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NRW Kenson River Restoration - FCA

Version P02

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This report describes work commissioned by Natural Resources Wales by an instruction dated 08.01.2025. The Client's representative for the contract was Elinor Meloy of Natural Resources Wales. George Williams of JBA Consulting carried out this work.

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Abbreviations

2D	Two Dimensional (modelling)
AEP	Annual Exceedance Probability
AOD	Above Ordnance Datum
BGS	British Geological Survey
DTM	Digital Terrain Model
FCA	Flood Consequence Assessment
FMfP	Flood Map for Planning
LDP	Local Development Plan
LFRMS	Local Flood Risk Management Strategy
LiDAR	Light Detection And Ranging
NGR	National Grid Reference
NRW	Natural Resources for Wales
PPW	Planning Policy Wales
TAN-15	Technical Advice Note 15: Development and Flood Risk
TUFLOW	Two-dimensional Unsteady FLOW (a hydraulic model)
WFD	Water Framework Directive

1 Introduction

1.1 Terms of Reference

JBA Consulting (JBA) were commissioned by Natural Resources Wales in January 2025 to produce a Flood Consequences Assessment (FCA) to support a planning application for the restoration and remeandering of a section of the Kenson River located within the Vale of Glamorgan.

1.2 FCA Requirements

This FCA follows the Welsh Government guidance on development and flood risk set out in the Technical Advice Note 15: Development, Flood Risk and Coastal Erosion (TAN-15). TAN-15 states that:

'The prime objective of a Flood Consequences Assessment is to develop a full appreciation of:

- The risks and consequences of flooding on the development; and

- The risk and consequences (i.e the overall impacts) of the development on flood risk elsewhere.'

To achieve this, the FCA should establish if suitable avoidance and mitigation measures can be incorporated, in a manner compatible with the placemaking aims of Planning Policy Wales, within the site design to ensure that development is safe and there is:

- Minimal risk to life;
- Minimal disruption to people living and working in the area;
- Minimal potential damage to property; and
- Minimal disruption to the sustainable management of natural resources.

As outlined in TAN-15, the planning authority will need to conclude where a development should proceed or not, depending on whether the consequences of flooding can be safely managed, including its effects on flood risk elsewhere.

2 Site Description

2.1 Site Summary

The site is situated on a stretch of the River Kenson between Kenson Hill (NE) to the location where the Kenson River passes under the B4265. The river flows southwest through grassland and riparian habitats until its confluence with the River Thaw 500m southwest of the site boundary.

The area of interest is a 2.2km long reach from Kenson Hill, 250m north of Kenson, to the B4265, 2km to the west of Kenson, and is centralised on national grid reference NGR ST 04343 68371. The site is irregular in shape and occupies an area of 3.94 hectares. The site location and red line boundary are shown below in Figure 2-1.

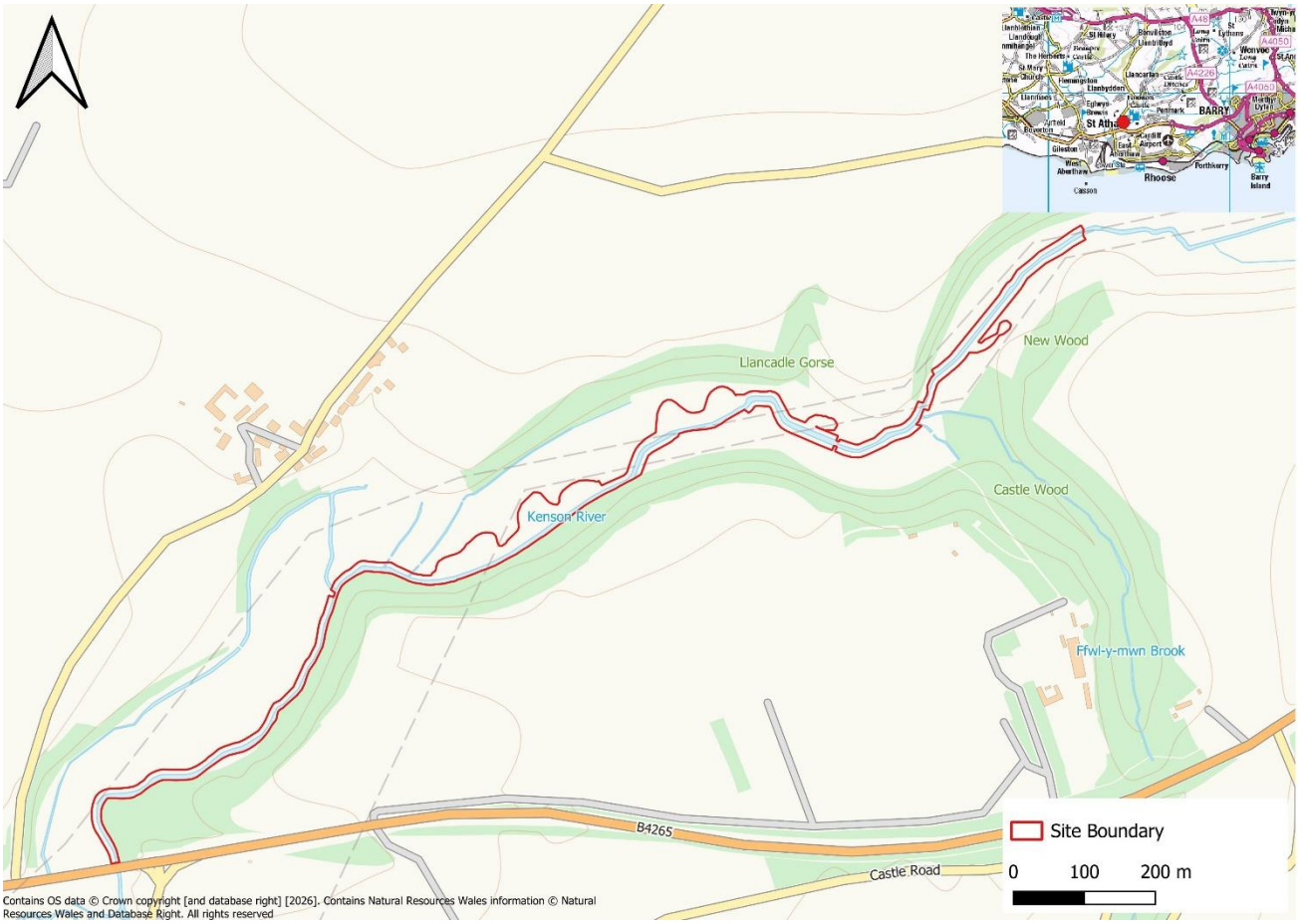


Figure 2-1 Site Overview

2.2 Site Topography

Natural Resources Wales 2023 1m LiDAR-derived Digital Terrain Model (DTM) has been used to assess the topography at the site, as shown in Figure 2-2.

The topography of the site is predominantly flat, with the floodplain level across the whole site consistently within the region of 7m AOD. The riverbed level varies, with a range of approximately 5-7m AOD throughout the course. Toward the southern area of the water course, bed levels are lower at around 5m AOD, whereas the upstream area is greater at around 7m AOD.

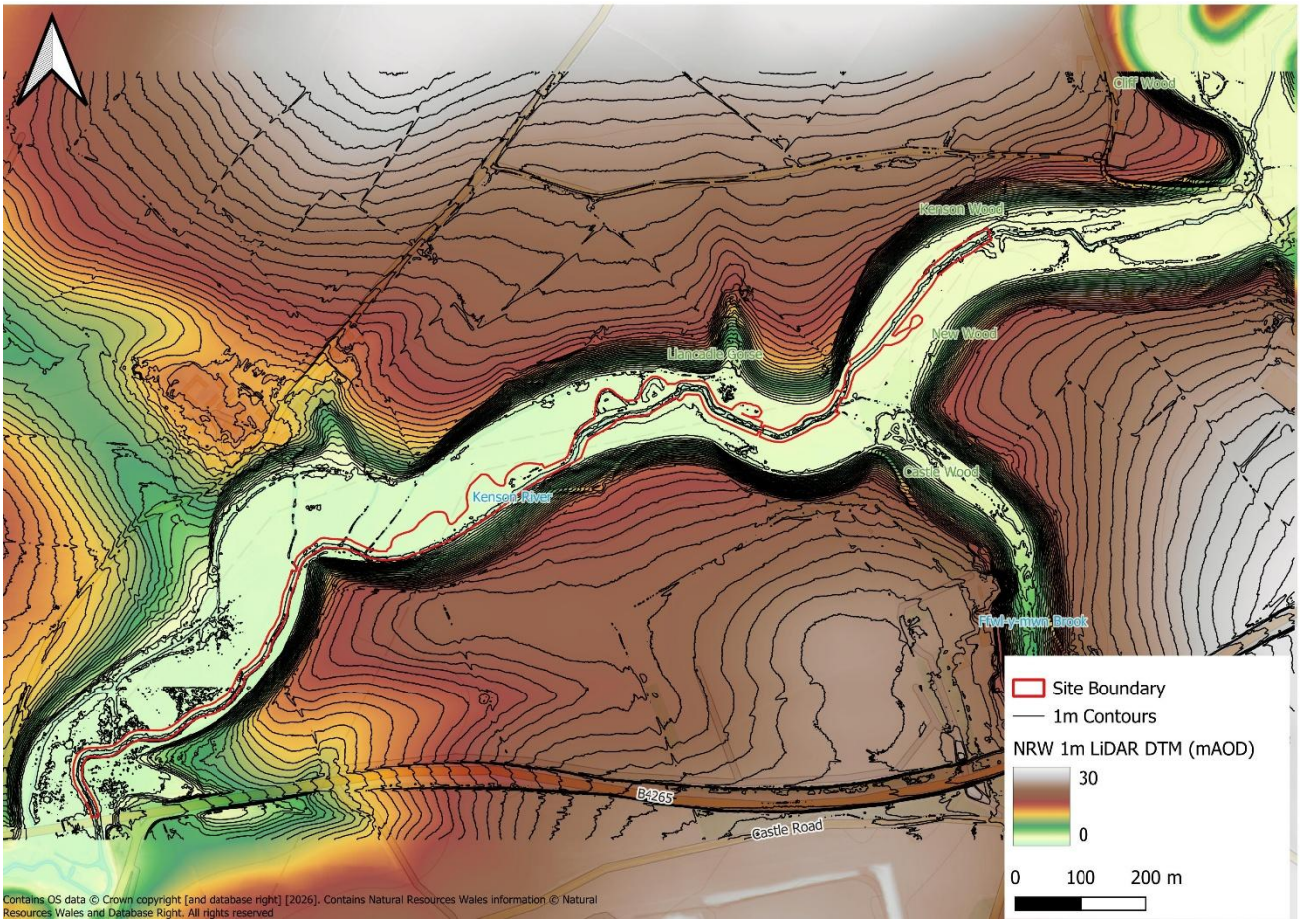


Figure 2-2 1m LiDAR DTM Topography Map

2.3 Soils and Geology

The geology of the site has been assessed using the British Geological Survey (BGS) GeoIndex[1]. The bedrock geology across the entirety of the development site is shown to be the Porthkerry Formation, comprised of thinly interbedded limestone and calcareous mudstone or siltstone. Superficial alluvium deposits are also present at the site.

1 GeoIndex - British Geological Survey

The soils on site have been assessed on the Cranfield University Soilscape Viewer[2]. The soil across the entirety of the site consists of freely draining, slightly acidic but base-rich soil with a loamy texture.

2.4 Watercourses and Flood Defences

The Kenson River, the focus of this FCA is a NRW Main River as shown in Figure 2-3. The Kenson flows in a south-westerly direction throughout the site. The Ffwl-y-Mwn brook, a small tributary, runs in a south to north direction adjacent to the B4265 joining the Kenson towards the north of the area of interest. There are also a number of small, unnamed watercourses that feed into the Kenson River and are located throughout the area of interest.

No NRW flood defences are present along the Kenson River within the study area.

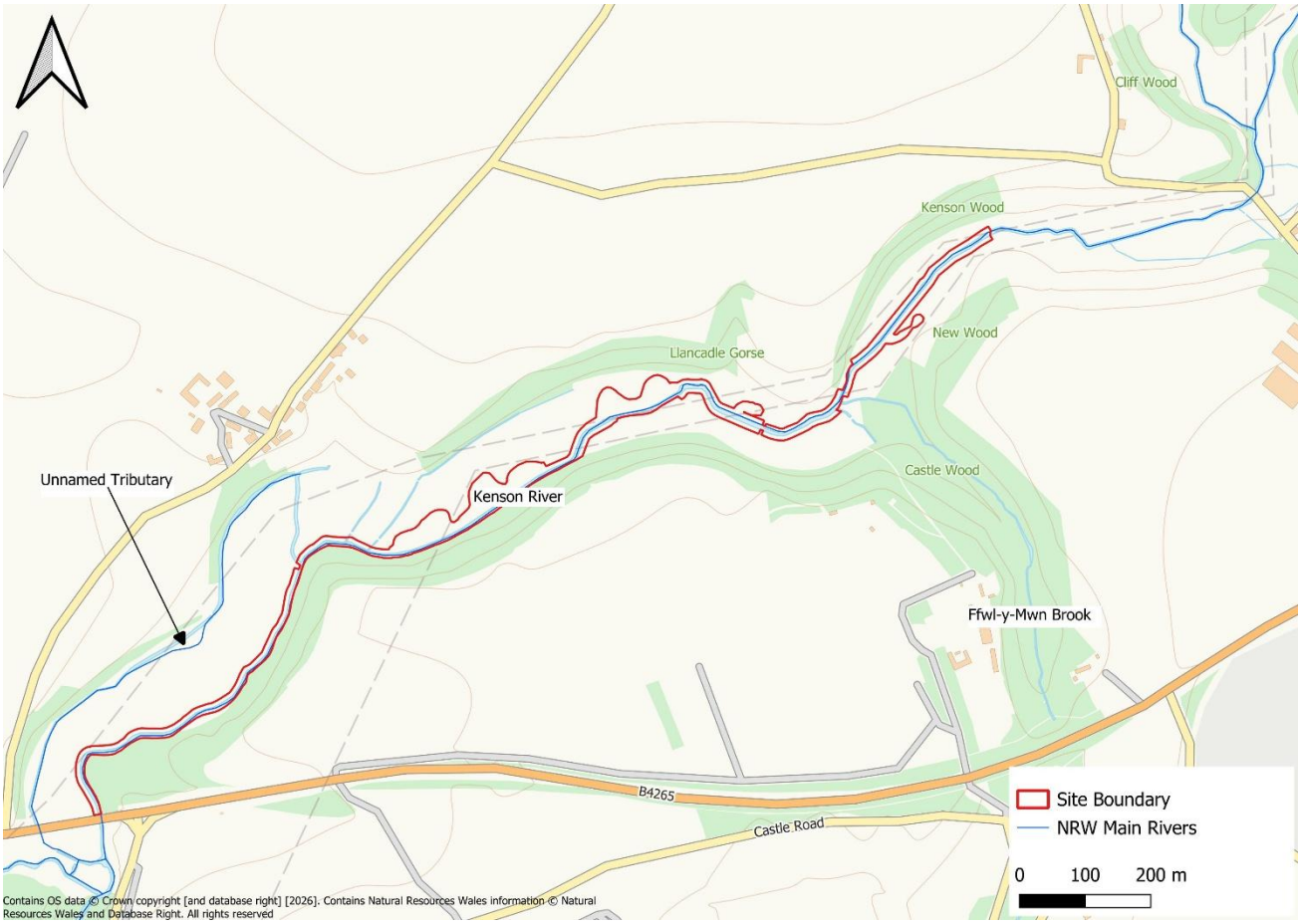


Figure 2-3 Watercourses

2 LandIS - Land Information System - Soilscapes soil types viewer

2.5 Proposed Development

The development will include changes to the floodplain and the channel of the Kenson River. The restoration of the river corridor will establish a sinuous river planform and improve in-channel habitats using nature-based solutions (NBS) to replicate and reinstate natural channel dynamics and increase habitat diversity. Meanwhile, elements added and changed across the floodplain will increase lateral connectivity and restore habitats alongside the river. The works will consist of:

- Creating backwater areas in the current channel
- Bed raising
- Re-profiling and re-grading sections of riverbank
- Installing in-channel features, such as woody material and in-channel berms
- Reconnecting palaeo channels and channel infilling
- Floodplain lowering
- Improving riparian corridor
- Installing a new footbridge

The restoration will improve the resilience of habitats and increase biodiversity within the Kenson River. The restoration works should also improve water quality by reducing the amount of sediment entering the watercourses. Improving riparian buffer strip integrity will also help protect the banks from erosion. These gains will all contribute towards improving the WFD status of the Kenson River, with the added benefit of helping transform the site into more pleasant areas for local residents using the Public Rights of Ways (PRoWs) and visitors to Fonmon Castle to enjoy.

An overview of the proposed interventions is contained in Appendix A.

3 Planning Policy and Flood Risk

3.1 Planning Context

Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which, together with PPW, provide the national planning policy framework for Wales. These policies aim to make all development in Wales sustainable and improve the social, economic, environmental, and cultural wellbeing of Wales as set out in the Wellbeing of Future Generations Act 2015.

Technical Advice Note 15 (TAN-15), originally introduced by the Welsh Government in 2004 and most recently updated in March 2025, provides technical guidance relating to development planning and flood risk in Wales. TAN-15 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. The approach set out in the most recent update to TAN-15 ensures flooding and coastal erosion are accorded appropriate consideration in plan making and development management decisions.

3.2 Form of Development

TAN-15 recognises two key forms of development: New development and Redevelopment. The definition of both terms is provided in Table 3-1.

Table 3-1 Form of Development

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

The development proposals do not fall neatly within the two categories as the above definitions are more commonly used when assessing applications within the built environment. However, as the development is for the regeneration and restoration of a River, the development has been assessed as a **'Redevelopment'** working on the understanding that previous alterations to the river occurred that altered the river's natural alignment and processes, which provides the rationale for the proposed restoration of the river.

3.3 Vulnerability Classification

TAN-15 assigns one of three flood risk vulnerability classifications to a development, as shown in Table 3-2 (TAN-15, Figure 4). Section 9.3 of TAN-15 stated that 'Water compatible developments include developments which are required to be located near water by virtue of the nature, and developments which are resilient to the effects of occasional flooding'.

The proposed development is the regeneration of a river, as the development is for the river itself and is therefore considered to be **'water compatible development'** in line with section 9.3 of TAN-15.

Table 3-2 TAN-15 Development Vulnerability Classifications

Development category	Types
Highly vulnerable development	All residential premises (including hotels, Gypsy and Traveller sites, caravan parks and camping sites). Schools and childcare establishments, colleges and universities. Hospitals and GP surgeries. Especially vulnerable industrial development (e.g. power generating and distribution elements of power stations, transformers, chemical plants, incinerators), and waste disposal sites. Emergency services including: ambulance stations, fire stations, police stations, command centres, and emergency depots. Buildings used to provide emergency shelter in time of flood.
Less vulnerable development	General industrial, employment, commercial, and retail development. Transport and utilities infrastructure. Car parks. Mineral extraction sites and associated processing facilities (excluding waste disposal sites). Public buildings including libraries, community centres and leisure centres (excluding those identified as in Highly Vulnerable category and emergency shelters). Places of worship. Cemeteries. Equipped play areas. Renewable energy generation facilities (excluding hydro generation).
Water compatible development	Boatyard, marinas, and essential works required at mooring basins. Development associated with canals. Flood defences and management infrastructure. Open spaces (excluding equipped play areas). Hydo renewable energy generation.

3.4 Lifetime of Development

An FCA should help the planning authority determine whether the risk and consequences of flooding are acceptable over the lifetime of development. TAN-15 states:

'Generally, it is appropriate to think of new dwellings as having a lifetime of 100 years. Lifetimes for other types of development will vary, but 75 years is considered a reasonable rule of thumb'.

As the proposals are for a river restoration and there is no typical lifetime of development given to such proposals. Therefore, in the absence of a guided lifetime of development, a 75-year lifetime of development has been considered in this assessment.

3.5 Flood Map for Planning

The Flood Map for Planning (FMfP) is the starting point for consideration of flood risk. The map uses flood zones to indicate the degree to which land is at risk of flooding from rivers, the sea, surface water and small watercourses. The main zones are Zone 1, Zone 2, Zone 3 and the Defended Zone. The FMfP displays predicted future flood risk with an allowance made for climate change over a 100-year lifetime of development.

3.5.1 Flood Map for Planning - Flood Risk from Rivers

NRWs Flood Map for Planning (FMfP) - Flood Risk from Rivers show the entire site to be located within Flood Zone 3 as shown in Figure 3-1 below. Areas in Flood Zone 3 have a greater than 1.0% (1 in 100-year) chance of flooding in any given year, including an allowance for climate change.

The presence of Flood Zone 3 within the site boundary triggers the requirement for an FCA.

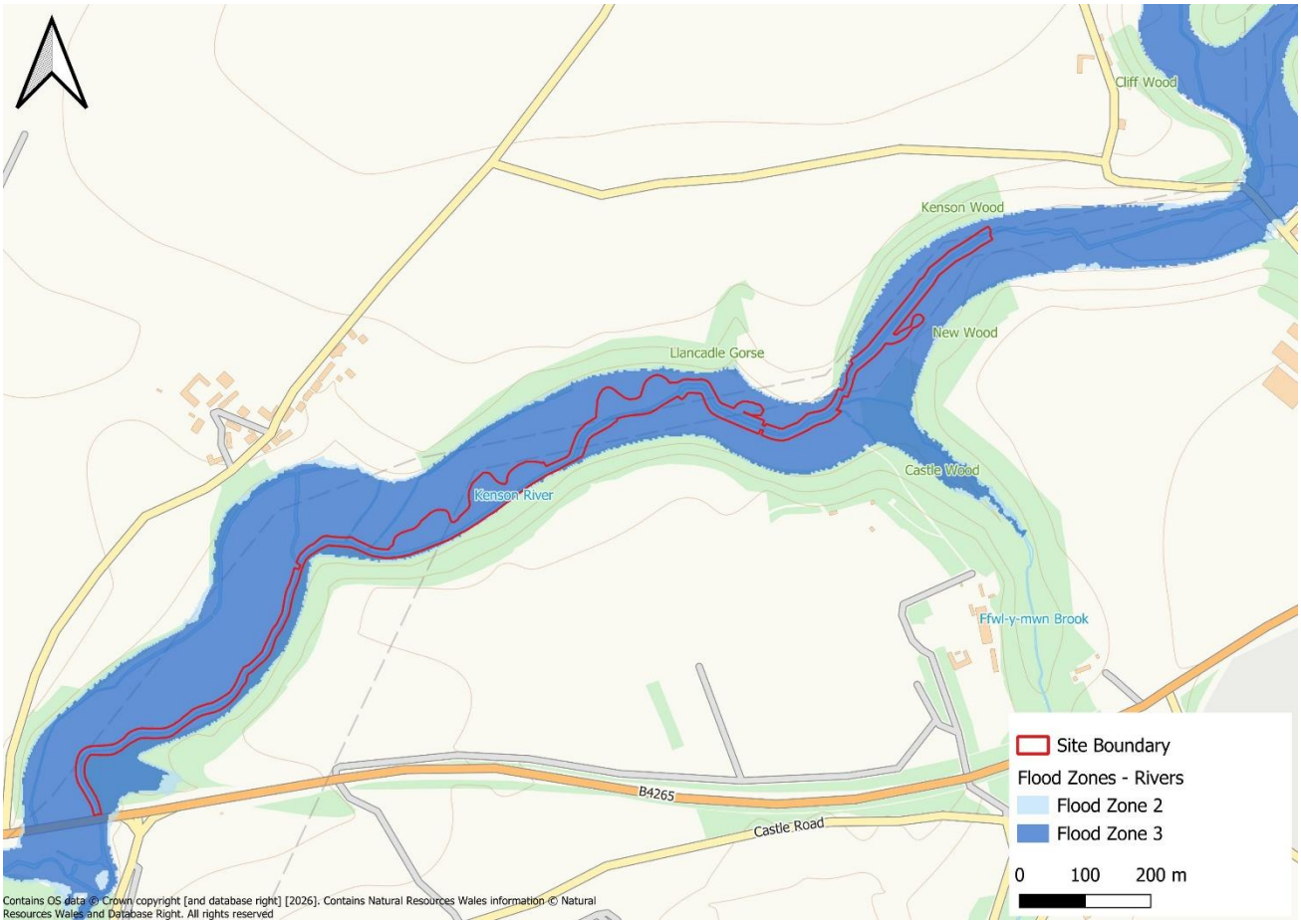


Figure 3-1 FMfP - Flood Risk from Rivers

3.5.2 Flood Map for Planning - The Sea

All areas of the proposed site are located in Flood Zone 3 of the NRW FMfP- Flood Risk from the Sea as shown in Figure 3-2. Flood Zone 3 represents those areas at greater than 0.5% AEP (1 in 200 years) chance of flooding in any given year, including an allowance for climate change from the sea.

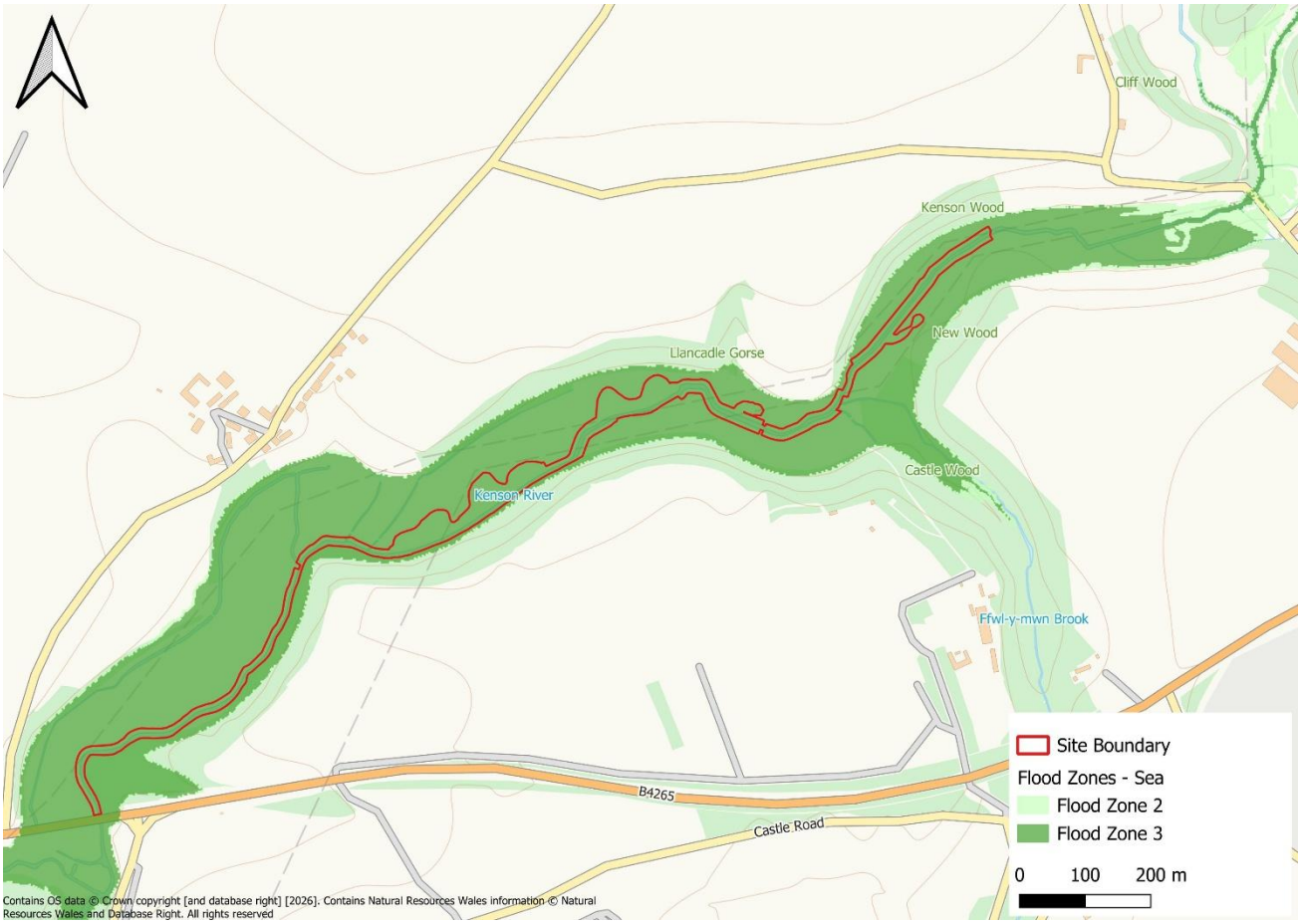


Figure 3-2 FMfP - Flood Risk from the Sea

3.5.3 Flood Map for Planning - Surface Water and Small Watercourses

Surface water flooding occurs when rain falls on saturated ground flows overland, following the local topography. Surface water flooding and subsequent overland flow can therefore pose a risk to both the development site and the surrounding land. Overland flow may originate from the site itself or from adjoining land at a higher elevation from which the flow migrates onto the development. As shown in Figure 3-3, much of the site is located within Flood Zone 1. Areas of the site are located within Flood Zone 2, Flood Zone 2 represents areas that have a between 1% AEP and 0.1% AEP chance of flooding in any given year, including an allowance for climate change from surface water or small watercourses.

Additionally, there are areas within Flood Zone 3. Areas in Flood Zone 3 represent a greater than 1% (1 in 100) chance of flooding in any given year, including an allowance for climate change.

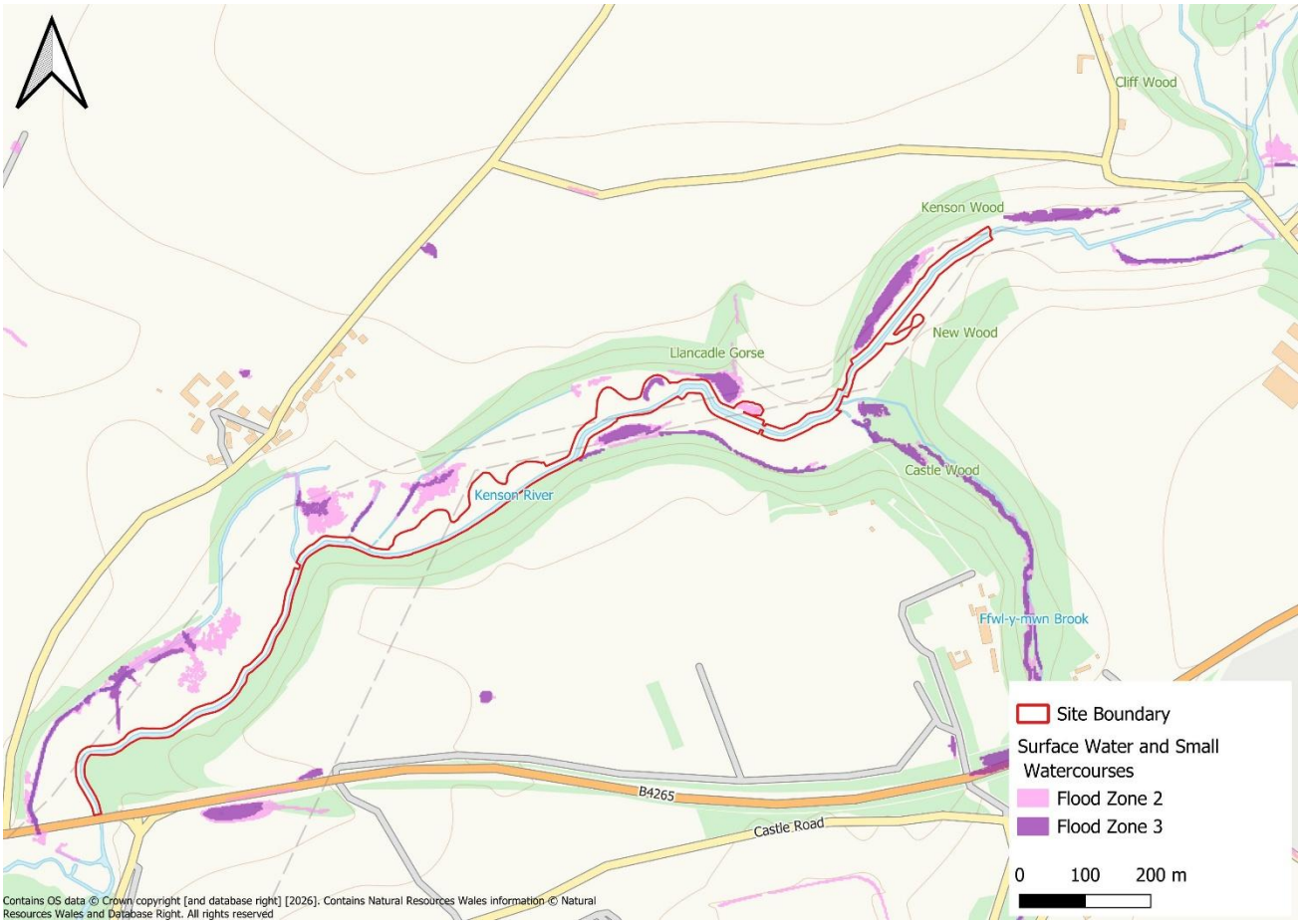


Figure 3-3 FMfP - Surface Water and Small Watercourses

3.6 Local Development Plan

The Local Development Plan (LDP) is a land-use document in which the council sets out its land use development over a 15-year period. The current LDP for the Vale of Glamorgan[3] was adopted in 2011 and provides a framework to guide development and set out where, when, and how new development can take place in that period (2011-2026).

Objective 4 of the LDP is *'To protect and enhance the Vale of Glamorgan's historic, built, and natural environment'*.

The objective further states '*The LDP will ensure that these natural and built environmental assets are protected, conserved and where appropriate enhanced as an important resource for local people and which attract visitors and contributes to the local economy'*.

The development proposal for the site complies with this objective as the restoration will ensure the natural environment asset of this floodplain is restored, enhancing for both the local people and visitors to Fonmon Castle and the surrounding area contributing to the local economy in the Vale of Glamorgan.

3 Adopted-LDP-Written-Statement-June-2017-final-interactive-web-version.pdf

4 Flood Risk Assessment

This section assesses the risk to the proposed development from all sources of flooding, the risk of increased flooding to others, and how flood risks can be managed.

4.1 Review of existing flood risk data

Table 4-1 below provides a summary of the flood risk to the site from all sources of flood risk.

Table 4-1 Summary of Flood Risk

Source of Flooding	Onsite Presence	Risk / Description
Flood Risk from Rivers	✓	**High** - The site is located in an area that is at high risk of fluvial flooding. Section 5 of this report assesses the fluvial flood risk further.
Flood Risk from the Sea	✓	**High** - the site is located in an area that is at high risk of tidal/coastal flooding. Section 5 of this report assesses the fluvial flood risk further.
Flood Risk from Surface Water and Small Watercourses	✓	**Medium to High** - The site is located within an area that is at medium to high risk of flooding from surface water and small watercourses.
Flood Risk from Groundwater	✓	**Low** - Located in an area that is at a low risk of flooding from groundwater.
Flood Risk from Reservoirs	×	**Very low** - The site is at a very low risk to flooding from reservoir failure.
Flood Risk from Sewers	×	**Very low** - The site is at a very low risk of flooding from sewers.

4.2 Historical Flood Risk

NRWs' map of recorded flood extents does not show any historic record of flooding on the site. Additionally, the Vale of Glamorgan's Local Flood Risk Management Strategy[4] (LFRMS) also identified no records of historic flooding at the site.

4 https://www.valeofglamorgan.gov.uk/Documents/Living/Environment/Flood-and-coastal-erosion-risk/VoGC-LFRMS.pdf

4.3 Flood Risk from Surface Water and Small Watercourses

As mentioned within Section 3.5.3, areas of the site are within Flood Zone 2 and Flood Zone 3 of the FMfP - flood risk from surface water and small watercourses. Flood Zones 2 and 3, respectively, represent those areas at medium and high risk of flooding from this source.

The areas of the site associated with Flood Zones 2 and 3 are primarily located along the tributaries to the Kenson River. Furthermore, there are areas located in Flood Zones 2 and 3 that are associated with localised topographic depressions, with water 'ponding' within these areas. As water compatible development which is seeking to restore and enhance the natural function of the floodplain, the proposals are unaffected by any actual or perceived flood risk from Surface Water and Small Watercourses. Consequently, while the risk of Surface Water and Small Watercourses flooding may be **Medium - High Risk**, the consequences of such flooding within the site are negligible, and the proposal will have no adverse effects.

4.4 Flood Risk from Groundwater

Groundwater flooding is caused by unusually high groundwater levels. It occurs as excess water emerges at the ground surface or within manmade structures such as basements. Groundwater flooding tends to be more persistent than surface water flooding, in some cases lasting for weeks or months, and can result in damage to property. This risk of groundwater flooding depends on the nature of the geological strata underlying the site and the local topography.

The Vale of Glamorgan's Local Flood Risk Management Strategy[5] (LFRMS) states *'Groundwater flood risk in the Vale is currently poorly understood'* and that there is *'Very little historic evidence of this type of flooding Flood Risk from Reservoirs'.*

It can therefore be concluded that the risk of flooding from groundwater at this site is **very low**.

4.5 Flood Risk from the Sea

As noted in Section 3.5.2 the site is located within Flood Zone 3 of the FMfP- Flood Risk from the Sea. Flood Zone 3 represents the area most at risk of tidal/coastal flooding. Flood risk will occur as a result of storm surges and high tides, preventing the natural discharge of the Kenson and inundating low-lying areas.

Given the identified flood risk, further assessment of the tidal risk has been undertaken in Section 5.

5 https://www.valeofglamorgan.gov.uk/Documents/Living/Environment/Flood-and-coastal-erosion-risk/VoGC-LFRMS.pdf

4.6 Flood Risk from Reservoirs

The NRW FRAW Flood Risk from Reservoirs map shows that the site has a very low risk of flooding from reservoir failure, with no reservoirs identified within the catchment. Therefore, the risk of flooding from reservoir failure has been assessed to be **very low**.

No figure has been provided as a very low risk is shown as transparent on the NRW flood risk from reservoir mapping.

4.7 Flood Risk from Sewers

The Vale of Glamorgan's Local Flood Risk Management Strategy[6] (LFRMS) suggests there is no evidence of sewer flooding at the site. It is thought that the likelihood of sewers being located near the site is low. Therefore, it can be concluded that the risk of flooding from sewers at the site is **very low.**

6 https://www.valeofglamorgan.gov.uk/Documents/Living/Environment/Flood-and-coastal-erosion-risk/VoGC-LFRMS.pdf

5 Detailed Flood Risk Assessment

Fluvial and tidal flood risks have been identified as the predominant sources of flood risk at the site. Consequently, a detailed assessment of this flood risk source has been carried out and is reported in the following section.

5.1 Hydraulic Modelling

The new detailed flood model was constructed using a fully 2D approach within TUFLOW using the latest executable (version 2025.1.0). This approach was followed in order to fully capture in-channel hydrodynamics and to accurately represent planned in-channel restoration features such as berms, channel raising, and bank regrading.

A channel survey of the study reaches of the Kenson, as well as a topographic drone survey of the surrounding floodplain, was undertaken by Storm Geomatics in January 2025. This data was used to represent the baseline channel and floodplain of the Kenson River.

The model used two different 2D domain extents depending on the scenario. For fluvial events, only the study reach of the Kenson and the reach of the Thaw from the Kenson confluence to the outflow into the Bristol Channel at Aberthaw were included. For the tidal scenario, the whole tidally influenced reach of the Thaw up to Gigman Bridge was included in addition to the study reach of the Kenson. This was to ensure that the design tidal event flows could propagate accurately up the Thaw valley and not be artificially constrained at the Kenson confluence, which may have incorrectly increased the tidal flood levels within the study reach of the Kenson. Figure 5-1 below provides a graphical representation of the different 2D domain extents.

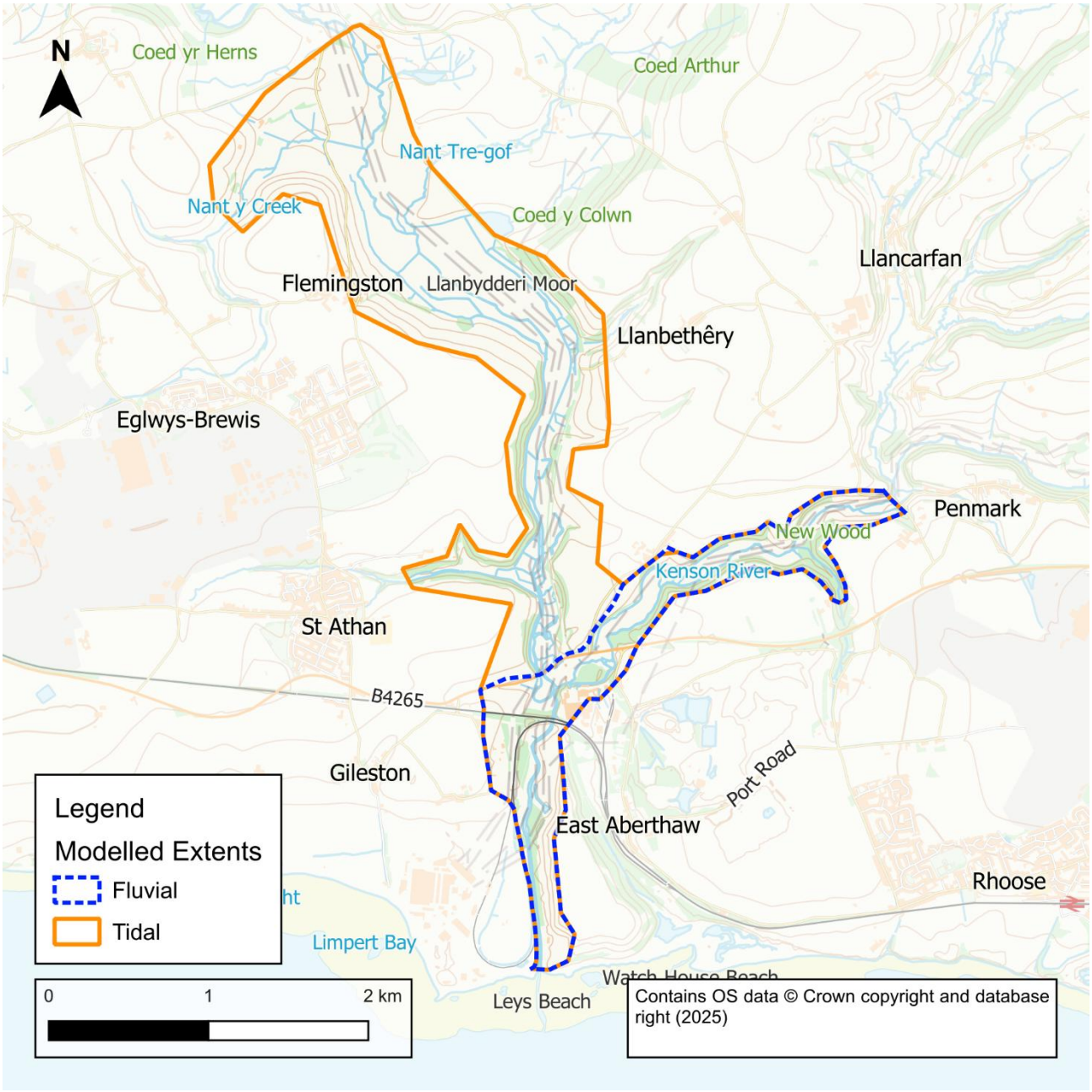


Figure 5-1 2D Domain Extents for both Fluvial and Tidal Dominated Scenarios.

Baseline modelling and post-development model simulations were also run. During the post-development runs the river restoration measures, designed by JBA, were incorporated into the model using z-shapes and roughness increases.

5.2 Fluvial Model Results

5.2.1 Fluvial Baseline

5.2.1.1 1% AEP + Climate Change Event

During the 1% AEP (1 in 100-year event) with an allowance for climate change, the entire site area is predicted to flood, as shown in Figure 5-2. Flood depths vary across the site, with most instances exceeding 1.3m in depth across much of the site. Depths are greatest towards the southern extent of the site and shallower in the north. The shallowest depth is approximately 0.1m, while the greatest depths within the floodplain exceed 2m.

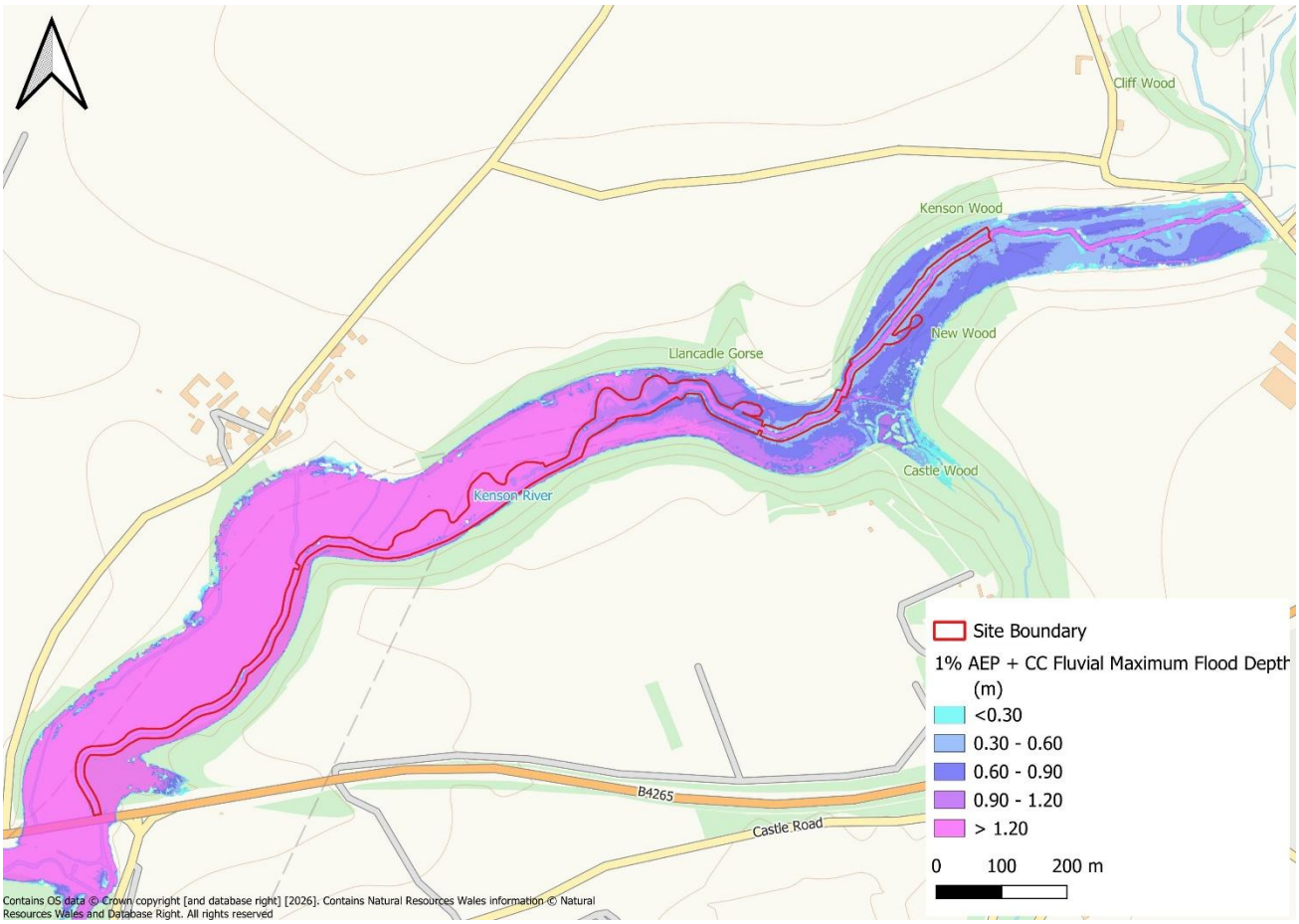


Figure 5-2 Baseline Fluvial 1% AEP + CC Maximum Flood Depth (m)

5.2.1.2 0.1% AEP + Climate Change Event

As with the 1% AEP plus climate change event, the entire site is predicted to flood during the 0.1% AEP plus climate change event, as shown in Figure 5-3. Flood depths increase across the site, with depths in most instances exceeding 1.6m. In some areas, maximum flood depths exceed 4m. Depths are greatest towards the southern extent of the site and shallower in the north.

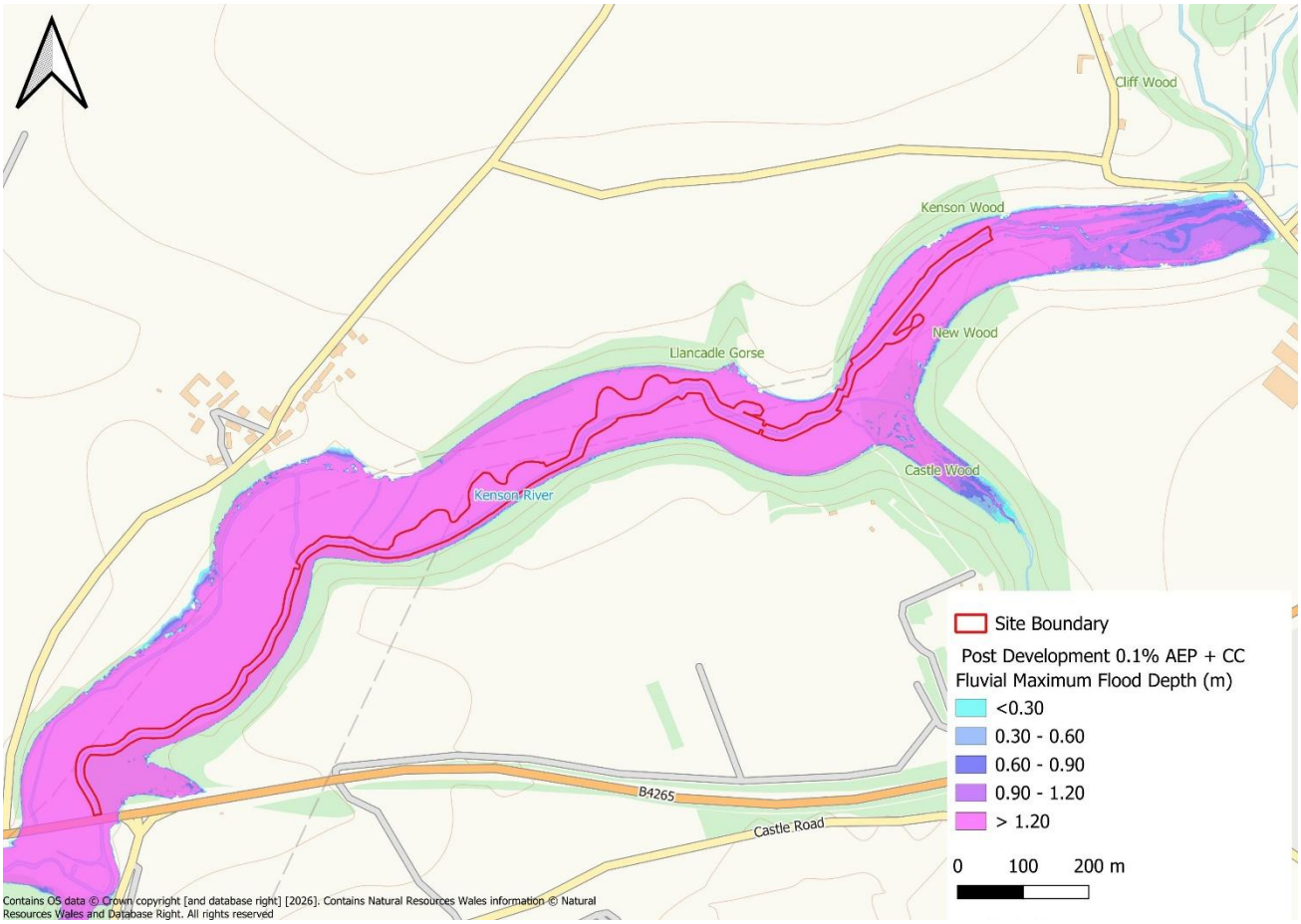


Figure 5-3 Baseline Fluvial 0.1% AEP + CC Maximum Flood Depth (m)

5.2.1.3 Summary of Baseline Results

The site is modelled to flood during both the 1% AEP and 0.1% AEP events, both with an allowance for climate change. Depths are significant in both events, often exceeding 1.5m in depth across the site. It has therefore been assessed that the site is at **high risk** of fluvial flooding. This is expected given that the site is a floodplain.

5.2.2 Fluvial Post-Development

Modelling was also undertaken to assess the potential for the scheme to impact on flood risk elsewhere, both positively and negatively. This was achieved by updating the baseline model with details of the proposed design through the application of topographical amendments to the model's Digital Elevation Model.

A comparative grid analysis was undertaken between the baseline and post-development model outputs to better understand localised changes. The assessment focused on differences in modelled maximum flood levels.

5.2.2.1 1% AEP + Climate Change Event

The entire site is predicted to flood during this post-development scenario, as shown in Figure 5-4. Flood extents during this event decrease very slightly. Similarly, flood depths are reduced by up to 0.02m.

Modelled maximum flood levels decrease across the site and within the floodplain, as shown in Figure 5-5. A reduction in the water level of up to 5cm was observed in the north east of the site, and reductions of less than 1 cm in the southwest. This reduction in the maximum water level is explained by the widening of the channel, which increases its capacity to hold and convey floodwater. The reduced water level demonstrates a small but measurable local benefit when compared to the baseline levels.

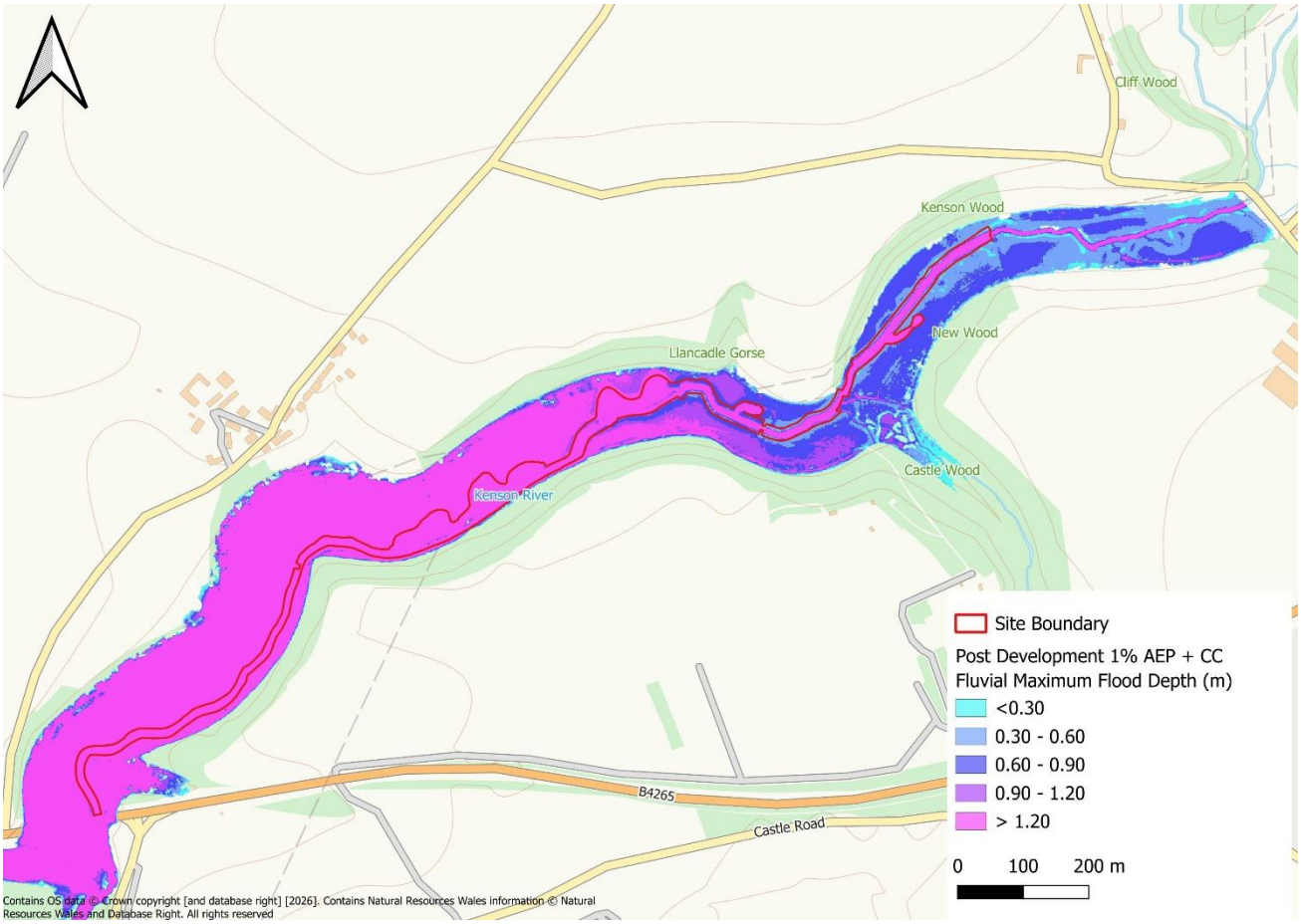


Figure 5-4 Post-Development Fluvial 1% AEP + CC Maximum Flood Depth (m)

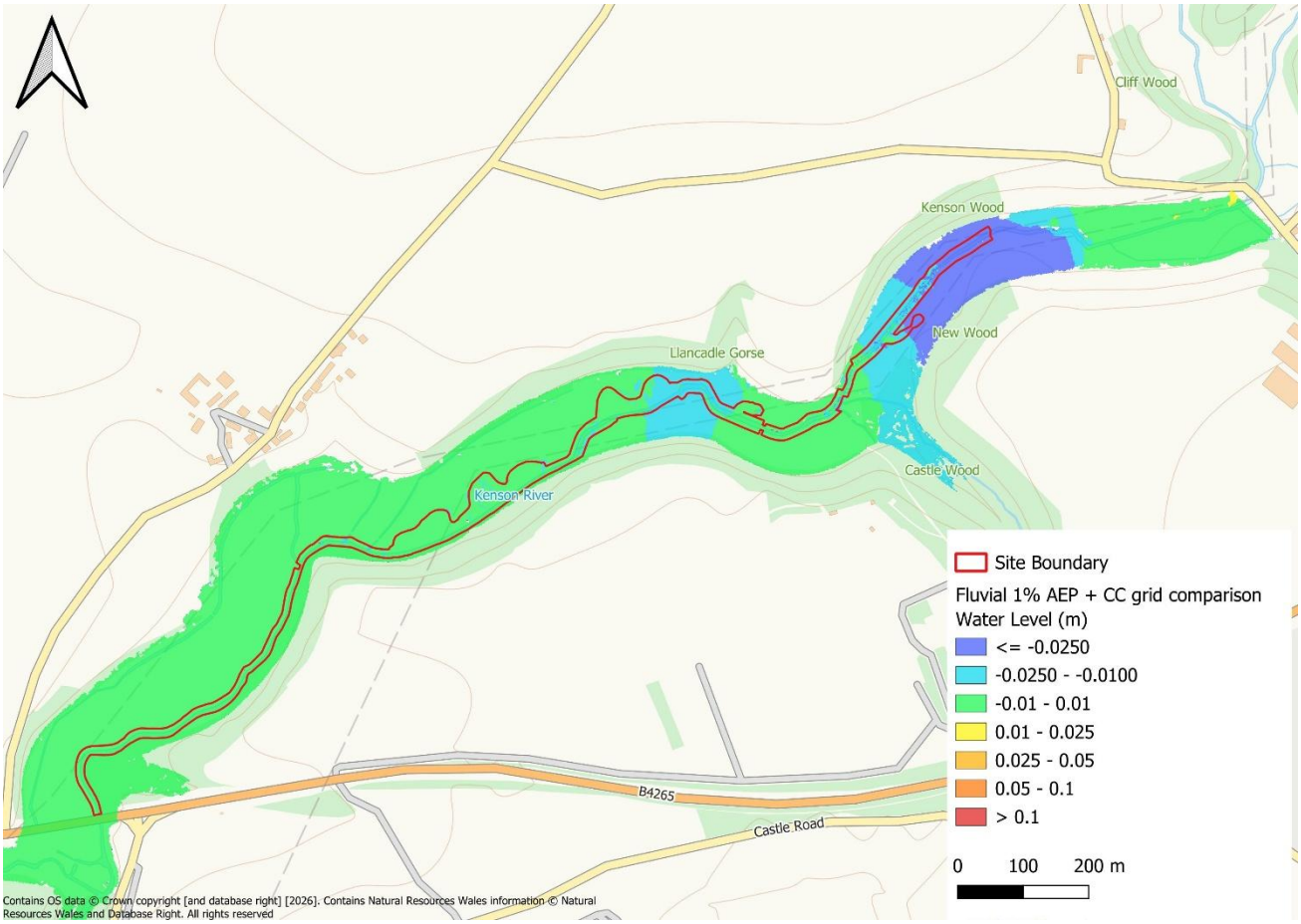


Figure 5-5 Fluvial 1% AEP plus CC Post-Development Grid Comparison

5.2.2.2 0.1% AEP + Climate Change Event

The entire site is predicted to flood during this post-development scenario, as shown in Figure 5-6.

Modelled maximum flood levels show no discernible change during this event when compared to the baseline scenario, as shown in Figure 5-7.

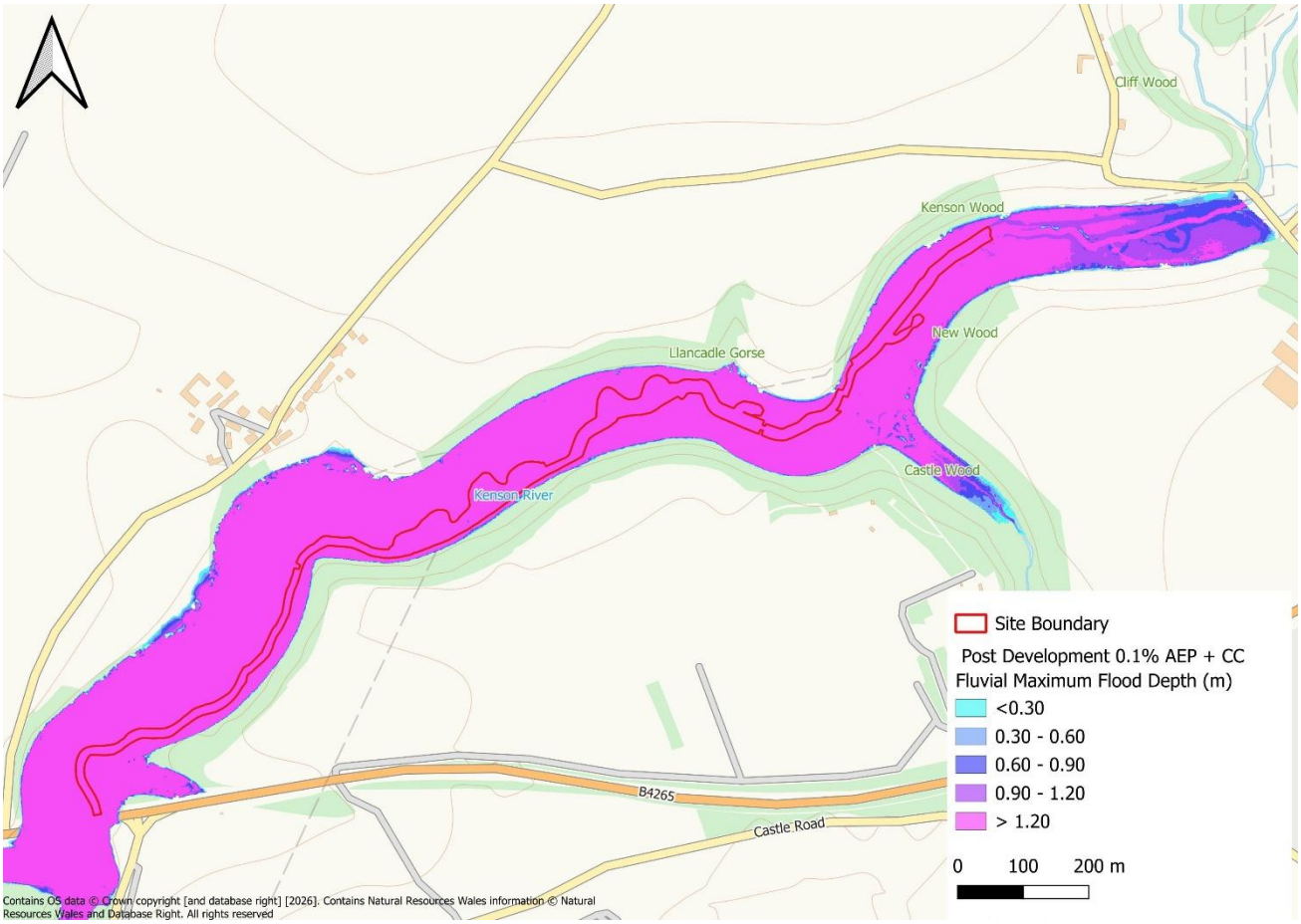


Figure 5-6 Post-Development Fluvial 0.1% AEP + CC Maximum Flood Depth (m)

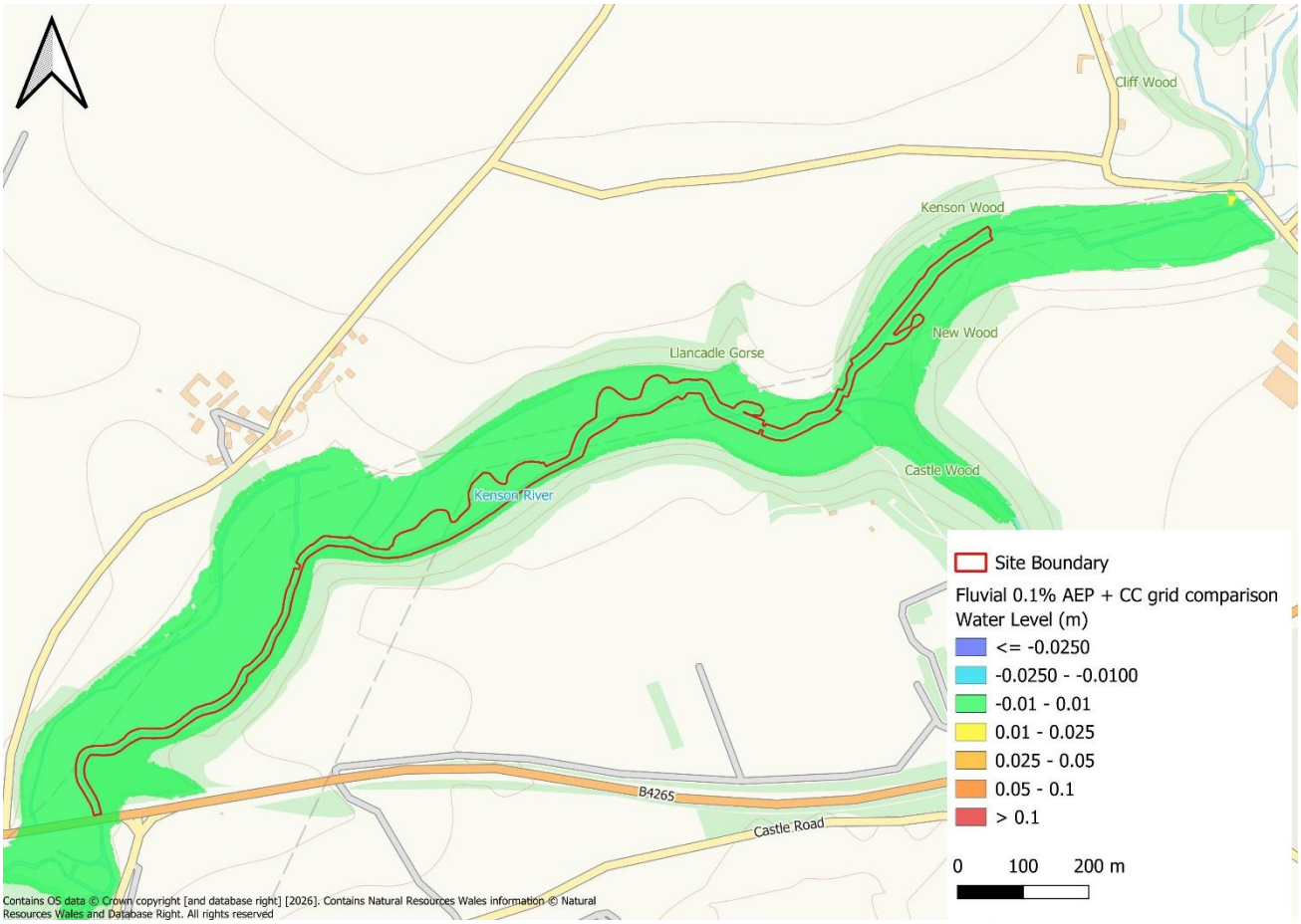


Figure 5-7 Fluvial 0.1% AEP plus CC Post-Development Grid Comparison

5.3 Tidal Results

When assessing the tidal-dominated events, a 50% AEP (1 in 2 year) fluvial event with an allowance for climate change was applied to river flows, with the tidal 0.5% (1 in 200 year) and 0.1% (1 in 1000 year) tidal events subsequently applied.

5.3.1 Tidal Baseline

5.3.1.1 0.5% AEP Event

During this event, the entire extent of the site is predicted to flood as shown in Figure 5-8. Flood depths are significant, with depths regularly exceeding 1 m. The greatest depths are found in the south of the site, and the shallowest tending to be in the north. Depths range up to 1.3m in the south.

When compared to the fluvial-dominated event, the tidal-dominated events are predicted to be somewhat less severe.

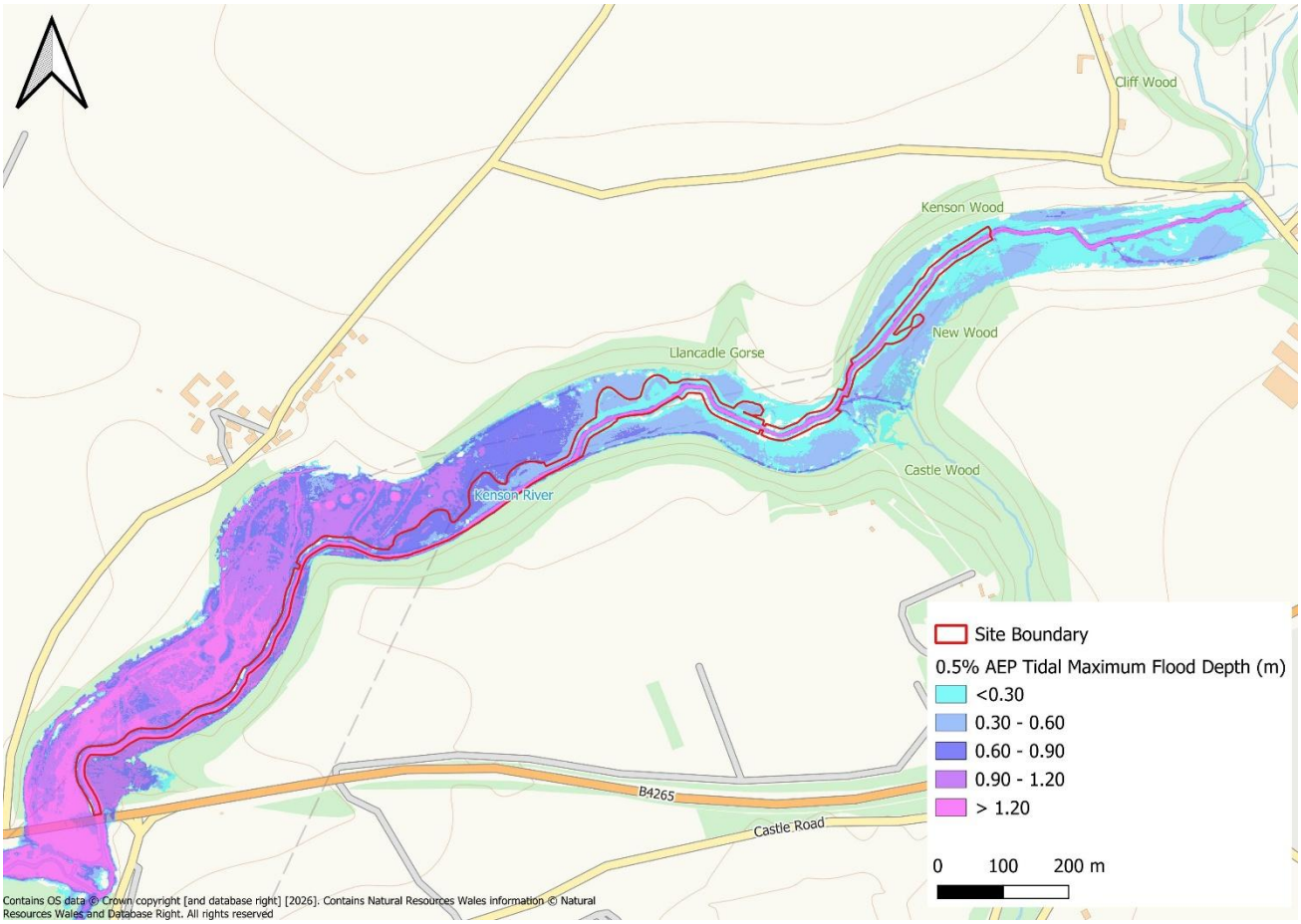


Figure 5-8 Baseline Tidal 0.5% AEP Maximum Flood Depth (m)

5.3.1.2 0.1% AEP Event

During this event, the entire extent of the site is predicted to flood, as shown in Figure 5-9. Flood depths are significant and slightly increased when compared to the 0.5% AEP event, with depths regularly exceeding 1m. The greatest depths can be found in the south of the site, approximately 1.4m.

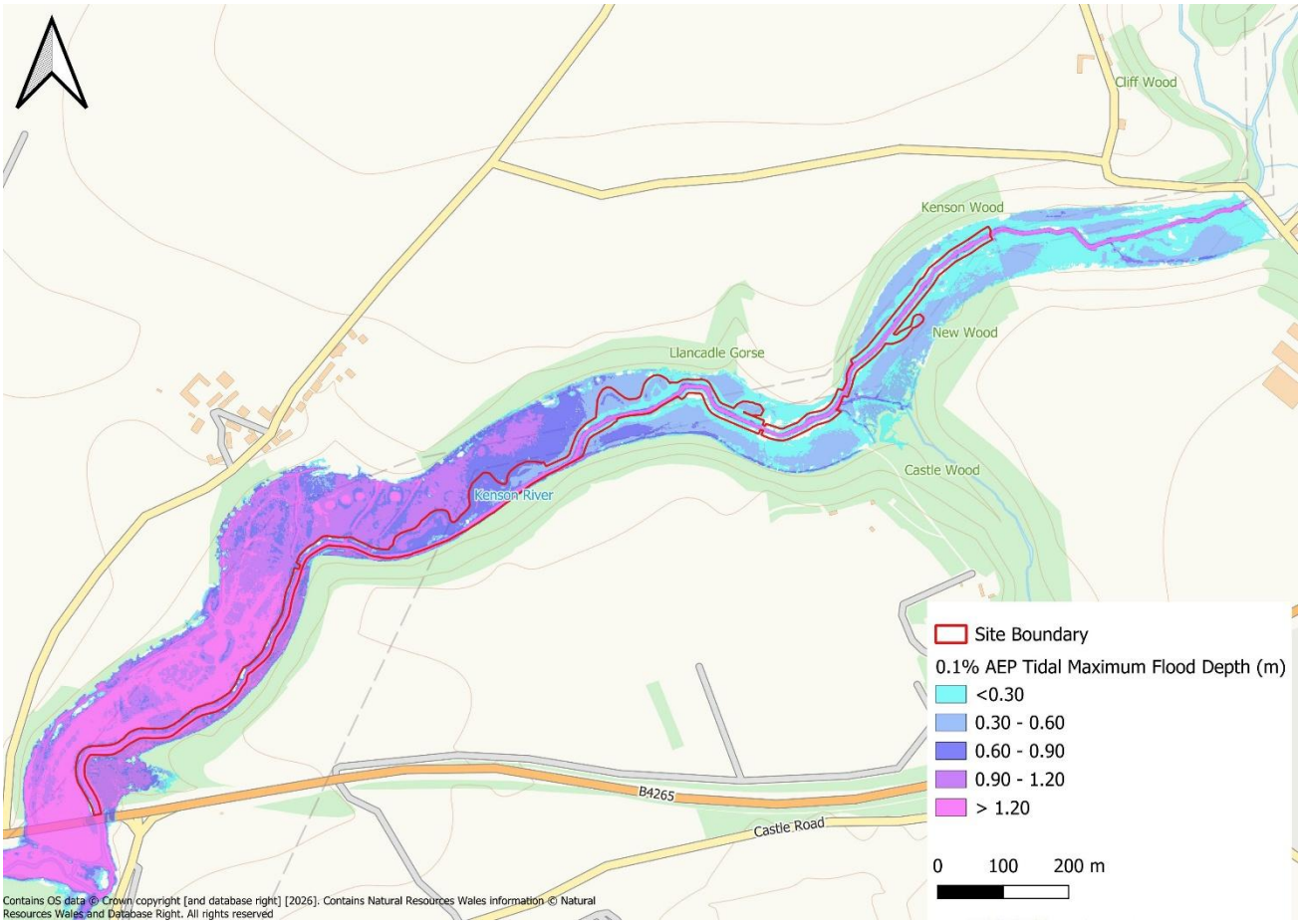


Figure 5-9 Baseline Tidal 0.1% AEP Maximum Flood Depth (m)

5.3.1.3 Summary of Baseline Results

The site is predicted to flood during both the 0.5% AEP and 0.1% AEP events, including a 75-year allowance for climate change. Depths are significant in both events, often exceeding 1m in depth across the site. It has therefore been assessed that the site is at **high risk** of Tidal flooding. Given that the site is an existing floodplain, this is expected.

5.3.2 Tidal Post-Development

5.3.2.1 0.5 % AEP Event

During this event, the entire extent of the site is predicted to flood, as shown in Figure 5-10. Flood depths are significant for much of the site, with depths widely exceeding 1m.

Modelled water levels are shown decrease very slightly across much of the site. The only exception to this is in the immediate vicinity of bed raising works towards the centre of the site, where modest and localised increases in flood levels are predicted. Such effects are a deliberate consequence of the proposed floodplain reconnection works.

Flood levels do not increase outside of the intended areas, as shown in Figure 5-11.

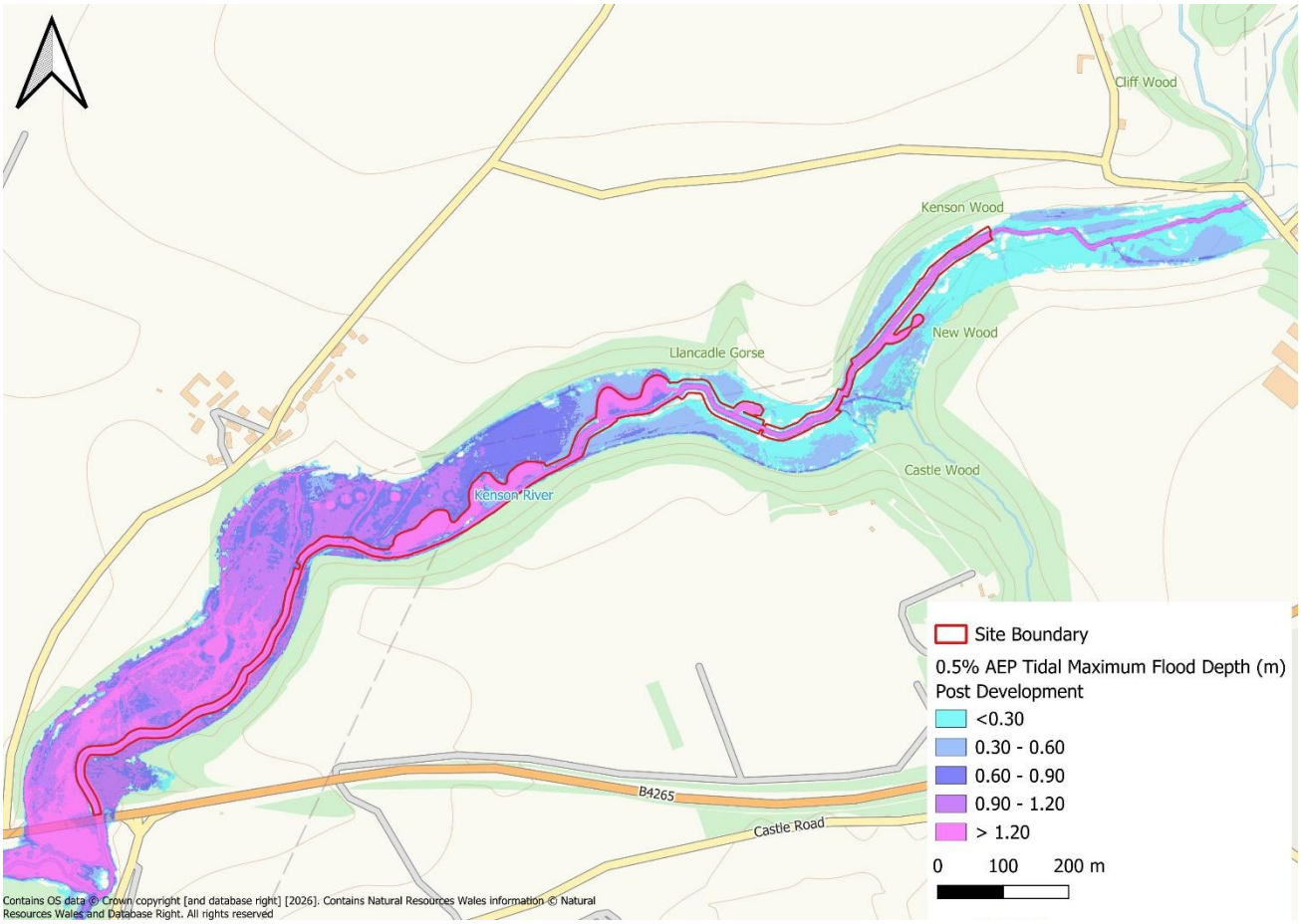


Figure 5-10 Post-Development Tidal 0.5% AEP + CC Maximum Flood Depth (m)

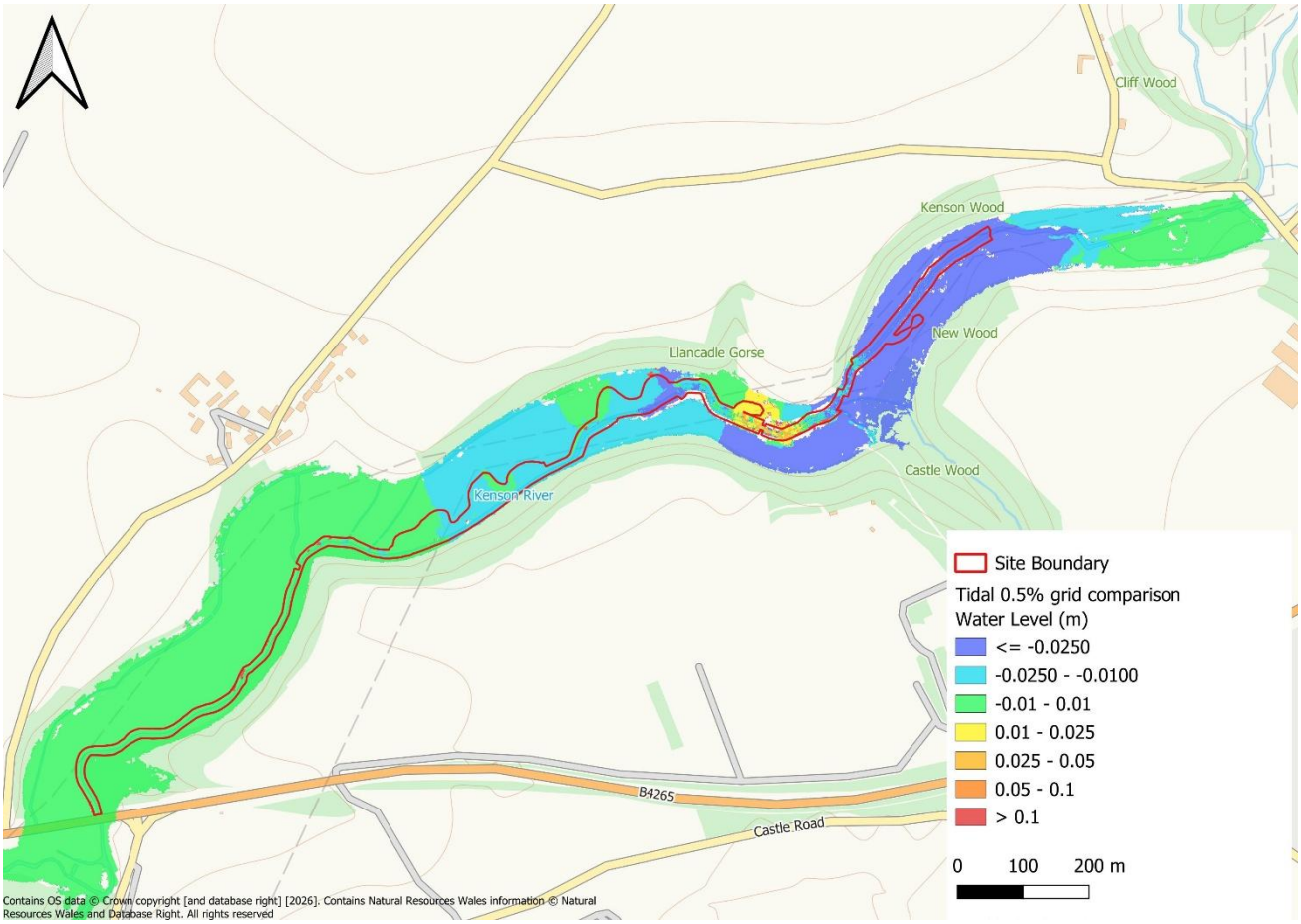


Figure 5-11 Tidal 0.5% AEP plus CC Post-Development Grid Comparison

5.3.2.2 0.1% AEP Event

During this event, the entire extent of the site is modelled to flood as shown in Figure 5-12. Flood depths are significant, with depths widely exceeding 1m.

The predicted changes in flood levels as a result of the proposals are almost indistinguishable from those reported in Section 5.3.2.1.

Flood levels are not increased outside of the intended areas, as shown in Figure 5-13.

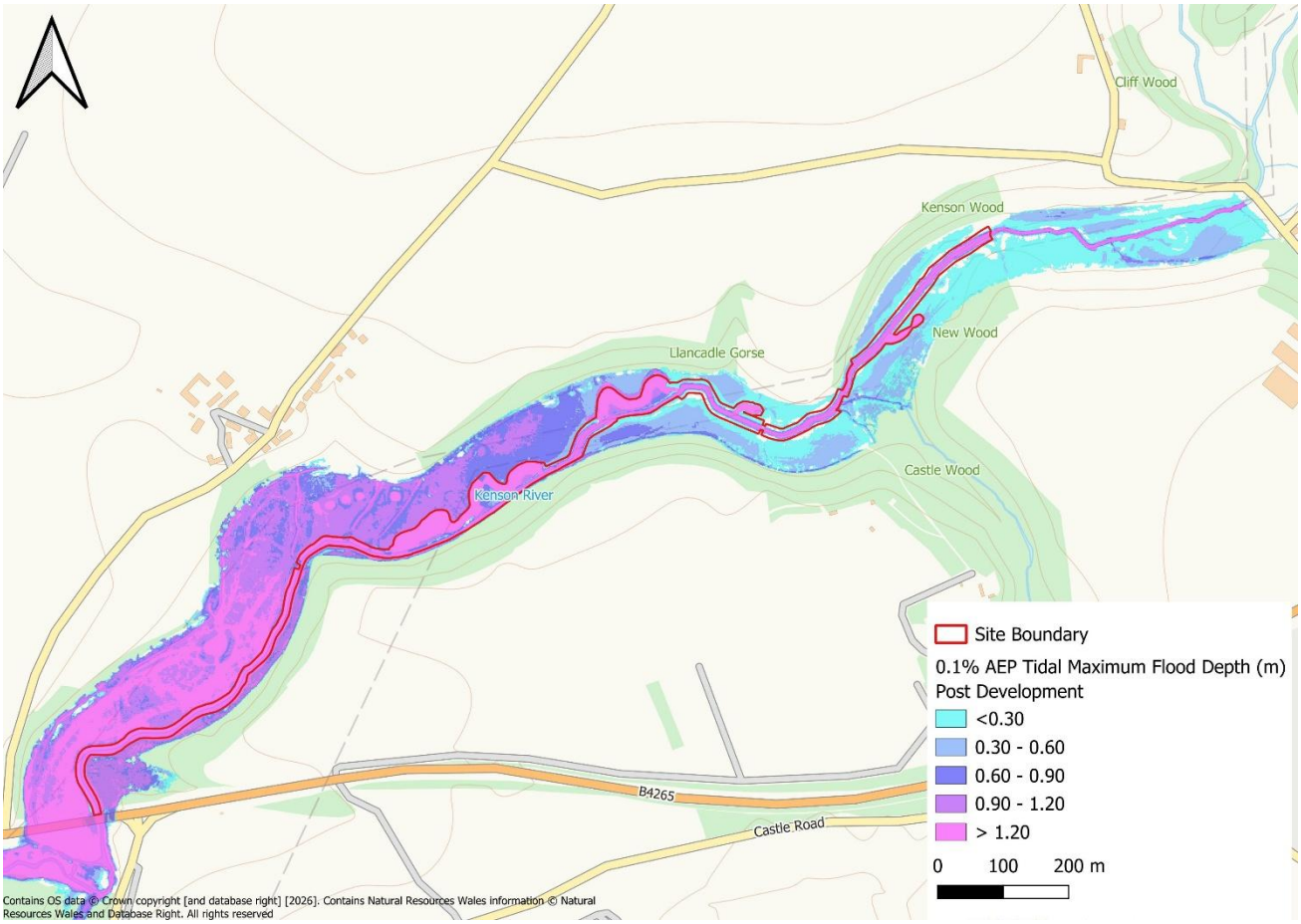


Figure 5-12 Post-Development Tidal 0.1% AEP + CC Maximum Flood Depth (m)

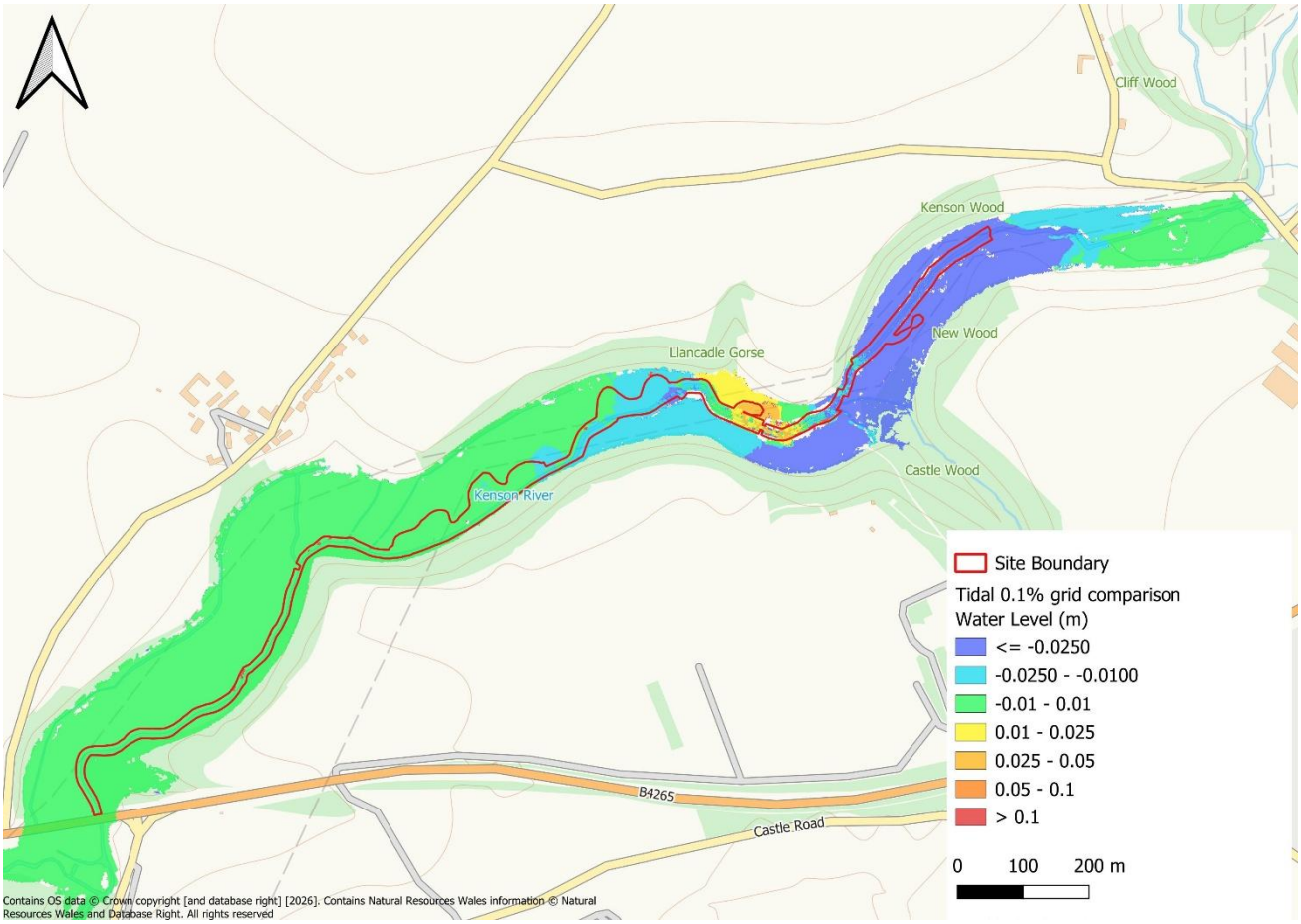


Figure 5-13 Tidal 0.1% AEP plus CC Post-Development Grid Comparison

6 Acceptability of Flood Consequences

Whether a development should proceed or not will depend upon whether the consequences of flooding can be safely managed, including its effects on flood risk elsewhere. TAN-15 Sections 10 and 11 of TAN-15 set out the key conditions that should be met to demonstrate that development is appropriate for its location.

6.1 Application of Flood Zones to Development Management Decisions

When considering a development proposal, TAN-15 sets out the requirements based on the form of development and its vulnerability classification.

For Water Compatible developments, Section 10.25 of TAN-15 states:

Water compatible development is acceptable in all flood zones

As the proposed site is water compatible by virtue of its nature, the proposals are appropriate for the proposed location despite being located within Flood Zone 3 of the FMfP for flood risk from rivers and the sea.

Water compatible development must give appropriate consideration to the Acceptability Criteria of TAN-15 Section 10. Although it is recognised that many aspects of the Acceptability Criteria are not applicable to water compatible development.

6.2 Acceptability Criteria

The site has been assessed against the Acceptability Criteria of Section 11 of TAN-15, as summarised in Table 6-1.

Table 6-1 Assessment of Acceptability Criteria

TAN-15 Acceptability Criteria	Comments	Achieved
No increase in flooding elsewhere.	The development proposals will not have an adverse impact on flood risk elsewhere. This has been demonstrated by pre- and post-development analysis contained with Section 5. Overall, the scheme provides a very small reduction in flood risk.	Yes
Occupiers aware of flood risk	Development proposals do not include any element related to occupation. However, land owners/development managers will be provided with information on the risk to the site in the form of this report.	N/A

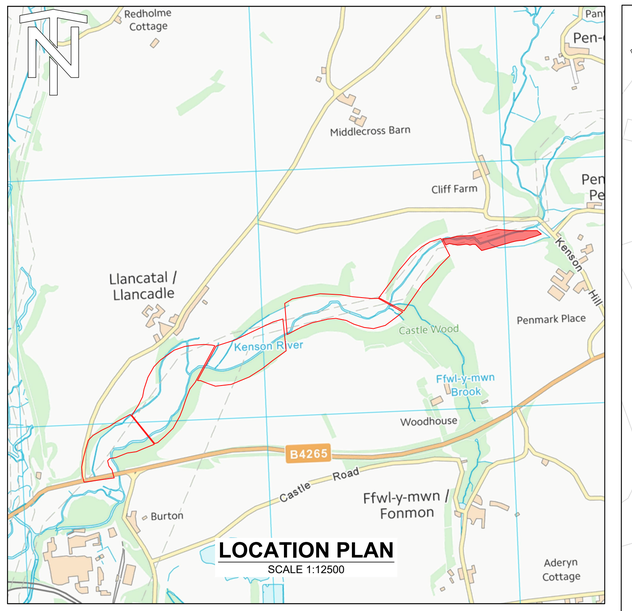
TAN-15 Acceptability Criteria	Comments	Achieved
Escape/evacuation routes present	The site is not proposed to be occupied; therefore, escape and/ or evacuation will not be required from the site during times of flood.	N/A
Flood emergency plans and procedures agreed and in place	The site is not proposed to be occupied; therefore, escape and/ or evacuation will not be required from the site during times of flood.	N/A
Flood resistant and resilient design	As the proposals are for the restoration of a river, they shall be naturally flood resilient.	N/A

7 Conclusion

- JBA Consulting (JBA) were commissioned by Natural Resources Wales (NRW) to produce a Flood Consequences Assessment to support a planning application for the restoration and remeandering of a section of the Kenson River located within the Vale of Glamorgan.
- The development proposals are for the extensive river restoration of a 2.2km reach of the Kenson River. The Kenson River restoration project aims to improve biodiversity, increase habitat resilience, and to minimise further deterioration of the WFD status.
- The site is situated on a stretch of the River Kenson between Kenson Hill to the location where the Kenson River passes under the B4265. In this reach the river flows southwest through grassland and riparian habitats until its confluence with the River Thaw 500m southwest of the site boundary. The area of interest is a 2.2km long reach from Kenson Hill 250m north of Kenson to the B4265 2km to the west of Kenson and is centralised on national grid reference NGR ST 04343 68371. The site is irregular in shape and occupies an area of 3.94 hectares.
- The proposed development is classed by TAN15 as a 'Redevelopment' and as a 'Water Compatible Development'.
- The site is shown to be within Flood Zone 3 of the Flood Map for Planning - Flood Risk from Rivers, as well as Flood Zone 3 of the Flood Map for Planning - Flood Risk from the Sea.
- The site is predominantly within Flood Zone 1 of the Flood Map for Planning - Flood Risk from Surface Water and Small Watercourses but does have areas located within Flood Zones 2 and 3.
- Detailed flood modelling of the River Kenson was undertaken to assess both the baseline flood risk and post-development changes in flood risk.
- The site was shown to flood in all baseline and post-development scenarios as expected, with minimal change in the results outside of the river restoration features. Flood depths were shown to be greatest in the south of the site and shallowest in the north. Depths ranged across the scenarios, but often flood depths are predicted to exceed 1m, with maximum flood depth exceeding 3m in some scenarios.
- Post-development modelling identifies that the proposals will result in small but measurable reductions in flood extent and flood depths outside of the river restoration features. No areas outside of the scheme shall be adversely affected by an increase in flood risk.

- All aspects of the Acceptability Criteria set out in TAN-15 have been assessed and shown to be satisfied. Consequently, it is concluded that on the grounds of flood risk, the proposed development meets the requirements set out in TAN-15 and the aims of Planning Policy Wales.

Appendix A - Proposed Development



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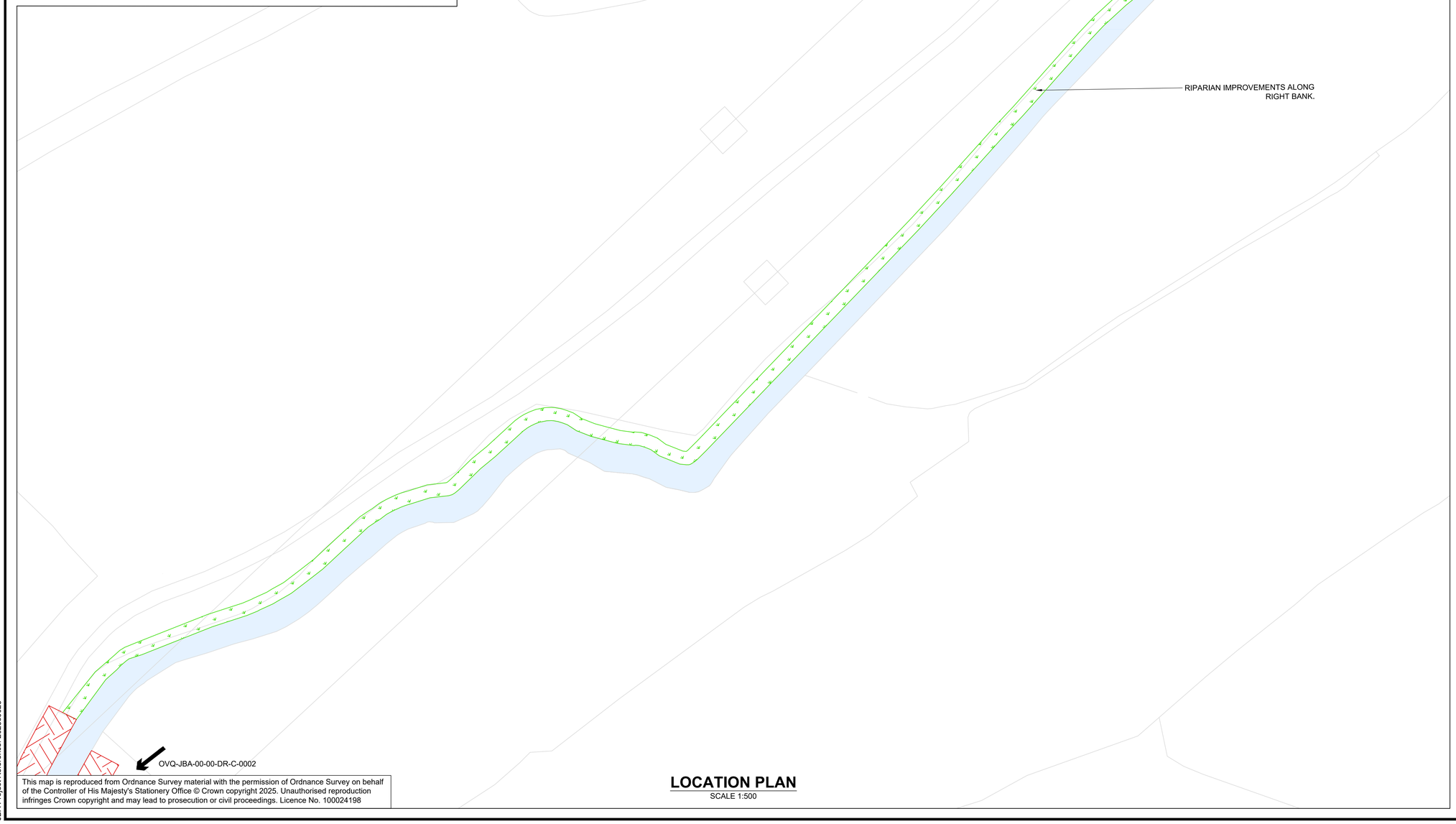

LOCATION PLAN
SCALE 1:500

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES RELATIVE TO ORDNANCE DATUM NEWLYN (mAOD) UNLESS NOTED OTHERWISE.
3. ALL COORDINATES ARE IN METRES RELATIVE TO ORDNANCE SURVEY NATIONAL GRID.
4. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.

DRAWING NOTES

1. BANK REGRADING THROUGHOUT REACH TO 1V:3H ON AVERAGE. NO REGRADING WHERE MATURE TRESS ARE TO BE RETAINED. BANK GRADIENTS MAY CHANGE AT BERM AND LARGE WOODY MATERIAL FEATURES TO INTRODUCE CHANNEL PROFILE DIVERSITY.
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   - OVQ-JBA-00-00-DR-C-0003-S3-P01-General_Arrangement_3
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   - OVQ-JBA-00-00-DR-C-0023-S3-P01-Typical_Sections_and_Details_2_of_3
   - OVQ-JBA-00-00-DR-C-0024-S3-P01-Typical_Sections_and_Details_3_of_3

LEGEND

- IN CHANNEL BERM
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- BANK REGRADING AND REPARIAN PLANTING
- RIFFLE CREATION
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- FLOOD PLAIN LOWERING AND RIPERIAN PLANTING
- CHANNEL INFLLING
- PALAEO CHANNELS RECONNECTION
- BACKWATER
- PUBLIC RIGHT OF WAY PATH

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Project Title
KENSON RIVER RESTORATION

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KENSON RESTORATION GENERAL ARRANGEMENT REACH 1

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Author	Designer	Checker	Approver
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Suitability	Status	Revision
SUITABLE FOR REVIEW AND COMMENT	S3	P01

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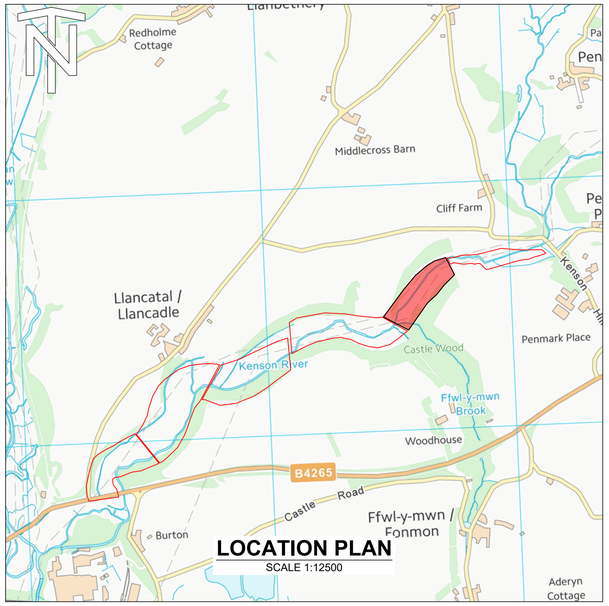

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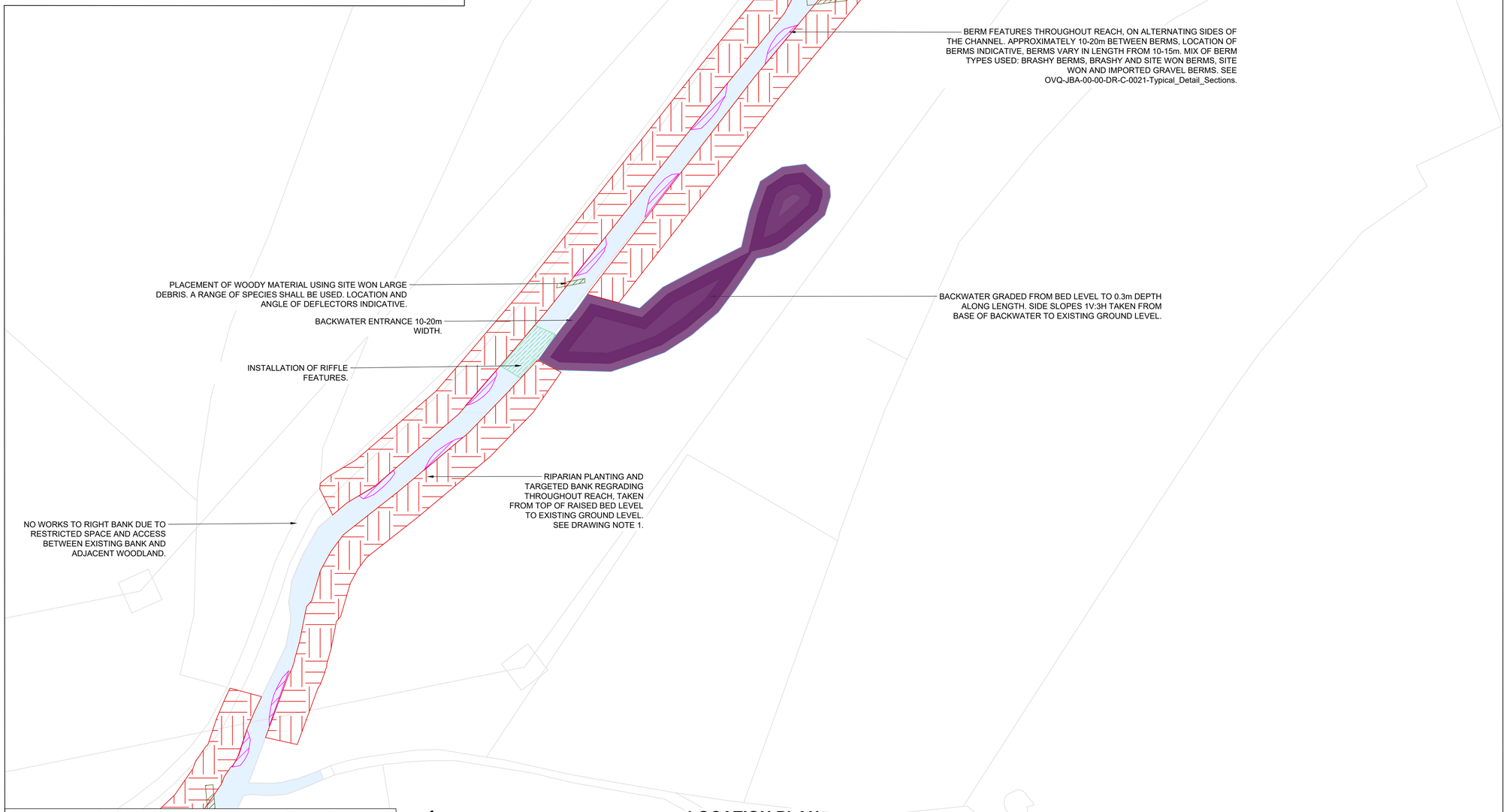

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LOCATION PLAN
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GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
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3. ALL COORDINATES ARE IN METRES RELATIVE TO ORDNANCE SURVEY NATIONAL GRID.
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DRAWING NOTES

1. BANK REGRADING THROUGHOUT REACH TO 1V:3H ON AVERAGE. NO REGRADING WHERE MATURE TRESS ARE TO BE RETAINED. BANK GRADIENTS MAY CHANGE AT BERM AND LARGE WOODY MATERIAL FEATURES TO INTRODUCE CHANNEL PROFILE DIVERSITY.
2. BED RAISING THROUGHOUT REACH.
3. DRAWING TO BE READ IN CONJUNCTION WITH:
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   - OVQ-JBA-00-00-DR-C-0003-S3-P01-General_Arrangement_Reach_3
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   - OVQ-JBA-00-00-DR-C-0024-S3-P01_Typical_Sections_and_Details_3_of_3

LEGEND

- IN CHANNEL BERM
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- BACKWATER
- PUBLIC RIGHT OF WAY PATH

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SCALE 1:12500 (m)

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Project Title
KENSON RIVER RESTORATION

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KENSON RESTORATION GENERAL ARRANGEMENT REACH 2

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Security Classification	Scale
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Author	Designer	Checker	Approver
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Suitability	Status	Revision
SUITABLE FOR REVIEW AND COMMENT	S3	P01

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A1 Sheet Size

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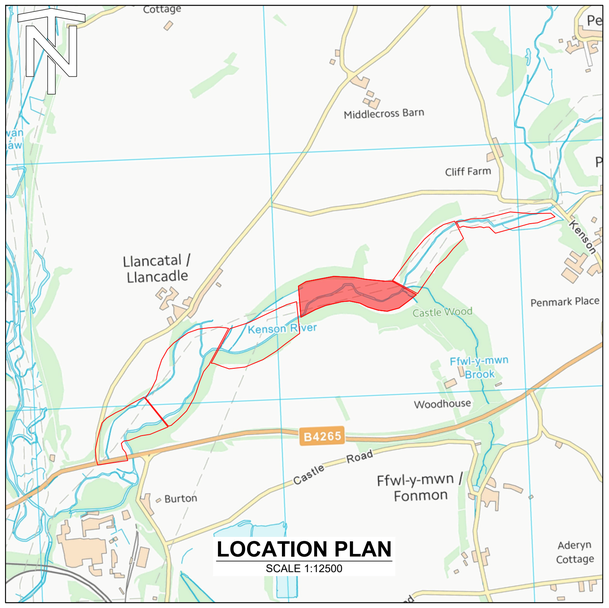

LOCATION PLAN
SCALE 1:12500

OVQ-JBA-00-00-DR-C-0002

ACCESS TRACK RELOCATED TO FOLLOW ROUTE BETWEEN PALEO CHANNEL / FLOODPLAIN WORKS AND EXISTING WOODLAND AT FIELD BOUNDARY.

THE FULL LENGTH RAISED BED SECTION AIMS TO RAISE MOST OF THE MIDDLE REACH TO THE SAME BED DEPTH AND TIE INTO THE LOCALISED MATERIAL RAISED SECTIONS UP AND DOWNSTREAM. MOVING FROM A DEEPER (LOCALISED) TO A SHALLOWER MORE CONNECTED AND LESS INCISED CHANNEL DEPTH (FULL LEGNTH) IN THE MIDDLE REACH.

PLACEMENT OF WOODY MATERIAL USING SITE WON LARGE DEBRIS. A RANGE OF SPECIES SHALL BE USED. LOCATION AND ANGLE OF DEFLECTORS INDICATIVE.

BACKWATER GRADED FROM BED LEVEL TO 0.5M DEPTH. SIDE SLOPES 1V:3H.

INFILL EXISTING CHANNEL TO GROUND LEVEL BETWEEN RECONNECTED PALEO CHANNEL.

AREA OF FLOODPLAIN LOWERING RESEEDED.

BACKWATER GRADED FROM BED LEVEL TO 0.5M DEPTH. SIDE SLOPES 1V:3H.

NEW PEDESTRIAN FOOTBRIDGE ALONG ALIGNMENT OF PUBLIC RIGHT OF WAY.

INSTALLATION OF RIFFLE FEATURE.

EXISTING BRIDGE.

RIPARIAN PLANTING AND TARGETED BANK REGRADING THROUGHOUT REACH, TAKEN FROM TOP OF RAISED BED LEVEL TO EXISTING GROUND LEVEL. SEE DRAWING NOTE 1.

BERM FEATURES THROUGHOUT REACH, ON ALTERNATING SIDES OF THE CHANNEL. APPROXIMATELY 10-20m BETWEEN BERMS, LOCATION OF BERMS INDICATIVE, BERMS VARY IN LENGTH FROM 10-15m. MIX OF BERM TYPES USED: BRASHY BERMS, BRASHY AND SITE WON BERMS, SITE WON AND IMPORTED GRAVEL BERMS. SEE OVQ-JBA-00-00-DR-C-0021-Typical_Detail_Sections.

PUBLIC RIGHT OF WAY.

EXISTING PEDESTRIAN FOOTBRIDGE OVER PUBLIC RIGHT OF WAY.

OVQ-JBA-00-00-DR-C-0004

LOCATION PLAN
SCALE 1:1000

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
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2. DRAWING TO BE READ IN CONJUNCTION WITH:
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500 250 0 250 500 750 1000
SCALE 1:12500 (m)

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SCALE 1:1000 (m)

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Author	Designer	Checker	Approver
S.KNIGHT	M.SMITH	J.KING	R.DRABBLE

Suitability	Status	Revision
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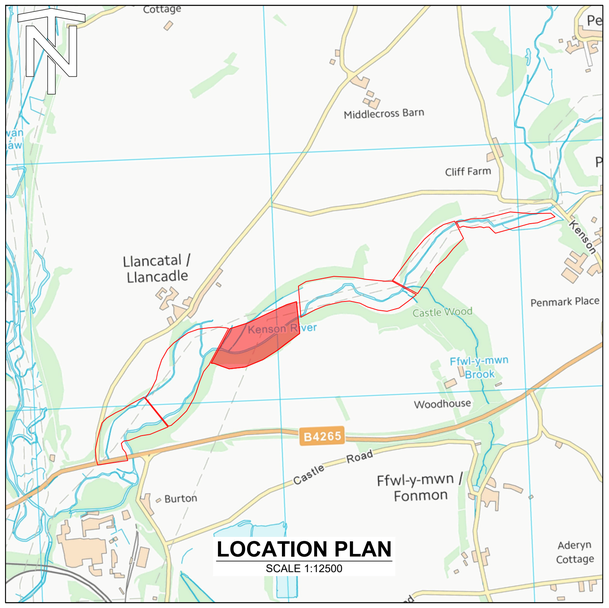

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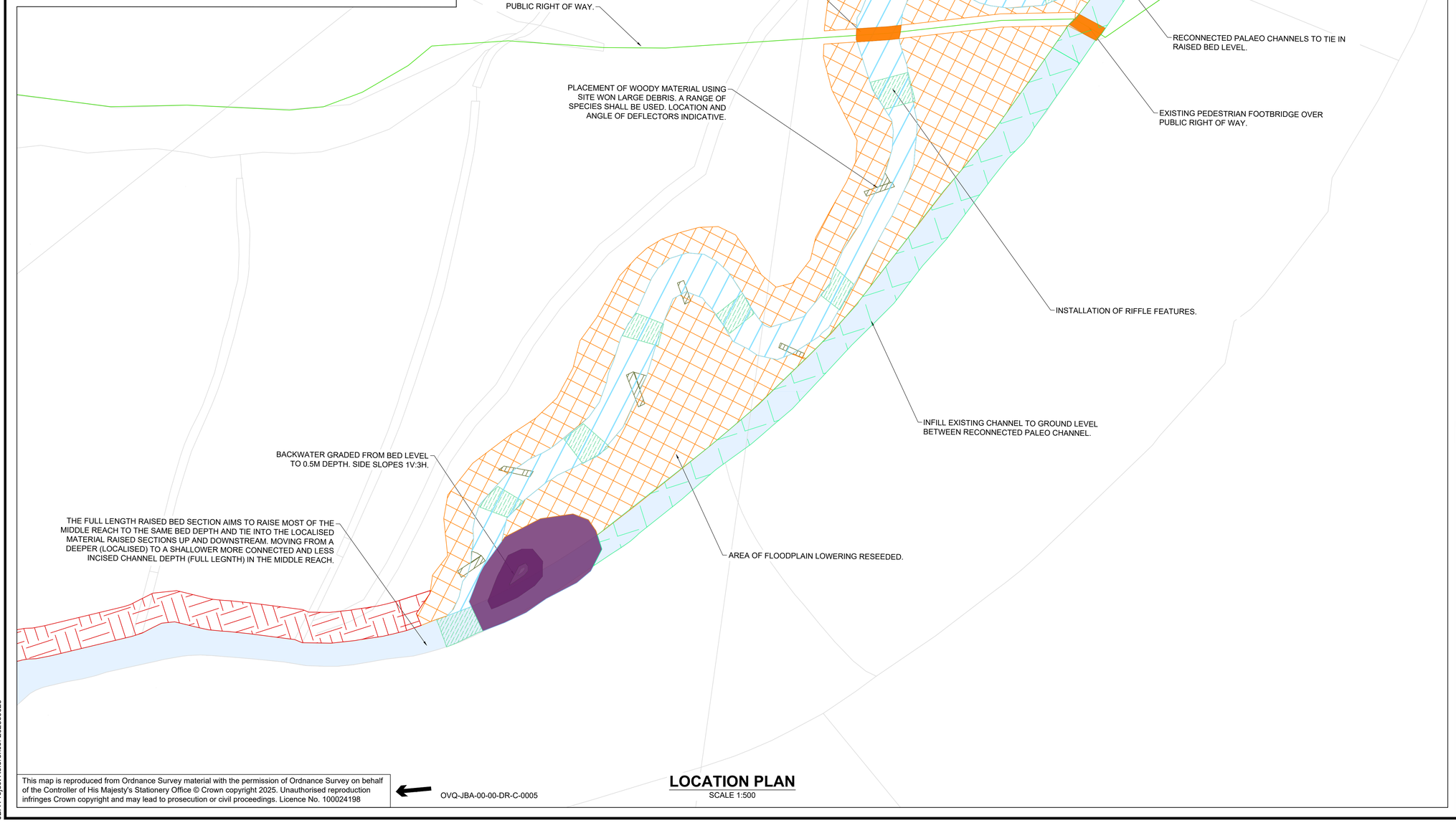

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1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
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3. ALL COORDINATES ARE IN METRES RELATIVE TO ORDNANCE SURVEY NATIONAL GRID.
4. DO NOT SCALE FROM THIS DRAWING. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.

DRAWING NOTES

1. BANK REGRADING THROUGHOUT REACH TO 1V:3H ON AVERAGE. NO REGRADING WHERE MATURE TRESS ARE TO BE RETAINED. BANK GRADIENTS MAY CHANGE AT BERM AND LARGE WOODY MATERIAL FEATURES TO INTRODUCE CHANNEL PROFILE DIVERSITY.
2. DRAWING TO BE READ IN CONJUNCTION WITH:
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   - OVQ-JBA-00-00-DR-C-0002-S3-P01-General_Arrangement_Reach_2
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   - OVQ-JBA-00-00-DR-C-0005-S3-P01-General_Arrangement_Reach_5
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   - OVQ-JBA-00-00-DR-C-0021-S3-P01_Typical_Sections_and_Details_1_of_3
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   - OVQ-JBA-00-00-DR-C-0024-S3-P01_Typical_Sections_and_Details_3_of_3

LEGEND

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- PUBLIC RIGHT OF WAY PATH

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SCALE 1:12500 (m)

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SCALE 1:500 (m)

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Project Title
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Cyfoeth Naturiol Cymru / Natural Resources Wales

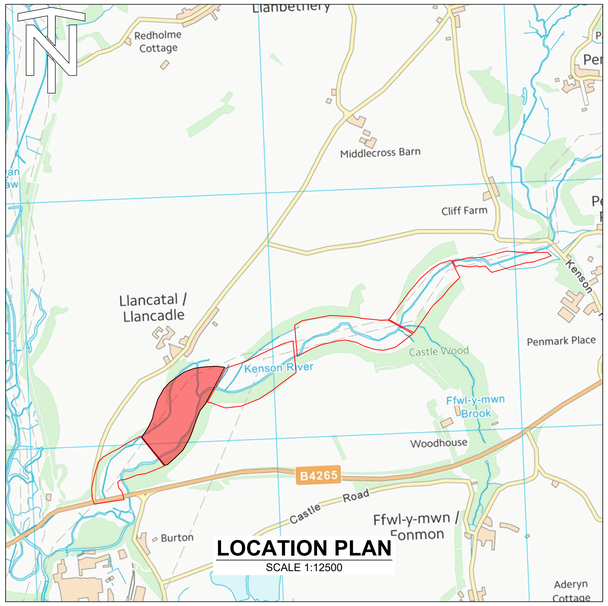
Parent Model
NOT FROM MODEL

Security Classification	Scale
OFFICIAL	AS SHOWN

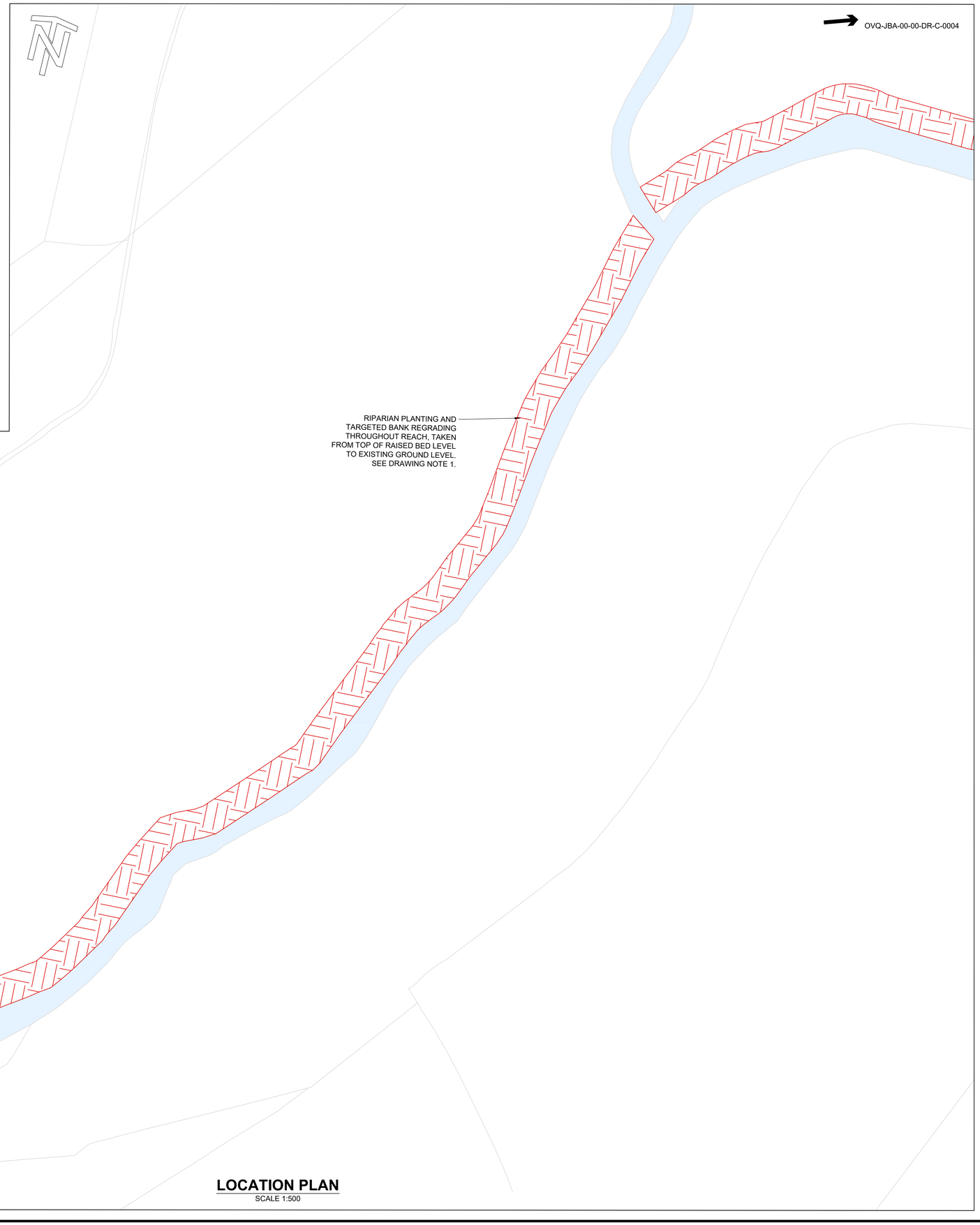
Author	Designer	Checker	Approver
S.KNIGHT	M.SMITH	J.KING	R.DRABBLE

Suitability	Status	Revision
WORK IN PROGRESS	S3	P01

Information Container: OVQ-JBA-00-00-DR-C-0004
A1 Sheet Size



LOCATION PLAN
SCALE 1:12500



LOCATION PLAN
SCALE 1:500

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES RELATIVE TO ORDNANCE DATUM NEWLYN (mAOD) UNLESS NOTED OTHERWISE.
3. ALL COORDINATES ARE IN METRES RELATIVE TO ORDNANCE SURVEY NATIONAL GRID.
4. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.

DRAWING NOTES

1. BANK REGRADING THROUGHOUT REACH TO 1V:3H ON AVERAGE. NO REGRADING WHERE MATURE TRESS ARE TO BE RETAINED. BANK GRADIENTS MAY CHANGE AT BERM AND LARGE WOODY MATERIAL FEATURES TO INTRODUCE CHANNEL PROFILE DIVERSITY.
2. BED RAISING THROUGHOUT REACH
3. DRAWING TO BE READ IN CONJUNCTION WITH:
   - OVQ-JBA-00-00-DR-C-0001-S3-P01-General_Arrangement_1
   - OVQ-JBA-00-00-DR-C-0002-S3-P01-General_Arrangement_2
   - OVQ-JBA-00-00-DR-C-0003-S3-P01-General_Arrangement_3
   - OVQ-JBA-00-00-DR-C-0004-S3-P01-General_Arrangement_4
   - OVQ-JBA-00-00-DR-C-0006-S3-P01-General_Arrangement_6
   - OVQ-JBA-00-00-DR-C-0022-S3-P01-Location_Plan
   - OVQ-JBA-00-00-DR-C-0021-S3-P01-Typical_Sections_and_Details_1_of_3
   - OVQ-JBA-00-00-DR-C-0023-S3-P01-Typical_Sections_and_Details_2_of_3
   - OVQ-JBA-00-00-DR-C-0024-S3-P01-Typical_Sections_and_Details_3_of_3

LEGEND

- IN CHANNEL BERM
- RIPARIAN PLANTING
- BANK REGRADING AND REPARIAN PLANTING
- RIFFLE CREATION
- LARGE WOODY MATERIAL
- FLOOD PLAIN LOWERING AND RIPERIAN PLANTING
- CHANNEL INFLLING
- PALAEO CHANNELS RECONNECTION
- BACKWATER
- PUBLIC RIGHT OF WAY PATH

500 250 0 250 500 750 1000
SCALE 1:12500 (m)

25 20 15 10 5 0 10 20 30
SCALE 1:500 (m)

Rev.	Description	Date	Author	Designer	Checker	Approver
P01	FOR REVIEW	02/12/25	SK	MS	JK	RD

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Project Title
KENSON RIVER RESTORATION

Drawing Title
KENSON RESTORATION GENERAL ARRANGEMENT REACH 5

Parent Model
NOT FROM MODEL

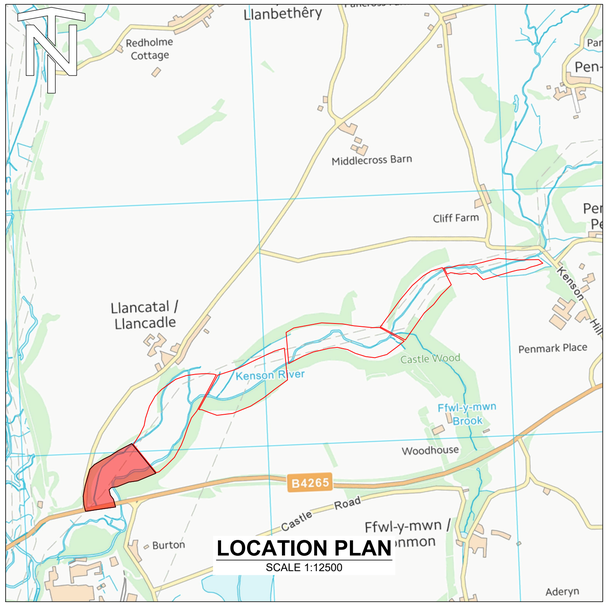
Security Classification	Scale
OFFICIAL	**AS SHOWN**

Author	Designer	Checker	Approver
S.KNIGHT	**M.SMITH**	**J.KING**	**R.DRABBLE**

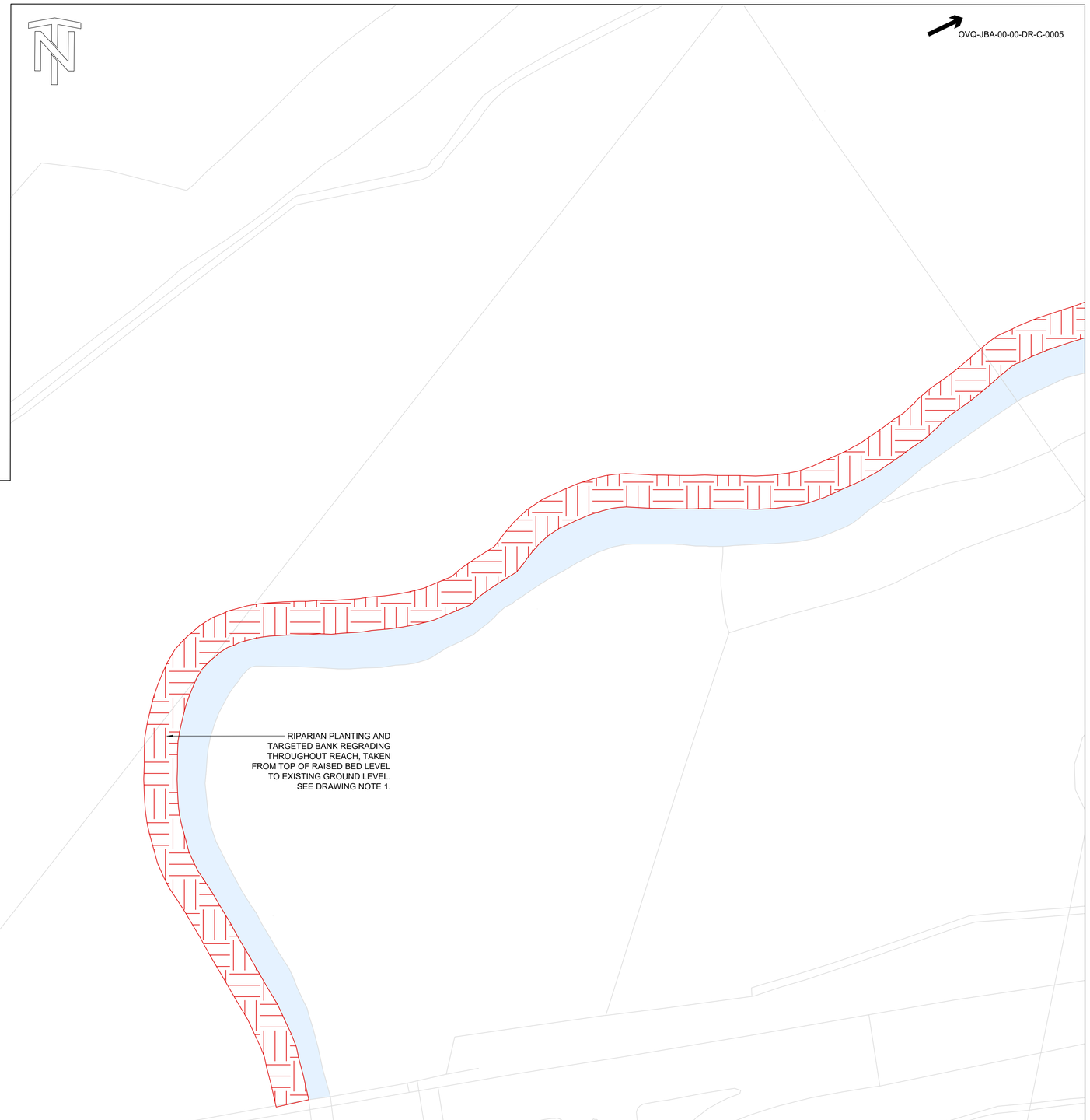
Suitability	Status	Revision
WORK IN PROGRESS	**S3**	**P01**

Information Container — A1 Sheet Size
OVQ-JBA-00-00-DR-C-0005

JBA Project Reference: 2025s0023



LOCATION PLAN
SCALE 1:12500



LOCATION PLAN
SCALE 1:500

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES RELATIVE TO ORDNANCE DATUM NEWLYN (mAOD) UNLESS NOTED OTHERWISE.
3. ALL COORDINATES ARE IN METRES RELATIVE TO ORDNANCE SURVEY NATIONAL GRID.
4. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.

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2. BED RAISING THROUGHOUT REACH.
3. DRAWING TO BE READ IN CONJUNCTION WITH:
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   - OVQ-JBA-00-00-DR-C-0002-S3-P01-Reach_2_General_Arrangement
   - OVQ-JBA-00-00-DR-C-0003-S3-P01-Reach_3_General_Arrangement
   - OVQ-JBA-00-00-DR-C-0004-S3-P01-Reach_4_General_Arrangement
   - OVQ-JBA-00-00-DR-C-0005-S3-P01-Reach_5_General_Arrangement
   - OVQ-JBA-00-00-DR-C-0022-S3-P01-Location_Plan
   - OVQ-JBA-00-00-DR-C-0021-S3-P01-Typical_Sections_and_Details_1_of_3
   - OVQ-JBA-00-00-DR-C-0023-S3-P01-Typical_Sections_and_Details_2_of_3
   - OVQ-JBA-00-00-DR-C-0024-S3-P01-Typical_Sections_and_Details_3_of_3

LEGEND

- IN CHANNEL BERM
- RIPARIAN PLANTING
- BANK REGRADING AND REPARIAN PLANTING
- RIFFLE CREATION
- LARGE WOODY MATERIAL
- FLOOD PLAIN LOWERING AND RIPERIAN PLANTING
- CHANNEL INFLLING
- PALAEO CHANNELS RECONNECTION
- BACKWATER
- PUBLIC RIGHT OF WAY PATH

500 250 0 250 500 750 1000
SCALE 1:12500 (m)

25 20 15 10 5 0 10 20 30
SCALE 1:500 (m)

Rev.	Description	Date	Author	Designer	Checker	Approver
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Project Title
KENSON RIVER RESTORATION

Drawing Title
KENSON RESTORATION
GENERAL ARRANGMENT REACH 6

Parent Model
NOT FROM MODEL

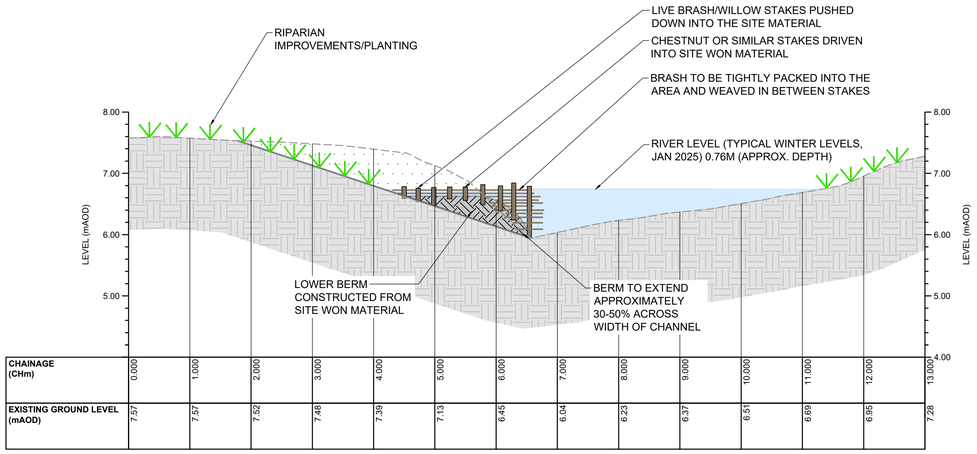
Security Classification	Scale
OFFICIAL	AS SHOWN

Author	Designer	Checker	Approver
S.KNIGHT	M.SMITH	J.KING	R.DRABBLE

Suitability	Status	Revision
SUITABLE FOR REVIEW AND COMMENT	S3	P01

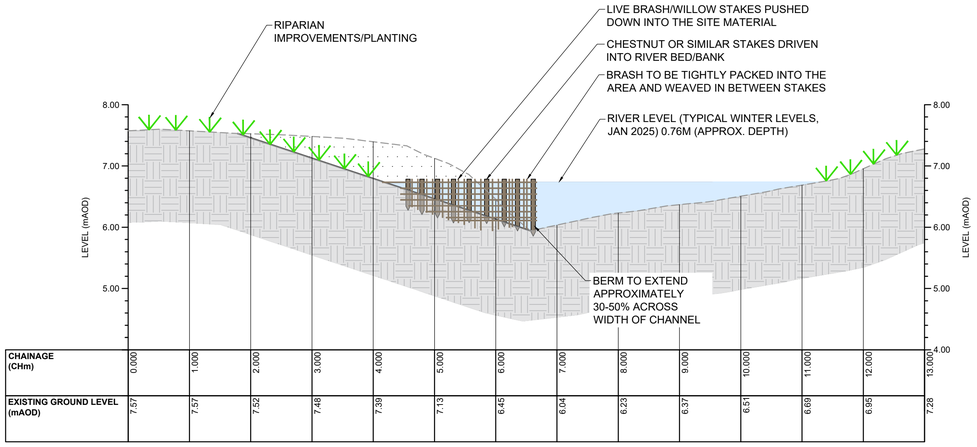
Information Container — A1 Sheet Size
OVQ-JBA-00-00-DR-C-0006

JBA Project Reference: 2025s0023



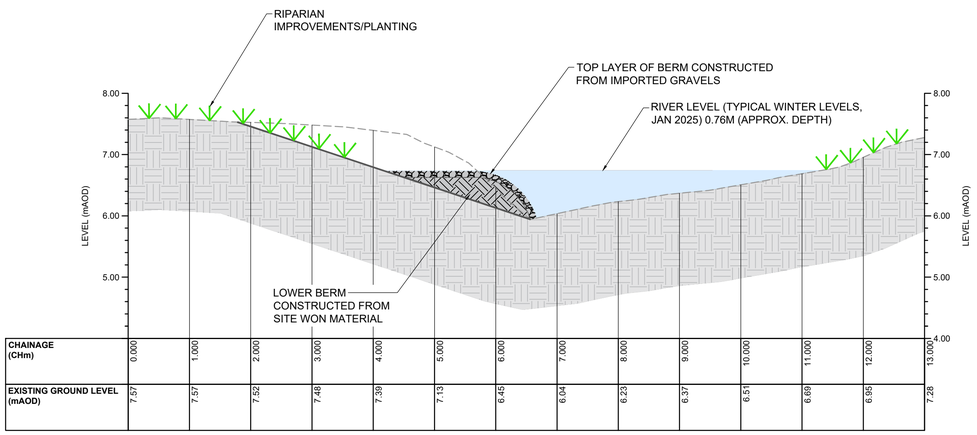
SITE WON MATERIAL AND BRASHY BERM
TYPICAL SECTION
SCALE 1:50

FIGURE 1: SITE WON MATERIAL AND BRASHY BERM EXAMPLE PHOTO



BRASHY BERM
TYPICAL SECTION
SCALE 1:50

FIGURE 2: BRASHY BERM
EXAMPLE PHOTO



SITE WON MATERIAL AND IMPORTED GRAVEL BERM
TYPICAL SECTION
SCALE 1:50

FIGURE 3: SITE WON MATERIAL AND IMPORTED GRAVEL BERM EXAMPLE PHOTO

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES RELATIVE TO ORDNANCE DATUM NEWLYN (mAOD) UNLESS NOTED OTHERWISE.
3. ALL COORDINATES ARE IN METRES RELATIVE TO ORDNANCE SURVEY NATIONAL GRID.
4. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.

DRAWING NOTES

1. FOR THE PURPOSE OF THIS DOCUMENT ALL INTERVENTION TYPES ARE SHOWN USING THE SAME CROSS SECTION. THE CROSS SECTIONS SHOWN ARE TYPICAL AND INDICATIVE TO ILLUSTRATE THE INTERVENTION METHOD.
2. BERM FEATURES ON ALTERNATING SIDES OF THE CHANNEL. APPROXIMATELY 10-20m BETWEEN BERMS. BERMS VARY IN LENGTH FROM 10-15m.
3. DRAWING TO BE READ IN CONJUNCTION WITH:
   - OVQ-JBA-00-00-DR-C-0001-S3-P01-General_Arrangement_Reach_1
   - OVQ-JBA-00-00-DR-C-0002-S3-P01-General_Arrangement_Reach_2
   - OVQ-JBA-00-00-DR-C-0003-S3-P01-General_Arrangement_Reach_3
   - OVQ-JBA-00-00-DR-C-0004-S3-P01-General_Arrangement_Reach_4
   - OVQ-JBA-00-00-DR-C-0005-S3-P01-General_Arrangement_Reach_5
   - OVQ-JBA-00-00-DR-C-0006-S3-P01-General_Arrangement_Reach_6
   - OVQ-JBA-00-00-DR-C-0022-S3-P01-Location_Plan
   - OVQ-JBA-00-00-DR-C-0023-S3-P01-Typical_Sections_and_Details_2_of_3
   - OVQ-JBA-00-00-DR-C-0024-S3-P01-Typical_Sections_and_Details_3_of_3

REFERENCES

FIGURE 1: CHRISTCHURCH. 2009. STRATEGIC RESTORATION AND MANAGEMENT OF THE RIVER AVON SAC. ADVICE NOTE RIVER RESTORATION. 7. <HTTPS://WWW.THERRC.CO.UK/ASSETS/GENERAL/MOT/REFERENCES/STREAM_RESTORATION_TECHNIQUES_ADVICE_NOTE.PDF> (ACCESSED 04 DEC 2025)

FIGURE 2: BERM CREATION ON THE CHERTSEY BOURNE. 2024. <HTTPS://WWW.SURREYWILDLIFETRUST.ORG/BLOG/SURREY-WILDLIFE-TRUST/BERM-CREATION-CHERTSEY-BOURNE> (ACCESSED 04 DEC 2025)

FIGURE 3: BERMS, W. EXAMPLE CHALK STREAM RESTORATION TECHNIQUES. <HTTPS://WWW.WESSEXRT.ORG.UK/ASSETS/FILES/CHALKSTREAMRESTORATION EXAMPLES--EMAILVERSION.PDF> (ACCESSED 04 DEC 2025)

LEGEND

- INDICATIVE WATERCOURSE LEVELS
- EXISTING GROUND
- WOODY MATERIAL
- SITE WON MATERIAL
- IMPORTED GRAVELS
- RIPARIAN IMPROVEMENTS/PLANTING
- EXISTING GROUND PROFILE
- INDICATIVE BANK REGRADING

2.5 2.0 1.5 1.0 0.5 0 1 2 3
SCALE 1:50 (m)

Rev.	Description	Date	Author	Designer	Checker	Approver
P01	FIRST DRAFT	04/12/25	BM	MS	JK	RD

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Project Title
KENSON RIVER RESTORATION

Drawing Title
TYPICAL SECTIONS AND DETAILS SHEET 1 OF 3

Parent Model: NOT FROM MODEL

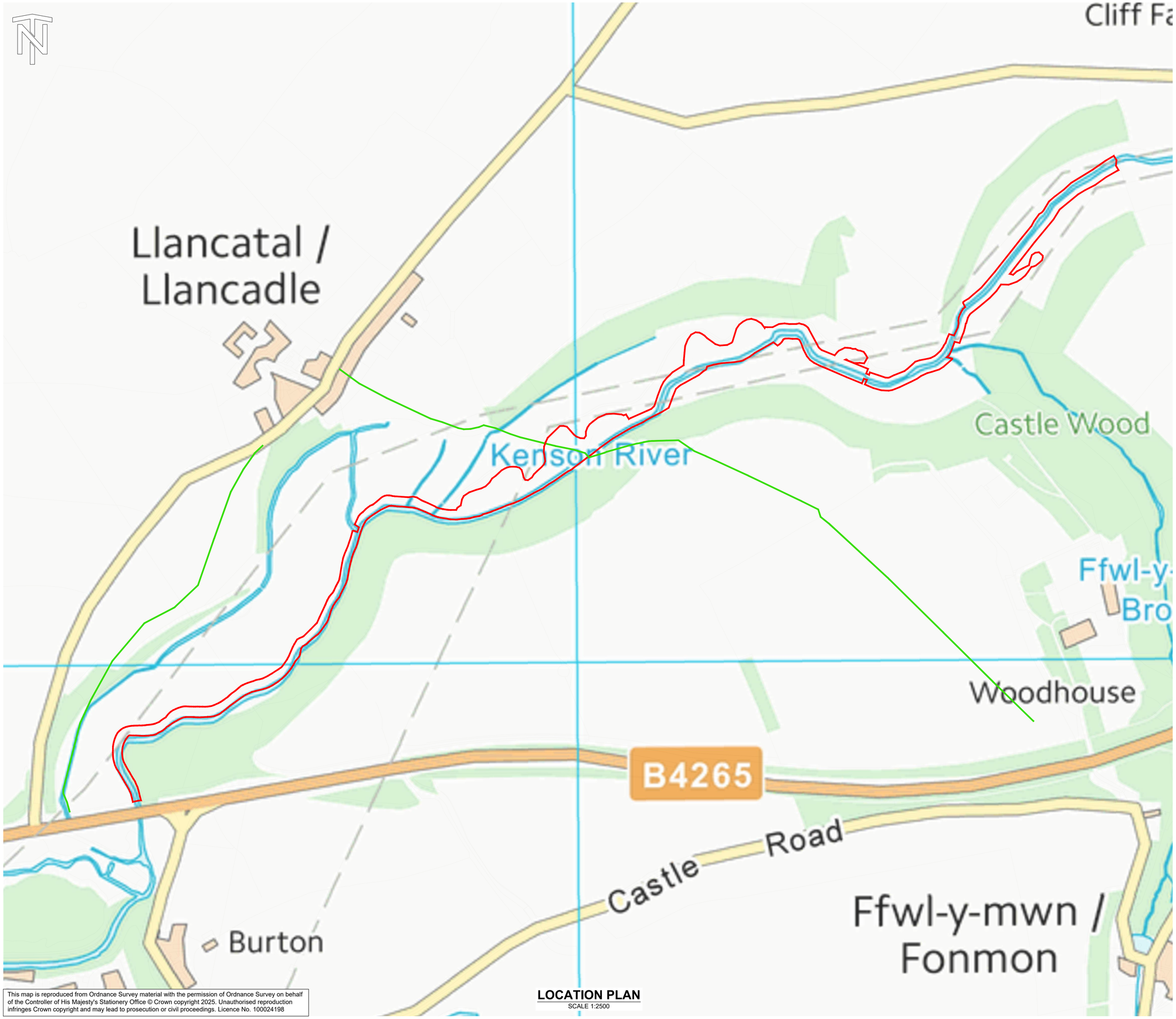
Security Classification	Scale
OFFICIAL	AS SHOWN

Author	Designer	Checker	Approver
B. MOHAMMED	M. SMITH	J. KING	R. DRABBLE

Suitability	Status	Revision
SUITABLE FOR REVIEW AND COMMENT	S3	P01

Information Container: OVQ-JBA-00-00-DR-C-0021.dwg
A1 Sheet Size

JBA Project Reference: 2025s0023



LOCATION PLAN
SCALE 1:2500

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES RELATIVE TO ORDNANCE DATUM NEWLYN (mAOD) UNLESS NOTED OTHERWISE.
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DRAWING NOTES

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   - OVQ-JBA-00-00-DR-C-0001-S3-P01-General_Arrangement_Reach_1
   - OVQ-JBA-00-00-DR-C-0002-S3-P01-General_Arrangement_Reach_2
   - OVQ-JBA-00-00-DR-C-0003-S3-P01-General_Arrangement_Reach_3
   - OVQ-JBA-00-00-DR-C-0004-S3-P01-General_Arrangement_Reach_4
   - OVQ-JBA-00-00-DR-C-0005-S3-P01-General_Arrangement_Reach_5
   - OVQ-JBA-00-00-DR-C-0006-S3-P01-General_Arrangement_Reach_6
   - OVQ-JBA-00-00-DR-C-0021-S3-P01-Typical_Sections_and_Details_1_of_3
   - OVQ-JBA-00-00-DR-C-0023-S3-P01-Typical_Sections_and_Details_2_of_3
   - OVQ-JBA-00-00-DR-C-0024-S3-P01-Typical_Sections_and_Details_3_of_3

LEGEND

- RED LINE BOUNDARY
- PUBLIC RIGHT OF WAY

100 50 0 50 100 150 200
SCALE 1:2500 (m)

Rev.	Description	Date	Author	Designer	Checker	Approver
P01	FIRST DRAFT	04/12/25	SK	MS	JK	RD

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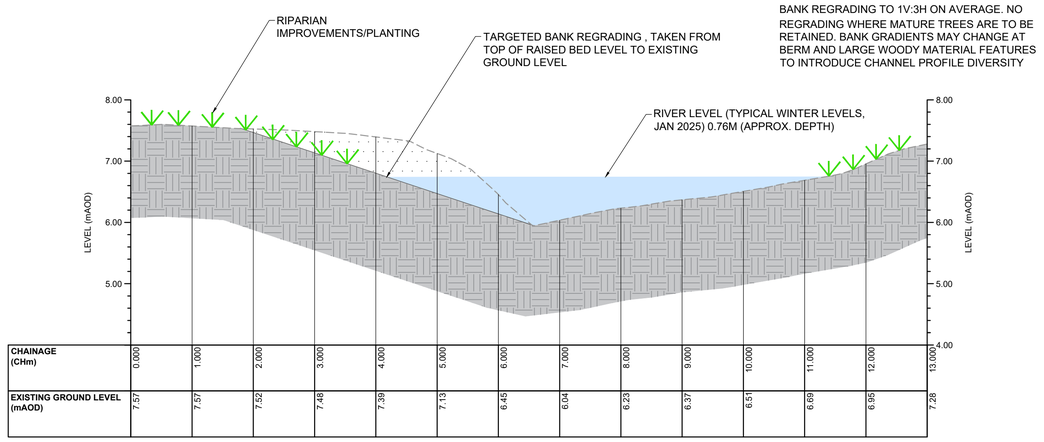
Project Title
KENSON RIVER RESTORATION

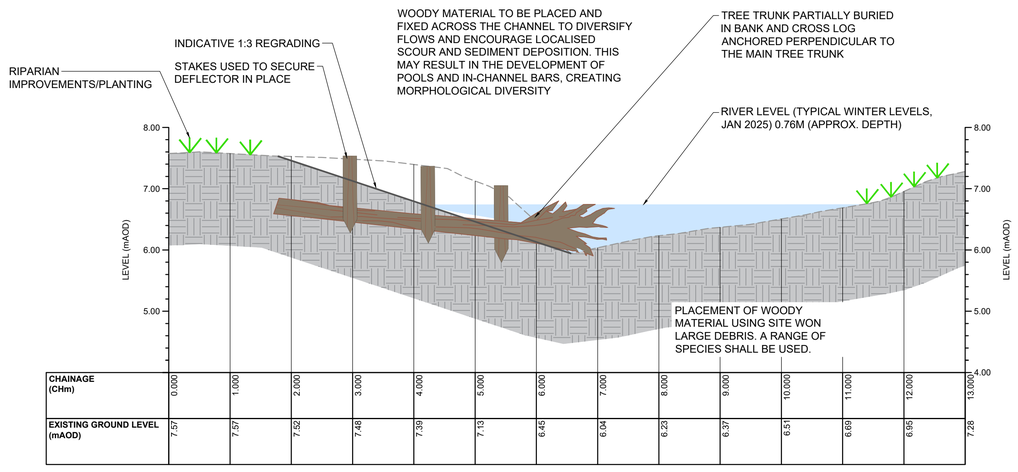
Drawing Title
Location Plan

Parent Model: OVQ-JBA-00-00-DR-C-0022-S3-P01-Location_Plan			
Security Classification: OFFICIAL		Scale: AS SHOWN	
Author: S.KNIGHT	Designer: M.SMITH	Checker: J.KING	Approver: R.DRABBLE
Suitability: WORK IN PROGRESS		Status: S3	Revision: P01
Information Container: OVQ-JBA-00-00-DR-C-0022			A1 Sheet Size

JBA Project Reference: 2025s0023



INDICATIVE BANK REGRADING
TYPICAL SECTION
SCALE 1:50



LARGE FLOW DEFLECTOR
TYPICAL SECTION
SCALE 1:50

FIGURE 4: LARGE FLOW
DEFLECTOR EXAMPLE PHOTO

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES RELATIVE TO ORDNANCE DATUM NEWLYN (mAOD) UNLESS NOTED OTHERWISE.
3. ALL COORDINATES ARE IN METRES RELATIVE TO ORDNANCE SURVEY NATIONAL GRID.
4. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.

DRAWING NOTES

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   - OVQ-JBA-00-00-DR-C-0003-S3-P01-General_Arrangement_Reach_3
   - OVQ-JBA-00-00-DR-C-0004-S3-P01-General_Arrangement_Reach_4
   - OVQ-JBA-00-00-DR-C-0005-S3-P01-General_Arrangement_Reach_5
   - OVQ-JBA-00-00-DR-C-0006-S3-P01-General_Arrangement_Reach_6
   - OVQ-JBA-00-00-DR-C-0022-S3-P01-Location_Plan
   - OVQ-JBA-00-00-DR-C-0021-S3-P01-Typical_Sections_and_Details_1_of_3
   - OVQ-JBA-00-00-DR-C-0024-S3-P01-Typical_Sections_and_Details_3_of_3

REFERENCES

FIGURE 4: MARSHALL, S. 2023. BERMS ARCHIVES - SOUTH EAST RIVERS TRUST, SOUTH EAST RIVERS TRUST. <HTTPS://WWW.SOUTHEASTRIVERSTRUST.ORG/TAG/BERMS/?CN-RELOADED=1> (ACCESSED 04 DEC 2025)

LEGEND

- INDICATIVE WATERCOURSE LEVELS
- EXISTING GROUND
- WOODY MATERIAL
- RIPARIAN IMPROVEMENTS/PLANTING
- EXISTING GROUND PROFILE
- BANK REGRADING

2.5 2.0 1.5 1.0 0.5 0 1 2 3
SCALE 1:50 (m)

Rev.	Description	Date	Author	Designer	Checker	Approver
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Twitter @JBAConsulting

Project Title
KENSON RIVER RESTORATION

Drawing Title
TYPICAL SECTIONS AND DETAILS SHEET 2 OF 3

Parent Model: **NOT FROM MODEL**

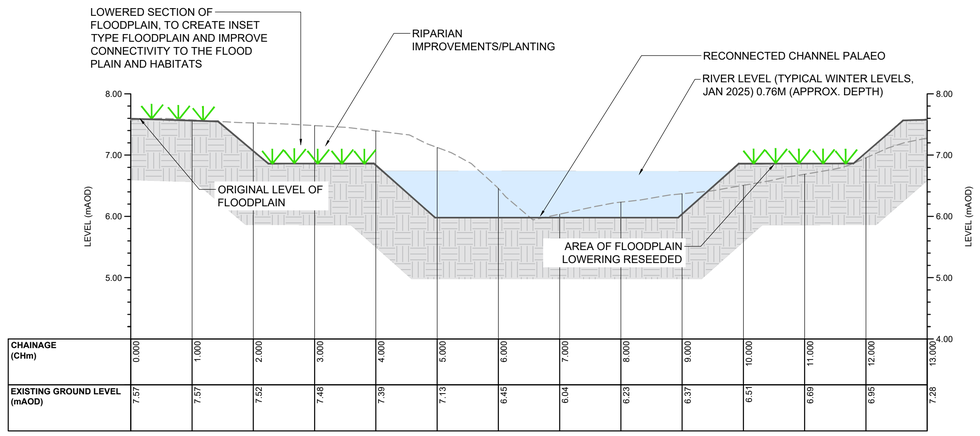
Security Classification	Scale
OFFICIAL	AS SHOWN

Author	Designer	Checker	Approver
B. MOHAMMED	M. SMITH	J. KING	R. DRABBLE

Suitability	Status	Revision
SUITABLE FOR REVIEW AND COMMENT	S3	P01

Information Container: **OVQ-JBA-00-00-DR-C-0023.dwg** — A1 Sheet Size

JBA Project Reference: 2025s0023



PALAEOCHANNEL
TYPICAL SECTION
SCALE 1:50

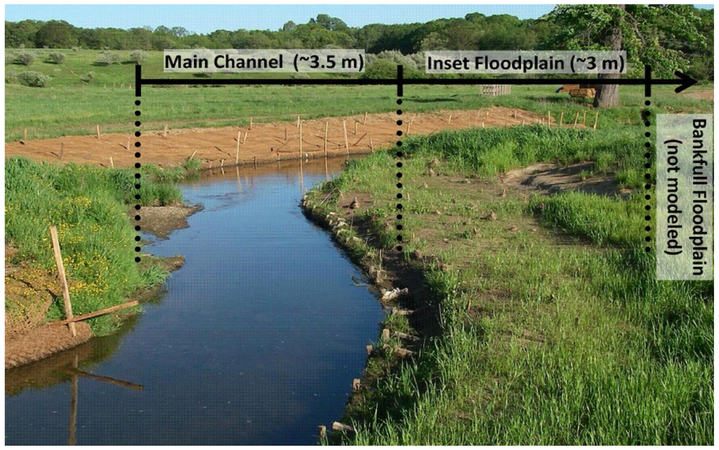
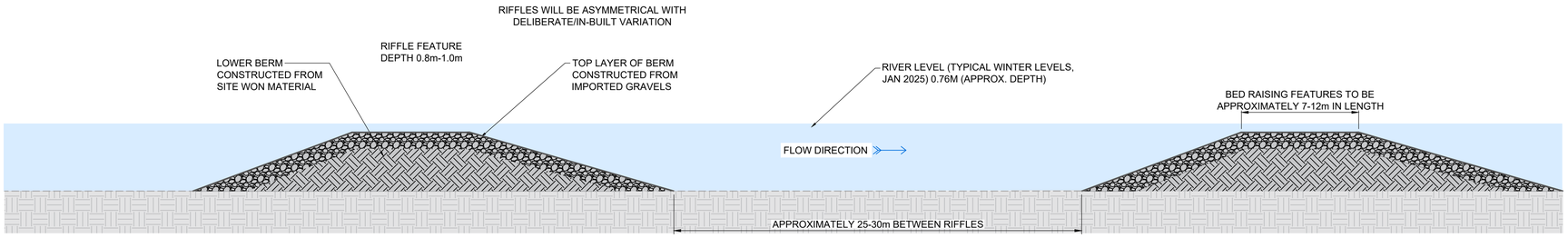


FIGURE 5: PALAEOCHANNEL
EXAMPLE PHOTO



RIFFLES
TYPICAL LONG SECTION
NOT TO SCALE

FIGURE 6: LOCALISED RIFFLES
EXAMPLE PHOTO

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES RELATIVE TO ORDNANCE DATUM NEWLYN (mAOD) UNLESS NOTED OTHERWISE.
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   - OVQ-JBA-00-00-DR-C-0003-S3-P01-General_Arrangement_Reach_3
   - OVQ-JBA-00-00-DR-C-0004-S3-P01-General_Arrangement_Reach_4
   - OVQ-JBA-00-00-DR-C-0005-S3-P01-General_Arrangement_Reach_5
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   - OVQ-JBA-00-00-DR-C-0022-S3-P01-Location_Plan
   - OVQ-JBA-00-00-DR-C-0021-S3-P01-Typical_Sections_and_Details_1_of_3
   - OVQ-JBA-00-00-DR-C-0023-S3-P01-Typical_Sections_and_Details_2_of_3

REFERENCES

FIGURE 5: AZINHEIRA, D.L. ET AL. 2014 'COMPARISON OF EFFECTS OF INSET FLOODPLAINS AND HYPORHEIC EXCHANGE INDUCED BY INSTREAM STRUCTURES ON SOLUTE RETENTION, WATER RESOURCES RESEARCH, 50(7), PP. 6168–6190. <HTTPS://DOI.ORG/10.1002/2013WR014400> (ACCESSED 04 DEC 2025)

FIGURE 6: GRAVEL INTRODUCTION, WITHAM SLEA BLUE GREEN CORRIDOR, BLUE GREEN CORRIDOR. 2014. <HTTPS://WWW.WITHAMSLEABLUEGREENCORRIDOR.CO.UK/GRAVEL-INTRODUCTION> (ACCESSED 04 DEC 2025)

LEGEND

- INDICATIVE WATERCOURSE LEVELS
- EXISTING GROUND
- SITE WON MATERIAL
- IMPORTED GRAVELS
- RIPARIAN IMPROVEMENTS/PLANTING
- EXISTING GROUND PROFILE
- BANK REGRADING

2.5 2.0 1.5 1.0 0.5 0 1 2 3
SCALE 1:50 (m)

Rev.	Description	Date	Author	Designer	Checker	Approver
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Project Title
KENSON RIVER RESTORATION

Drawing Title
TYPICAL SECTIONS AND DETAILS SHEET 3 OF 3

Parent Model
NOT FROM MODEL

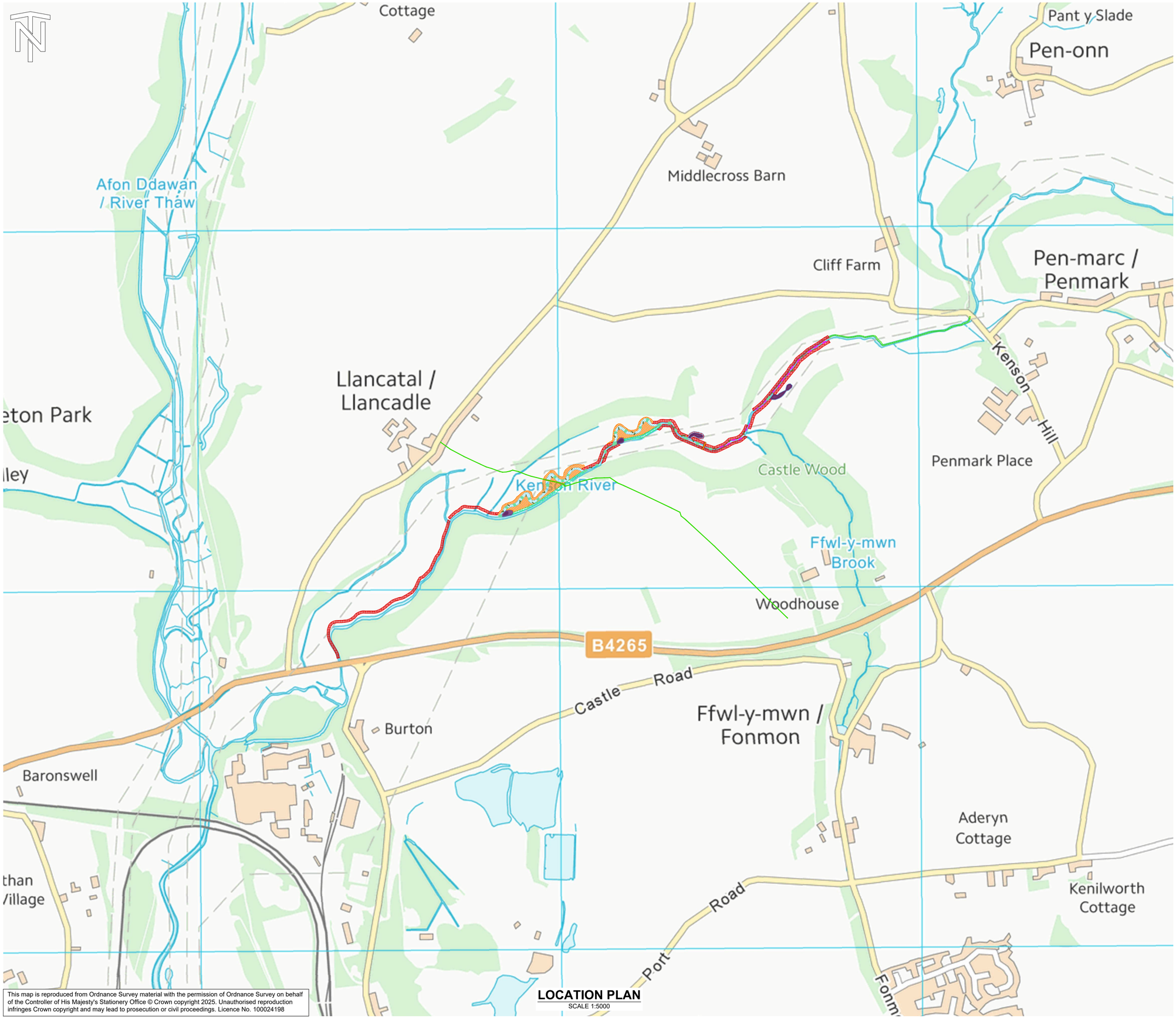
Security Classification	Scale
OFFICIAL	**AS SHOWN**

Author	Designer	Checker	Approver
B. MOHAMMED	**M. SMITH**	**J. KING**	**R. DRABBLE**

Suitability	Status	Revision
SUITABLE FOR REVIEW AND COMMENT	**S3**	**P01**

Information Container — A1 Sheet Size
OVQ-JBA-00-00-DR-C-0024.dwg

JBA Project Reference: 2025s0023



LOCATION PLAN
SCALE 1:5000

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES RELATIVE TO ORDNANCE DATUM NEWLYN (mAOD) UNLESS NOTED OTHERWISE.
3. ALL COORDINATES ARE IN METRES RELATIVE TO ORDNANCE SURVEY NATIONAL GRID.
4. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.

DRAWING NOTES

1. DRAWING TO BE READ IN CONJUNCTION WITH:
   - OVQ-JBA-00-00-DR-C-0001-S3-P01-General_Arrangement_Reach_1
   - OVQ-JBA-00-00-DR-C-0002-S3-P01-General_Arrangement_Reach_2
   - OVQ-JBA-00-00-DR-C-0003-S3-P01-General_Arrangement_Reach_3
   - OVQ-JBA-00-00-DR-C-0004-S3-P01-General_Arrangement_Reach_4
   - OVQ-JBA-00-00-DR-C-0005-S3-P01-General_Arrangement_Reach_5
   - OVQ-JBA-00-00-DR-C-0006-S3-P01-General_Arrangement_Reach_6
   - OVQ-JBA-00-00-DR-C-0022-S3-P01-Location_Plan
   - OVQ-JBA-00-00-DR-C-0021-S3-P01-Typical_Sections_and_Details_1_of_3
   - OVQ-JBA-00-00-DR-C-0023-S3-P01-Typical_Sections_and_Details_2_of_3
   - OVQ-JBA-00-00-DR-C-0024-S3-P01-Typical_Sections_and_Details_3_of_3

LEGEND

- IN CHANNEL BERM
- RIPARIAN PLANTING
- BANK REGRADING AND REPARIAN PLANTING
- RIFFLE CREATION
- LARGE WOODY MATERIAL
- FLOOD PLAIN LOWERING AND RIPERIAN PLANTING
- CHANNEL INFLLING
- PALAEO CHANNELS RECONNECTION
- BACKWATER
- PUBLIC RIGHT OF WAY PATH

250 200 150 100 50 0 100 200 300
SCALE 1:5000 (m)

Rev.	Description	Date	Author	Designer	Checker	Approver
P01	FIRST DRAFT	04/12/25	SK	MS	JK	RD

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Project Title
KENSON RIVER RESTORATION

Drawing Title
Design Overview

Parent Model
NOT FROM MODEL

Security Classification	Scale
OFFICIAL	**AS SHOWN**

Author	Designer	Checker	Approver
S.KNIGHT	**M.SMITH**	**J.KING**	**R.DRABBLE**

Suitability	Status	Revision
WORK IN PROGRESS	**S3**	**P01**

Information Container
OVQ-JBA-00-00-DR-C-0025
A1 Sheet Size

JBA Project Reference: 2025sd023

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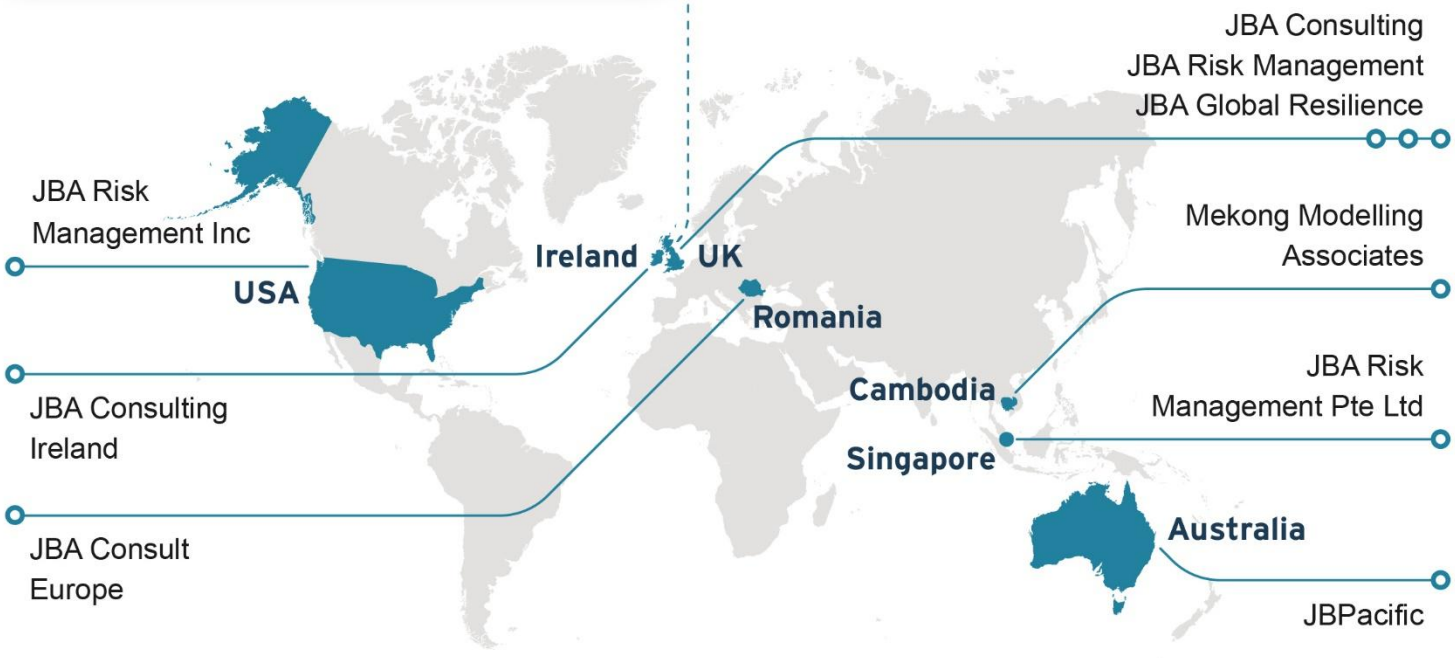

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