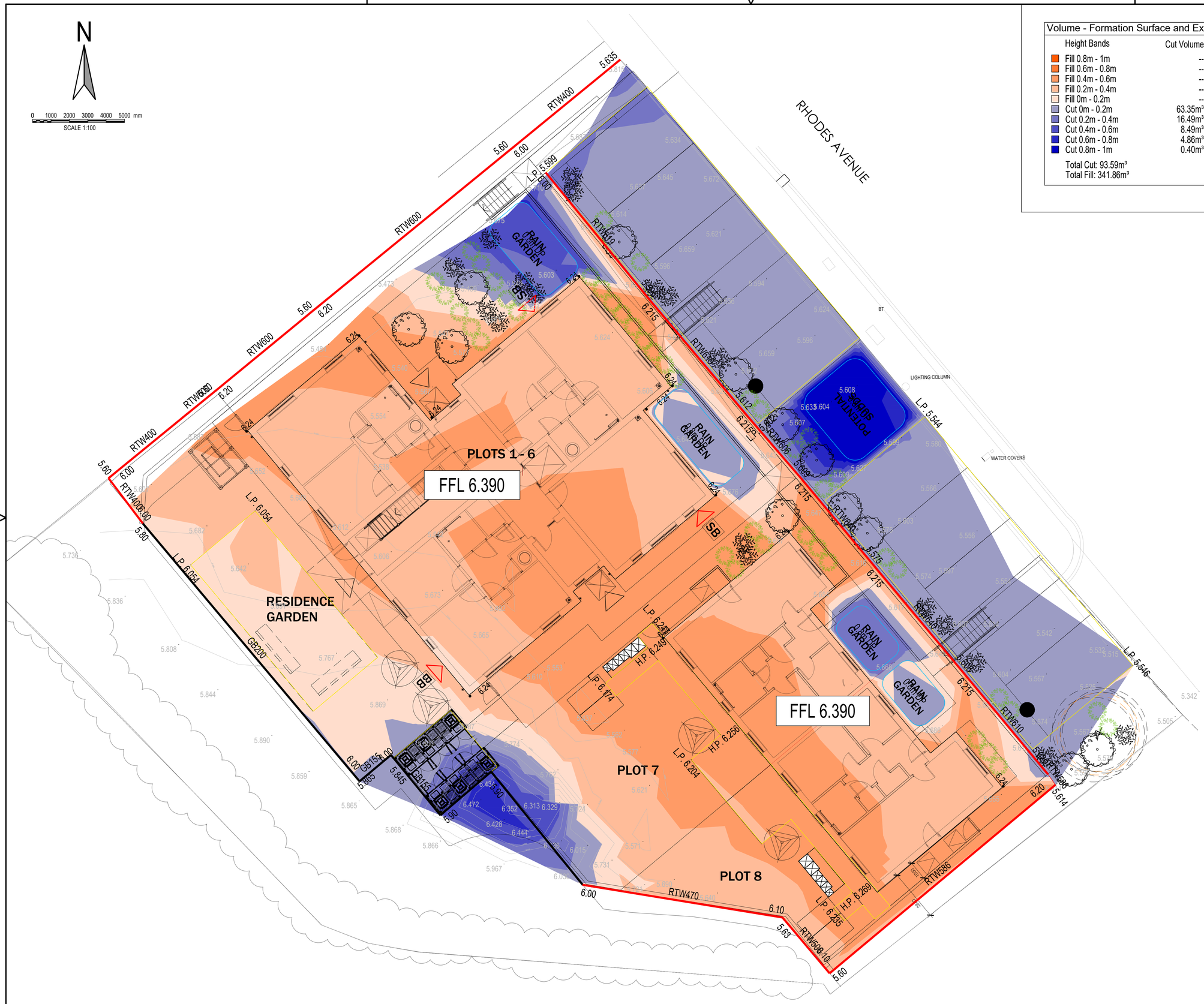


Toe mesh - A393 - (393 mm^2/m)
Heel mesh - A393 - (393 mm^2/m)
Stem bars - 10 mm dia.@ 200 mm centres - (393 mm^2/m)

APPENDIX E:

Cut and Fill

Sheet ACAD - A1 rev. C



Volume - Formation Surface and Existing Topo

Height Bands	Cut Volume	Fill Volume
Fill 0.8m - 1m	--	--
Fill 0.6m - 0.8m	--	--
Fill 0.4m - 0.6m	--	22.32m³
Fill 0.2m - 0.4m	--	135.56m³
Fill 0m - 0.2m	--	183.98m³
Cut 0m - 0.2m	63.35m³	--
Cut 0.2m - 0.4m	16.49m³	--
Cut 0.4m - 0.6m	8.49m³	--
Cut 0.6m - 0.8m	4.86m³	--
Cut 0.8m - 1m	0.40m³	--
Total Cut: 93.59m³		
Total Fill: 341.86m³		

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE SHOWN IN METRES UNLESS NOTED OTHERWISE.
3. DO NOT SCALE FROM THE DRAWING. USE FIGURED DIMENSIONS ONLY.
4. ANY DISCREPANCIES TO BE REPORTED IMMEDIATELY TO THE ENGINEER.
5. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS, SUBCONTRACTORS AND SPECIALISTS DRAWINGS AND SPECIFICATIONS.
6. EXISTING SERVICES HAVE NOT BEEN SHOWN BUT ARE PRESENT - THE CONTRACTOR IS TO LIAISE WITH ALL STATUTORY AUTHORITIES PRIOR TO THE COMMENCEMENT OF ANY WORKS.

THIS CUT AND FILL ANALYSIS IS A COMPARISON OF VOLUMES BETWEEN EXISTING GROUND LEVELS (TAKEN FROM 3RD PARTY DATA) AND PROPOSED FORMATION LEVELS, ASSUMED TO BE AS FOLLOWS:

FORMATION LEVELS (CONSTRUCTION DEPTH BELOW DESIGN SURFACES)

- DEPTH FOR ROADS/CAR PARKS = 150mm
- DEPTH FOR FOOTWAYS = 150mm
- DEPTH FOR BUILDING PADS =450mm
- DEPTH FOR EARTHWORKS = 0mm

THIS ANALYSIS DOES NOT CONSIDER TRENCHES FOR SERVICES.

THE TOPOGRAPHICAL SURVEY PROVIDED DOES NOT EXTEND ACROSS THE ENTIRE FOOTPRINT OF THE PROPOSED SITE. AS A RESULT, CERTAIN AREAS MAY BE INCOMPLETE WHERE EXISTING GROUND LEVELS ARE UNAVAILABLE FOR COMPARISON WITH THE PROPOSED DESIGN. IN THESE LOCATIONS, GROUND LEVELS HAVE BEEN INTERPOLATED BASED ON THE BEST AVAILABLE SURROUNDING DATA.

PRELIMINARY

rev.	drawn	chkd.	apprvd.	date	description
02	LT	LT	PG	06.05.26	CAR PARK FORMATION DEPTH REDUCED
01	LT	LT	PG	01.05.26	FIRST ISSUE

Client
CJ CONSTRUCTION

Project
FORMER CHANGING ROOMS
RHODES AVENUE, ABERAVON,
NEATH PORT TALBOT SA12 6UT

Title
CUT AND FILL ANALYSIS

Vale Consultancy
CONSULTING CIVIL & STRUCTURAL ENGINEERS
29 Bocam Park, Old Field Road, Pencoed, Bridgend CF35 5LJ.
Phone: 01656 863794 Email: enquiries@vale-consultancy.co.uk

date	drawn	checked		approved	
MAY 26	LT	LT	01.05.26	PG	01.05.26

scale @ A1	project no.
1:100	21698

status	drg. no.	rev.
P	21698_600	02

ORIGINAL DRAWING SIZE 841 x 594

10 0 10 20 50 100mm NATURAL SCALE

DRAWING STATUS
A - Approval, AB - As-Built, C - Construction, D - Draft, P - Preliminary, T - Tender

A1

APPENDIX F:
NRW Correspondence

Cyfoeth Naturiol Cymru
Natural Resources Wales

Ein cyf/Our ref: CAS-279551-Q8P2

Mr Robert Bowen
Robert Bowen Planning & Development Ltd.
info@rbplanning.co.uk

Dyddiad/Date: 23 May 2025

Annwyl Syr/Madam/Dear Sir/Madam,

BWRIAD/PROPOSAL: CHANGE OF USE FROM SINGLE STOREY DETACHED FORMER CHANGING ROOMS TO PROPOSED 8NO. RESIDENTIAL UNITS – 6NO. 1 BED FLATS (ASSISTED LIVING), 2NO. 1 BED BUNGALOWS (100% AFFORDABLE)

LLEOLIAD/LOCATION: FORMER CHANGING ROOM, RHODES AVENUE, ABERAFON, SA12 6UT

Thank you for consulting Cyfoeth Naturiol Cymru (CNC) / Natural Resources Wales (NRW) about the above pre-application enquiry, which we received on 27th April 2025.

We have considered your enquiry in relation to our Development Planning Consultations Topics document (September 2018). We advise the following matters are relevant to your proposal and suggest you consider these further prior to the submission of any planning application.

Flood Risk

The proposal is for a redevelopment of a parcel of land at Rhodes Avenue from changing rooms (LVD) to the erection of 8 residential units consisting of 6no 1 bed flats and 2 no 1 bed bungalows (HVD).

We have reviewed the Flood Consequences Assessment (FCA) ('Flood Consequence Assessment – Former Changing Room, Rhodes Avenue, Aberavon, Neath Port Talbot, SA12 6UT' by Vale Consultancy, dated 11/04/2025, report reference: 21698-FCA-01, issue 01).

The FCA refers to NRW's Flood Risk Assessment Wales (FRAW) Flood Maps, however these hold no relevance nor are considered suitable to inform FCA's and therefore this information has been disregarded.

The application site is located wholly within Flood Map for Planning (FMfP) Flood Zones 2 and 3, and within an TAN15 defended zone. However, it should be noted that defences are to protect existing property rather than justification of new developments.

The FCA has utilized NRW's flood model for Port Talbot to assess the flood risk to the site and reports that in the Q100+cc (Defended Scenario) the site is flood free. The Q1000+cc

(Defended Scenario) has not been assessed. We therefore cannot confirm compliance with Figure 6 of TAN15 and this information should be provided should formal planning permission be sought. In the T200+cc (Defended Scenario) the site is reported to be flood free, however in the T1000+cc (Defended Scenario) the site is shown to flood to depths exceeding the guidance contained with Figure 6 of TAN15.

The FCA has not undertaken any analysis of failure of the defences, and this should also be addressed in any future FCA supporting a formal application.

Section 5.5 of the FCA looks at the impact of flood risk elsewhere as result of the proposed development, however even though the site has been identified to be at risk of flooding in both the fluvial and tidal scenarios, the FCA has assumed that any displaced flood waters will remain on the application site and not affect any 3rd parties. There is no quantifiable evidence to support this claim, and we cannot concur with the report's findings at present.

In summary, the FCA fails to satisfy the requirements of TAN15 and further information would need to be provided for review, especially given the that the Q1000+cc has not been assessed, nor the impact should the defences in place fail. At present we could not provide a response that is supportive of introducing highly vulnerable development with ground floor sleeping into an area considered to be at flood risk.

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

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

FW: Former Changing Room - Rhodes Avenue ABERAVON (Pre-app Free) - NRW Response NRW:08691533

LD Liam Davies
To Richard Peskett

Reply | Reply All | Forward

Mon 09/06/2025 12:33

From: SW Planning <swplanning@cyfoethnaturiolcymru.gov.uk>
Sent: 17 April 2025 15:19
To: Liam Davies <Liam.Davies@vale-consultancy.co.uk>
Subject: Former Changing Room - Rhodes Avenue ABERAVON (Pre-app Free) - NRW Response NRW:08691533

FAO Liam Davies

Annwyl / Dear Liam,

Thank you for your email. As noted within your pre-app request form, the site is located within Flood Zone 3 Rivers and Sea and the TAN15 defended zone in the Flood Map for Planning. The flood risk to the site will need to be assessed in line with the updated TAN15 document (Technical Advice Note 15: Development, Flooding and Coastal Erosion (TAN15) (March 2025). In the first instance I would refer you to Section 10 of TAN15, and advise you liaise with the Local Planning Authority to confirm whether they consider the status of the land as greenfield or brownfield, and whether it is allocated within the Local Development Plan (LDP).

Cofion Cynnes / Kind Regards

A Fracchiolla

Tîm Cynllunio Datblygu / Development Planning Team
Cyfoeth Naturiol Cymru / Natural Resources Wales
www.cyfoethnaturiolcymru.gov.uk / www.naturalresourceswales.gov.uk

Yn falch o arwain y ffordd at ddyfodol gwell i Gymru trwy reoli'r amgylchedd ac adnoddau naturiol yn gynaliadwy / Proud to be leading the way to a better future for Wales by managing the environment and natural resources sustainably.

Croesewir gohebiaeth yn Gymraeg a byddwn yn ymateb yn Gymraeg, heb i hynny arwain at oedi / Correspondence in Welsh is welcomed, and we will respond in Welsh without it leading to a delay.

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

E-bost/E-mail: swplanning@cyfoethnaturiolcymru.gov.uk

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