

2.7 Ecology

A desk study and a field survey were undertaken in October and November 2022 to assess and map habitats within the site. An initial assessment was undertaken in the field to determine the potential of on-site habitats to support protected and notable species. The desk study indicated that there are six statutory protected sites (of ecological relevance) within 10km of the site and eight non-statutory) within 2km of the site. There were no areas of Ancient Woodland within 200m of the survey area. River Dee SAC/SSSI is located approximately 500m to the southwest and is hydrologically connected to the site via Tref-y-nant brook.

The site comprises of a large area of former industrial land on a mostly west facing slope. The remainder of the site was occupied by broadleaved semi-natural woodland, mixed species scrub, ruderal and ephemeral land, poor semi-improved grassland, and several scattered trees.

The site contained habitats with the potential to support protected or notable species. Potential ecological constraints may include:

- River Dee SAC/SSSI
- Non-native invasive plant species
- Amphibians, including great crested newts
- Reptiles
- Nesting birds
- Roosting, foraging and commuting bats
- Badgers
- Otter
- Hedgehog

In line with the 25 Year Plan for the Environment (HM Government, 2018) and the Planning Policy Wales (Welsh Government, 2021), new development should identify and pursue opportunities for securing measurable net gains for biodiversity and for the wider environment.

The Environment Act 2021 introduces a mandatory requirement for 10% biodiversity net gain for new development to ensure that they enhance biodiversity and create new green spaces for local communities to enjoy. The proposed enhancement and habitat creation will look to achieve this target as a minimum.

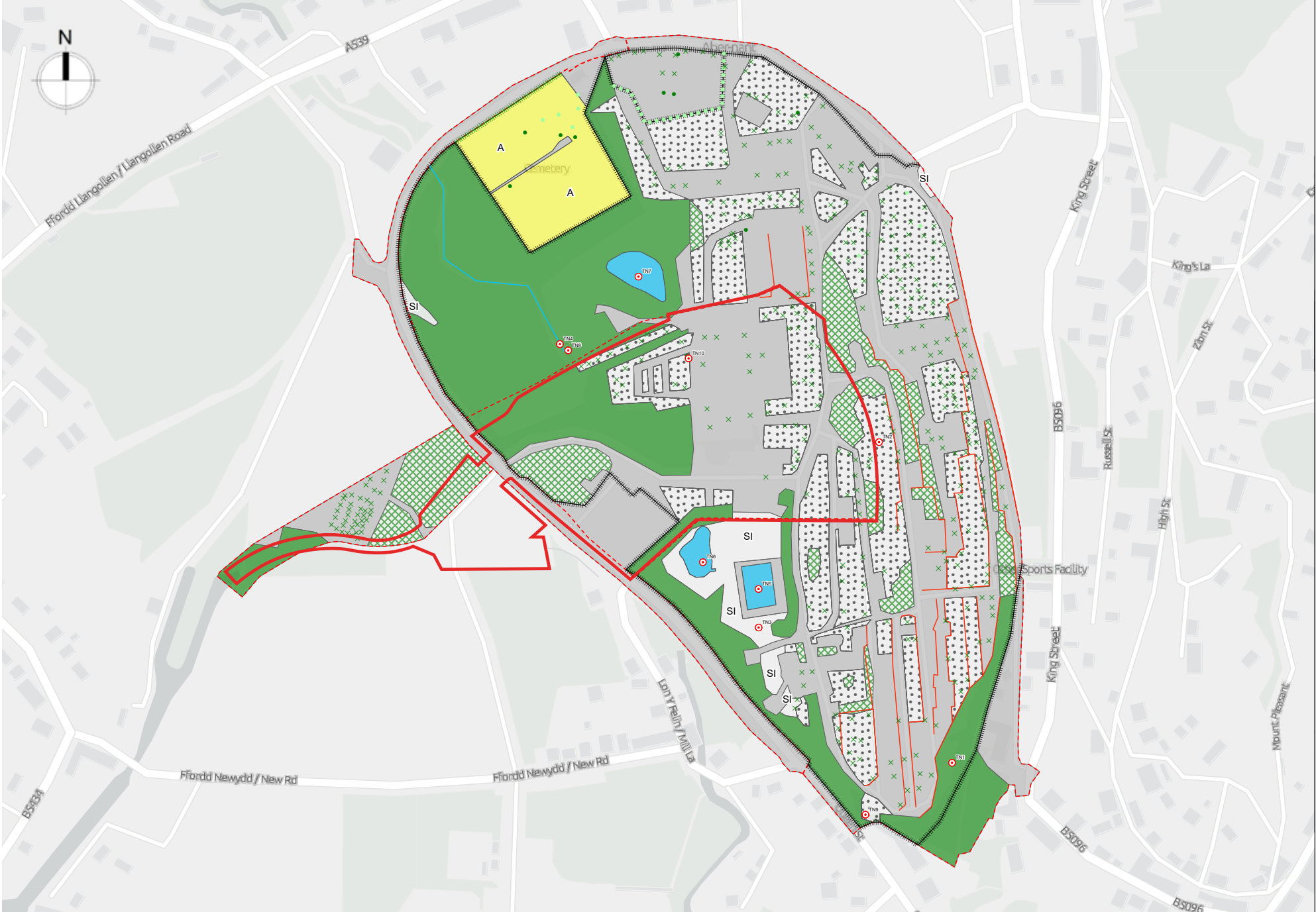


Figure 02-12: Ecology Plan

KEY	
	Site Boundary
	Broadleaved Parkland/Scattered Trees
	Coniferous Parkland/Scattered Trees
	Scrub-Scattered
	Running water
	Hedge with trees - Species(Poor)
	Fence
	Wall
	Broadleaved Woodland-Semi Natural
	Scrub-Dense/Continuous
	Poor semi-improved Grassland
	Standing water
	Amenity Grassland
	Bare Ground
	Other Habitat
	Target notes

2.8 Arboriculture

An Arboricultural Survey and Impact Assessment Report in line with British Standard BS 5837: 2012 Trees in relation to design has been undertaken. A total of 50 arboricultural features were recorded within the study area, these were recorded as 15 individual trees (T), 34 groups of trees (G) and one hedgerow (H). A total of 20 different individual tree species were recorded.

One veteran tree (T1) has been identified in the baseline arboricultural survey, an Ash tree, entitling it to protection under the National Planning Policy Framework (NPPF) (2023), and it is retained in the current designs.

The northern part of the site has become overgrown with vegetation, predominantly Silver Birch..
Wrexham Borough Council has confirmed that none of the surveyed trees are subject to Tree Preservation Orders or Conservation Area restrictions. Additionally, there are no designated ancient woodlands in the study area.

Trees & Groups within the site:

G3 - Ash, Dog Rose, Goat Willow, Norway Spruce, Silver Birch
G4 - Silver Birch
G5 - Silver Birch
G6 - Ash, Goat Willow, Hawthorn, Oak, Silver Birch, Sycamore, Wild Cherry
G7 - Goat Willow, Silver Birch
G8 - Silver Birch
G9 - Alder, Cherry, Elder, Hawthorn, Silver Birch, Willow
G19 - Silver Birch
G20 - Goat Willow, Silver Birch
G21 - Goat Willow, Silver Birch
G22 - Goat Willow, Silver Birch
G23 - Goat Willow, Silver Birch
G24 - Goat Willow, Silver Birch, Sycamore
G25 - Goat Willow, Silver Birch
G26 - Silver Birch
G27 - Silver Birch
G28 - Goat Willow, Silver Birch
G30 - Goat Willow, Oak, Silver Birch
G31 - Goat Willow, Silver Birch
G32 - Silver Birch
G33 - Goat Willow, Silver Birch
G34 - Silver Birch

T1 - Ash - Veteran Tree
T4 - Goat Willow
T14 - Hawthorn
T15 - Goat Willow

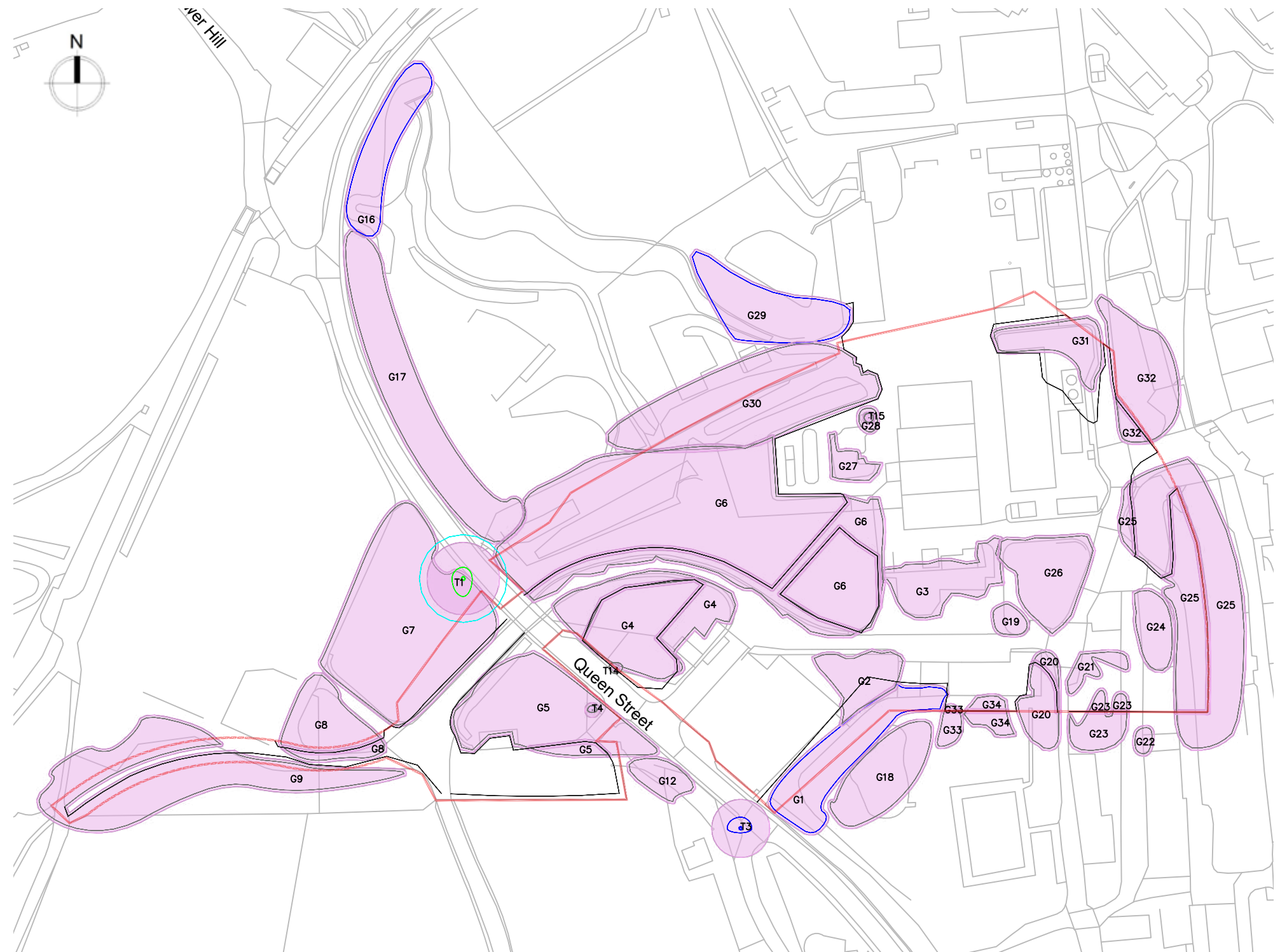
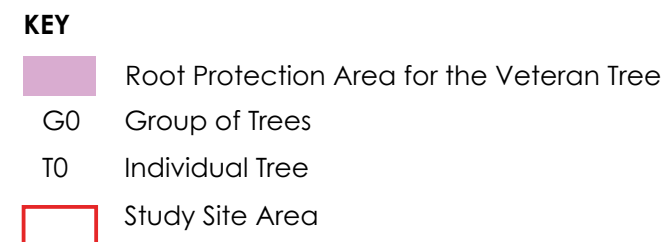


Figure 02-13: Extract from Arboricultural Survey



2.9 Land Use

About 65% of the site is comprised of hardstanding and bare ground, featuring terraces, brick walls, asphalt roads, and concrete pads from previous structures. These areas, often adorned with Butterfly-bush and tree saplings. The northern section displays a more sporadic scrubland, while the southern scrub is notably denser. Small pockets of concentrated scrub are dispersed in the south, east, and west regions, including the woodland perimeters.

In the northern part, a disused car park, adorned with ornamental shrubs and trees, has become overgrown with vegetation such as Silver Birch, Cypress, Bindweed (*Convolvulus* sp.), Firethorn (*Pyracantha coccinea*), Wall Cotoneaster (*Cotoneaster horizontalis*), mosses, and Bramble, concealing the original hardstanding. The remaining areas are covered with post demolition debris and fines, with minimal to no exposed soil. It is plausible that the gravel areas, resulting from previous building demolitions, may conceal additional hardstanding, as vegetation is sparse across these areas, with some mixed scrub beginning to regenerate.

The northern part of the site is characterised by scattered scrubland, while the southern part hosts more concentrated scrub, including dense patches around the south, east, and west areas, as well as near the western entrance and along the woodland perimeters. The site currently accommodates an existing small car park, consisting of approximately 3 coach bays and 46 car parking spaces. Access to the former Flexys site beyond (now owned by Solutia UK Ltd) is restricted by a galvanised palisade security fence and gate. To the northeast of the site lies the Cefn (Trefynant) Cemetery which is managed by Cefn Community Council and bounds the site by existing trees.

- KEY**
- Study site boundary
 - Large area of existing hardstand
 - Established/maturing vegetation
 - Vegetation associated with water body
 - Mix of hardstanding and self seeded scrubland
 - Water body
 - Cemetery
 - Existing Private road
 - Existing watercourse
 - Existing watercourse (culverted)
 - Existing Entrance
 - Bridge

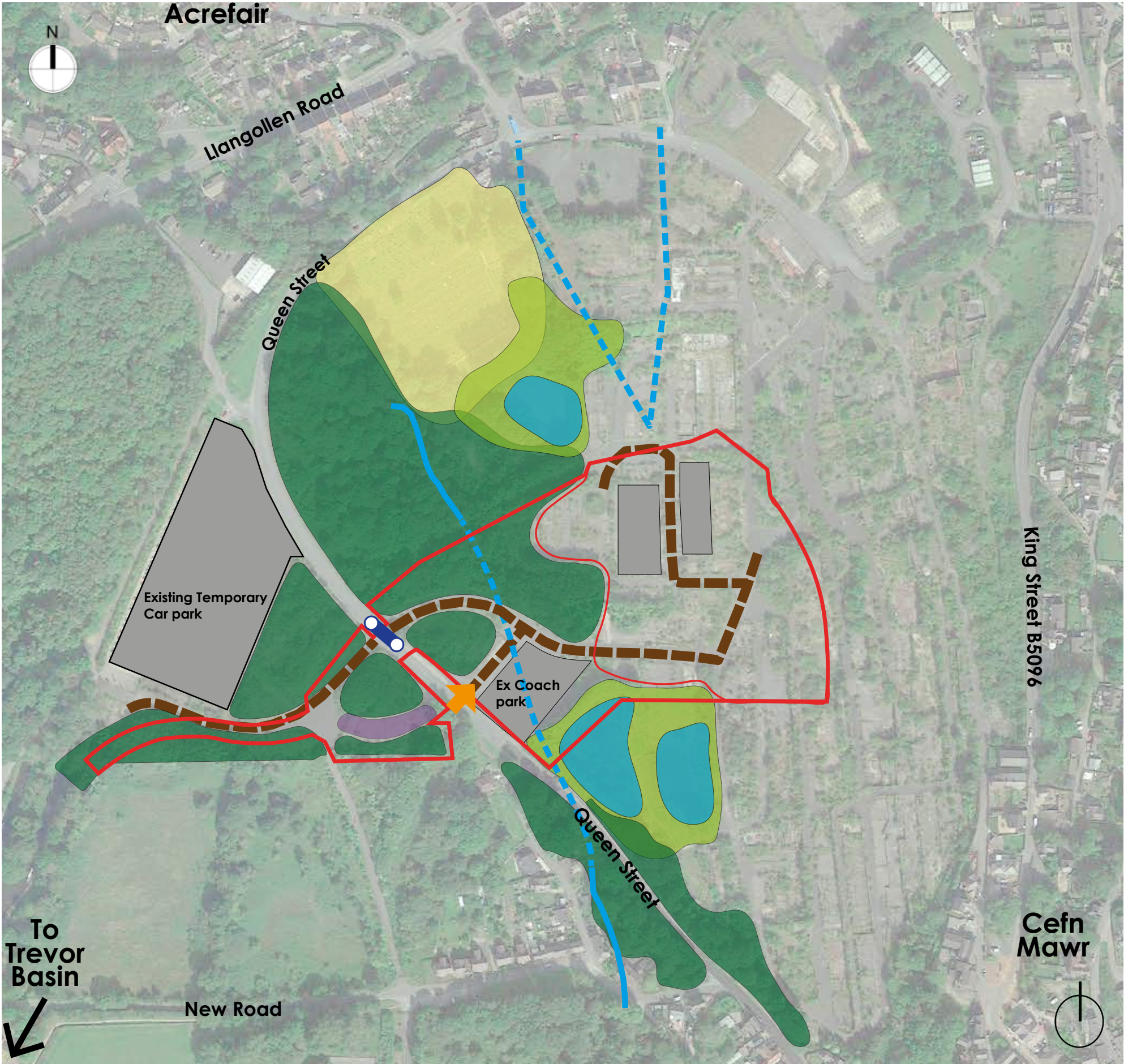


Figure 02-14: Land Use Plan

2.10 Landscape Character

Designations

The project site lies within a number of landscape designations of international and national importance, including the Pontcysyllte Aqueduct World Heritage Site, Bryniau Clwyd a Dyffryn Dyfrdwy Area of Outstanding Natural Beauty (AONB) and Pontcysyllte Aqueduct Conservation Area. The Pontcysyllte Aqueduct and Canal is designated a Scheduled Ancient Monument of National Importance. Ty Mawr Country Park lies a short distant east of the Site.

There are no National Parks, Registered Historic Landscapes or Historic Parks and Gardens within the local area.

Landscape Character

The following published national and local character assessments have been reviewed to inform the design process:

- National - National Landscape Character Areas (NLCA) published by Natural Resources Wales; and
- Local - Wrexham LANDMAP Supplementary Planning Guidance, Wrexham County Borough Council, 2007

NATIONAL LANDSCAPE CHARACTER

The site is situated in NLCA 13, Glannau Dyfrdwy a Wrecsam / Deeside and Wrexham and within close proximity to NLCA 15, Bro Llangollen a Dyffryn Dyfrdwy / Vale of Llangollen and Dee Valley. The NLCA provides a comprehensive profile for each area, outlining the key characteristics that contribute to the understanding of the Study Area's baseline. These characteristics are detailed below:

NLCA 13 Glannau Dyfrdwy a Wrecsam / Deeside and Wrexham:

- Lowland, foothills, and levels sloping down to the lower Dee and Dee estuary.
- Dominated by the single large river, the Dee, traversing the area.
- Broad flat floodplain adjacent to the Dee estuary.
- Narrow, incised, wooded tributary valleys, many originating from the west.
- Mixed pasture and some arable land, alongside farm woodland cover.
- Presence of urban settlements.
- Industrial character evident in the landscape.
- Small settlements associated with landed estates and isolated farmsteads.

NLCA 15 Bro Llangollen a Dyffryn Dyfrdwy / Vale of Llangollen and Dee Valley:

- A distinctive, deeply cut, meandering valley featuring the River Dee.
- Predominantly tranquil and rural landscape.
- Unique and spectacular limestone rock outcrops, particularly north of Llangollen.

- River morphology characterised by alluvium, gravels, and terraces, creating a gently undulating valley floor and floodplain in certain areas.
- Predominantly poorly drained / seasonally wet soils.
- Ecologically significant river habitats along the River Dee and its various small tributaries.
- Geometric field patterns of small to medium scale, defined by stone walls or hedgerows, with many hedgerow trees, extending up hillsides.
- Woodlands and pastures on valley and hillside, with a densely wooded character in some areas, featuring a mix of coniferous and deciduous plantations. In other places, open valley floor grazing and steep hillside sheep grazing.
- The Llangollen Canal and Pontcysyllte aqueduct, designated as a World Heritage Site.
- Settlement patterns related to historic transport patterns, which, in turn, are linked to the valley and topography. Notable historic and tourist towns, such as Corwen and Llangollen, are situated by the River Dee at historic crossing points.
- An iconic cultural landscape centered around Llangollen.

LOCAL LANDSCAPE CHARACTER

At the local landscape character level, the site falls within two character areas LCA 9d Dee Valley, Froncysyllte to Newbridge and LCA 7b Cefn-mawr. (Wrexham LANDMAP SPG) as per Figure 02-15.

LCA 9d Dee Valley, Froncysyllte to Newbridge

This designation encompasses a small wooded valley extending from Wrexham to Minera. Key characteristics pertinent to the landscape and visual context of the Site, as outlined in the SPG, include:

- An enclosed lowland valley featuring a level floodplain.
- A distinctive blend of farmed and wooded elements, bordered by closely built ‘urban villages’ such as Cefn-mawr, Trevor, and Froncysyllte.
- Exceptional views extending to and from landmarks like the Pontcysyllte Aqueduct, Cefn railway viaduct, and nearby hills.
- A notable man-made embankment that carries the canal to the aqueduct, contributing to the formation of a ‘gateway’ within the valley.
- The SPG emphasizes the sensitivity of LCA 9a to any development that may impact the setting of the Pontcysyllte Aqueduct and the scenic Vale of Llangollen.
- Management guidelines specific to LCA 9d and the Site are summarised as follows:
- Preserve and enhance the scenic and historic landscape character, identifying, maintaining, and enhancing significant views.
- Strengthen tree planting on valley edges while preserving selected views for a visually exciting rural-urban contrast.
- Improve recreational routes linking historic landscape features.
- Manage woodlands to enhance biodiversity, including diversifying woodland structure, restricting grazing, and retaining old/dead trees.
- Expand native woodland types, such as upland mixed ash

- woodland, and replace conifers with broadleaves.
- Safeguard industrial archaeology and earlier prehistoric and medieval heritage, particularly preserving the canal and associated structures.
- Promote understanding and enjoyment of the outstanding historic industrial landscape and setting through existing management strategies for Pontcysyllte, Trefor, and Ty Mawr Country Park.

LCA 7b Cefn-mawr

- The character area LCA 7b Cefn-mawr, is situated on a ridge overlooking the scenic Dee Valley at the entrance to the Vale of Llangollen. Key characteristics contributing to the landscape and visual baseline of the Study Area in this locale include:
- Diverse communities, including the tightly built Cefn-mawr on a ridge, the 1960s housing estate of Plas Madoc, and Acrefair visible from the Llangollen Rd tourist route.
- Scenic views to the south over the Dee Valley towards the Berwyn foothills.
- The presence of unsightly industrial development, particularly noticeable in views from the southwest.

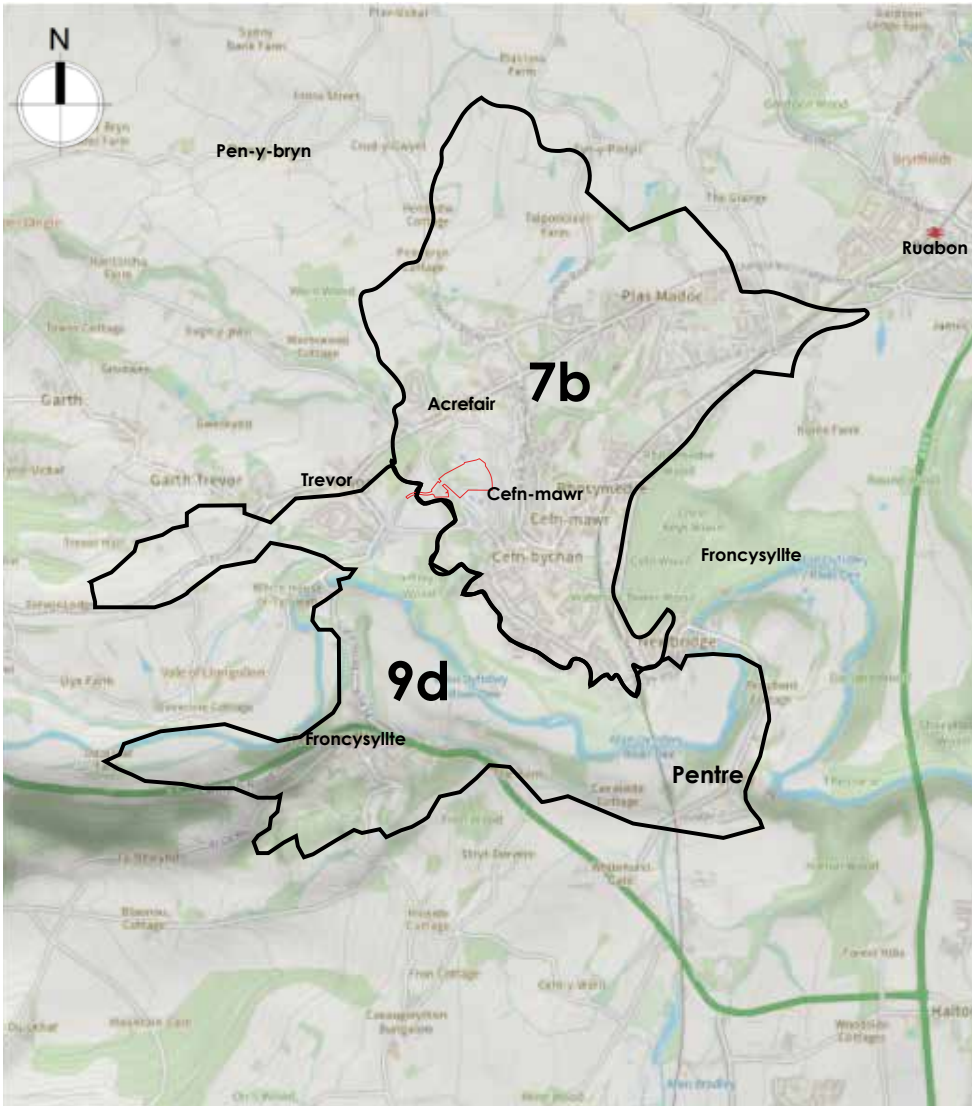


Figure 02-15: Landscape Character Map

- KEY
-  Study site Location
 -  Landscape Character Area

2.11 Site Photos

The following photographs provide a visual narrative of the site, capturing the dynamic interplay between existing former industrial infrastructure and the evolving landscape of the development area.

These images offer a perspective on the intricate relationships between human activity and nature. The industrial elements stand as a testament to the site's history and existing land use, showcasing the tangible imprint of prior endeavours.

This collection is a representative documentation of the complex interactions shaping the site, illustrating the delicate balance between progress, sustainability, and the preservation of natural elements.



1. View from the Queen Street looking south west along the current underpass road. To the left and right of the road is self seeded and emergent trees and woodland.



2. View from the existing underpass road looking south west towards the Queen Street Bridge



3. View west along the existing private road which links to the existing Car Park

Figure 02-16: Site Photograph Location Plan



4. View east from within the existing site boundary fence along the existing road linking to the underpass of the Queen Street Bridge.



7. View west from within the centre of the site. Concrete foundations at base level, with Buddleja growing within gaps.



10. View north showing existing brick retaining wall and concrete building foundations



5. Remnant of the former industrial use. Existing reinforced concrete slabs and retaining walls



8. View west from within the centre of the site. Concrete foundations at base level, with Buddleja growing within gaps.



11. View west along the existing internal road network. Existing block paving offers potential for reuse.



6. View from the existing access road looking north. To the right an existing brick retaining wall



9. View north west from inside the site boundary.



12. View east from an elevated viewpoint looking down on the remnant building foundations

2.12 Opportunities & Constraints

Figure 02-17 shows a summary for the site that identifies the potential advantages (opportunities) and limitations (constraints) inherent in the location, guiding the strategic decisions and planning for the project;

1. Improvements to access road.
 - a. Improved street scene.
 - b. Boundary improvements.
 - c. Enhancement to existing hedgerows.
 - d. Replace existing unsightly security fencing.
2. New pedestrian and cycle link on route of former historical route.
 - a. New high quality secure fencing.
 - b. Heritage interpretation.
 - c. Key views into rewilded areas.
3. Rewilded area - restricted access.
 - a. Retention of mature trees.
 - b. Protection of/improvement to existing habitats and their settings for enhanced biodiversity.
 - c. Planting designed to create new views in and out of site.
 - d. Controlled management of plant species.
4. New 'woodland' setting car parking and coach park.
 - a. Re-use of existing materials and areas of hard stand where stable and appropriate.
 - b. Tree planting for canopy shade, creation of views and reduction of visual impact on designated landscapes.
 - c. Potential use of permeable paving and SuDS.
 - d. Improved visual impact from AONB and WHS.
5. Re-use of existing materials and areas of hard stand where stable and appropriate.
 - a. Potential use of permeable paving and SuDS.
 - b. Improved visual impact from AONB and WHS.
6. Temporary landscape (future phase visitor centre).
 - a. Improved pedestrian and cycle access - main route to WHS.
 - b. Improved connectivity - potential pedestrian link to existing car park ('Gateway/Nodal area').
 - c. Location for potential welcome pod or kiosk.



Figure 02-17: Initial Opportunities Map

KEY

- | | |
|---|---|
| — Study site boundary | Car park Potential |
| — Key Pedestrian Movement | ● Pedestrian Node/Gateway |
| — Key Vehicular Movement | ● Vehicular Node/Gateway |
| - - - Boundary enhancement | |
| - - - New secure boundary | |
| - - - Hedgerow improvement | |
| Woodland improvement | |

2.13 Landownership

Figure 02-18 shows the current land in the ownership of Solutia and Wrexham Bouough Council. It is anticipated that ownership of the site is to be transferred to Wrexham Borough Council, with the infrastructure becoming a council asset. This will result in the Council becoming ultimately responsible for the car park and its management and maintenance.

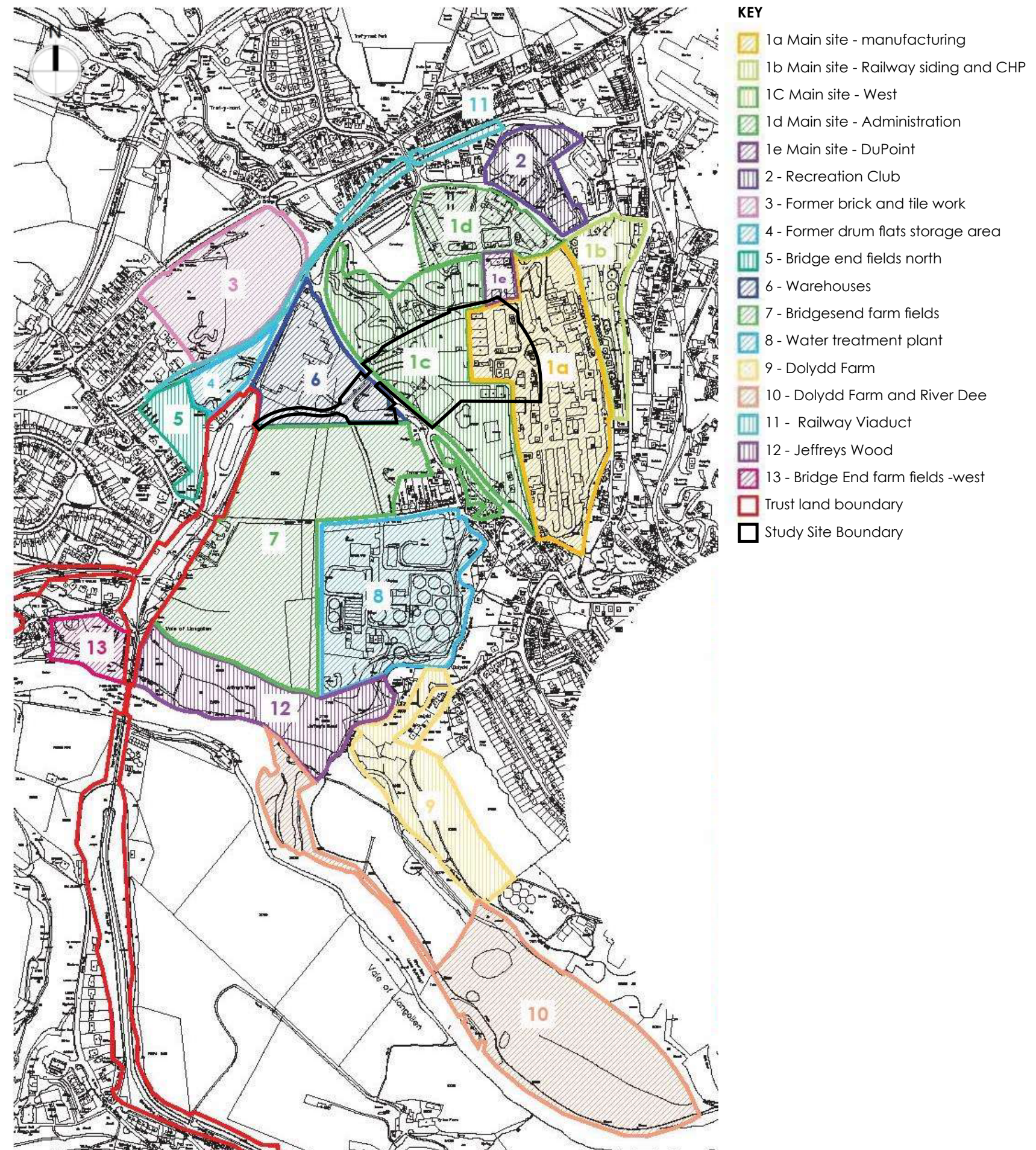


Figure 02-18: Land Ownership Plan

2.14 Current Car Parking Provision

There are currently three car parks within the vicinity as summarised below and show in Figure 02-19.

1 - Main Car Park accessed off Tower Hill

This car park is on the site of a former industrial unit and utilises the concrete foundation as its base. It is operated by the Canal & River Trust. It has capacity for 99 cars of which 6 are for disability access (Blue Badge Holders). There is a large turning head at the southern section of the site that allows for drop off by Coaches.

2 - Queen Street Car Park

This car park is surfaced in Asphalt and has capacity for 46 cars and 3 Coaches

3 - Pontycysyllte Aqueduct Blue Badge Car Park accessed off New Road

This car park is accessed off New Road and is only available for Blue Badge and Permit holders. It has capacity for 16 disability access bays and 16 permit holders bays.

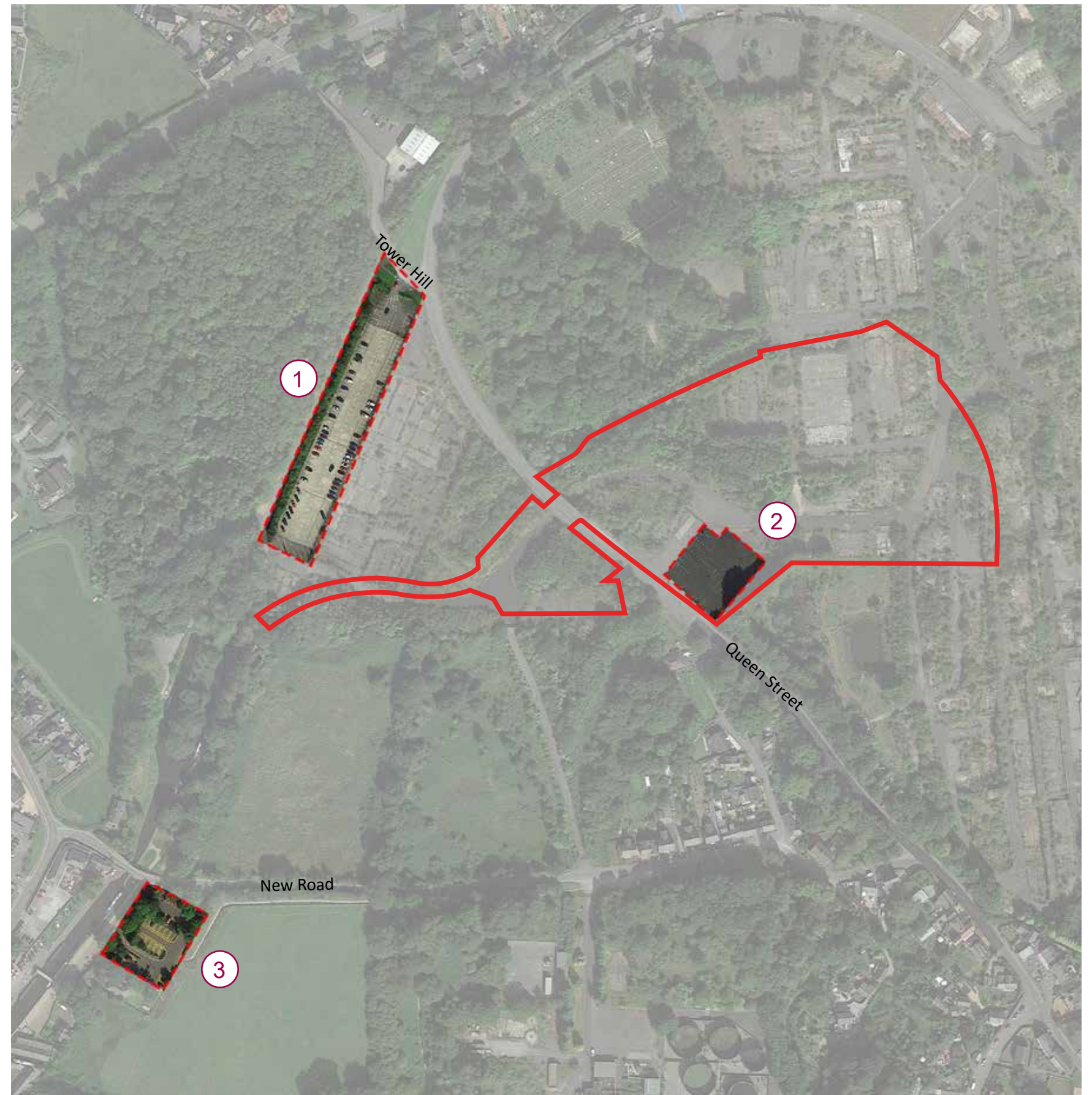


Figure 02-19: Car Parking Provision

2.14 Car Parking Provision



Figure 02-20: Current Main Car Park looking south from Tower Hill entrance



Figure 02-21: Current Main Car Park looking north from the southern section of the site



Figure 02-22: Queen Street Car Park looking east from the entrance.



Figure 02-23: Pontycysyllte Aqueduct Blue Badge Car Park accessed off New Road



03

Vision

3.1 Design Approach

Vision Statement

The project will seek to construct an efficient arrival point which will include designated car, coach, and cycle parking areas, purposeful pathways for both vehicles and active travel, and a recreational walking and cycle route to the Pontcysyllte Aqueduct via the Trevor Basin. This will be undertaken by preserving the natural environment, with enhancements like woodland planting and amenity green spaces, clear signage, effective wayfinding, drainage ponds, and additional fencing. To support this, the project will work within the following framework vision:



Aim: Safeguard the World Heritage Site

Ensure long-term sustainable access, to aid the generation of income and allow for reinvestment in maintenance and management, improve physical and non-physical accessibility elevate the quality of land use and views in and out.



Aim: Balance needs of community, residents and visitor numbers

The project to be designed around the needs of the local community to provide additional amenities that improve the quality of life for residents of Trevor and Cefn Mawr and address current parking issues in Trevor.



Aim: Maximise Economic & Community Benefits

Maximise economic and community benefits by creating a sustainable project that enhances the heritage experience. This project to be a catalyst for positive change, ensuring lasting benefits for residents, businesses, and visitors.



Aim: Enhance visitor attractions & dwell time

Improving visitor management through parking, wayfinding and the breadth of activities and destinations, to enhance the visitor experience and increasing dwell time and visitor spend.



Aim Improve Accessibility

Improved access to the WHS site through an enhanced public realm, footways and car parking.



Aim: Realistic options for brownfield regeneration / minimise brownfield maintenance.

Providing sympathetic development, improving access and minimising visual impact, with limited remedial works.



Aim: Enhance the health & wellbeing of community & visitors

Spread of new and existing visitors along the Llangollen Canal towpath, across the Pontcysyllte Aqueduct, and within the network of paths in and around the masterplan area, supporting the physical and mental health of those who use them. The woodland activity and education centre will offer opportunities to educate visitors (both adults and children) about biodiversity and sustainability issues

3.1 Design Approach

Fundamental Principles

The foundation of the Landscape and Public Realm Design is anchored in a set of fundamental principles. The design team has endeavoured to craft a thoughtfully designed proposal that engages with both the qualities of the site and the broader context beyond its boundaries.

The design must take into account the existing landscape character, strategically placing new access points and parking facilities within a well-defined network of routes, bolstered by a robust landscape framework. A key guiding principle is to minimise hard surfaces, to help promote permeable and sustainable drainage solutions (SUDS). These proposals will be intricately tailored to respond to pivotal local assets, making a constructive contribution to the distinctive character and positive features of the surrounding area. The result is a design that not only respects the site's inherent attributes but also enhances its integration within the broader context, reflecting a commitment to both aesthetic and environmental considerations.

- Public Realm is to be well connected and legible to enable people move around easily by walking and cycling.
- Green infrastructure will be at the core of the public realm and is fundamental to the success of the layout.
- Sustainable design, attenuation ponds, trees and other greenery are to be incorporated into the infrastructure, to soften the appearance, aid legibility, enhance the ecological value, aid flood management and contribute to sustainable drainage and air quality.
- A coherent palette of good quality materials and design features is to be used in the public realm, visually knitting the fabric together to contribute to a strong sense of place.
- High quality distinctive design, taking opportunities to integrate bespoke features, enhancing local character and wayfinding. The form of the landscape will take reference to the rich social character and heritage.
- The Public Realm will be constructed using sustainable materials and methods, and to allow for ease of future management and maintenance.
- A site wide planting strategy that enables ecology and wildness to establish, balanced with recreation, social and spaces for visitors, users and local residents.
- Car Parking Arrangement is in keeping with the aesthetic setting and ensures an efficient and robust arrangement.
- Access routes to the existing treatments works will be retained and integrated into the proposed layout.

Green & Blue Infrastructure

The project will transform the brownfield site with a focus on the natural environment. A network of green infrastructure space runs through the layout and is an essential component of the overall vision. Strategic interventions at the localised scale will include new attenuation features, retained and enhanced tree planting and the use of open mosaic habitat. These elements provide positive gains for natural capital, whilst the green infrastructure will be multifunctional, with roles in enhancing the appearance of, improving air quality, delivering biodiversity benefits, providing shade and cooling, and creating a space for people to enjoy. The surface water run-off is managed in a positive way that enhances water quality, amenity and biodiversity.

The project will support:

- Green infrastructure including trees, other planting and relevant sustainable urban drainage solutions.
- The public realm design recognises the importance of trees in promoting the character of place and environmental quality.
- Sustainable Urban Drainage Systems along the movement network forms part of the active strategy. Accommodated where feasible around existing services, are designed to concentrate and convey storm water runoff while removing debris and pollution and are also beneficial in recharging groundwater.
- Planting will be low maintenance, with a bias towards native species and nectar rich plants.

The attenuation features are to be vegetated, with gentle slopes to safely maximise the time the water spends in them. The growing media acts as a filter which aids the collection and removal of pollutants, silt, and debris. They will capture and treat storm water runoff before releasing it to the underground attenuation and back into the wider network at a controlled rate.

The Landscape Structure

The green space network will provide opportunities for formal and informal recreation linking the car park to the wider tourist destination. The landscape structure is designed to be high quality, robust and adaptable over time so that it will remain fit for purpose and will be managed and maintained for continual use.

The Landscape Structure will work within the following framework:

- To provide a high quality, well maintained and attractive landscape setting for the project and local community, for the long-term benefit.
- To establish and maintain open mosaic habitat
- To enhance public awareness and appreciation of the habitats and associated flora and fauna of the site.
- To comply with legal obligations and constraints and demonstrate use of best practice.
- To ensure all planting is suitably cared for to enable its successful establishment, to maintain healthy growth and attractive form.
- To ensure that hard surfaces and street furniture are maintained in a safe, debris-free state to facilitate all year-round use.

3.1 Design Approach

Inclusive Design

Inclusive design means making places attractive and accessible to all. It encapsulates more than physical infrastructure. It should also be considered as part of a process to encourage community involvement and participation.

The Project is committed to inclusive design in removing barriers to movement for people with impaired mobility and for pedestrians generally.

The public realm design will create a safe environments which will encourage people to use outdoor facilities and will provide appropriate seating and lighting, level access and features to help people find their way around.

The design of the public realm prioritises inclusivity in adherence to UK standards, notably quoting relevant guidance to ensure accessibility for all. Proposed levels aim to maintain shallower gradients than the 1:21 ratio recommended by UK standards. An exception is noted in the existing underpass beneath the Queens Street bridge, where a section at 1:16 is present. It is acknowledged that this existing slope does not fully align with current best practices for gradients. The decision to retain the current slope is rooted in the preservation of the existing Industrial Infrastructure, acknowledging constraints imposed by the available space and the context of the existing bridge, including considerations related to parapet clearance. This approach is aligned with the commitment to creating an inclusive public realm while addressing specific challenges posed by the site's historical and infrastructural context.

Relevant Guidance:

- *The Equality Act 2010*, which outlines legal obligations to make reasonable adjustments for disabled people, ensuring they have equal access to services and facilities.
- *Part M of the Building Regulations* pertains to access to and use of buildings. It focuses on ensuring that buildings are accessible to all.
- *BS 8300 Design of an Accessible and Inclusive Built Environment*, Covering outdoor spaces, parking areas, and other external features to make them accessible to all.
- *Guidance on the Use of Tactile Paving and Inclusive Mobility* Department of Transport.



Figure 03-1: Accessible Routes within a Woodland Character

3.1 Design Approach

Safety and Security

The project is designed to be well connected, continuous with high levels of natural surveillance.

Public realm will be lit to appropriate levels to encourage safe and proper use of the space. Street furniture is selected to reflect the industrial heritage and character and constructed from durable, robust materials.

Design prioritises the needs of pedestrians and cyclists within the setting, whilst facilitating appropriate traffic movement. Designs have been developed in accordance with best practice.

Relevant Guidance:

- *Wrexham Borough Council Local Planning Guidance Note 24 Designing Out Crime* - Measures aimed at enhancing public safety extend well beyond the functions of land use planning. The approach taken to designing out crime is, therefore:
 - a. comprehensive - design must be considered in conjunction with other security measures (e.g. CCTV, locks, Night Safe registration, etc.) and informal policing by the community; and
 - b. collaborative – extending responsibility for safety to all interested organisations (e.g. North Wales Police, house builders, etc.) and residents will promote a sense of ownership and pride.
- *Secure by Design*
- *Manual for Streets* (DfT, 2007).
- *Manual for Streets 2* (DfT, 2011).



Figure 03-2: *Parking with integrated green infrastructure*



Figure 03-3: *SuDS and planting features within parking areas*



Figure 03-4: *SuDS and drainage*



04

Design

4.1 - Masterplan Concept

The Masterplan proposed a distinctive linear approach, emphasising efficiency and a modern aesthetic. This design diverges from the contours of the existing landscape, adopting a more structured and organized layout for the car park. The linear approach aimed to maximise space utilisation and create a visually striking and contemporary parking facility.

The design for the car park and access encompasses a linear car parking with tree-lined edges. The entrance to the site is aligned to the existing site entrance with Coach parking adjacent on the location of the existing car park. A pedestrian link follows the old canal line along the site's perimeter, which will connect and provide an access route to the village of Cefyn Mawr. Access to the Trevor Basin from the main car park runs along the existing internal road network running underneath the Queens Street bridge. A Multi-Use Welcome Hub/Event Space serves as a combined visitor center, community resource, and event venue is positioned off this access route with a plaza and entrance space. Additionally, the design considers the proximity to potential Glamping/Camping Sites in fields east of Trevor Basin.

A detailed topographic survey and the information provided in Section 2 was not available to inform the layout at the initial concept masterplan stage.



Figure 04-1: Trevor Basin and Surrounding Area Masterplan - Car Park Initial stage Sketch Design

4.2 - Concept Development

Figure 04-2 illustrates the initial design concept, developed through the systematic site analysis outlined in Section 2. Working on the opportunities and constraints identified, this holistic bubble approach incorporates the following eight key elements:

1. Approach: Seizing the opportunity to enhance the site's approach by upgrading pavements, roads, and boundaries.
2. Arrival: Creating a memorable impression upon arrival with an improved "Gateway" featuring a setback of fence lines to facilitate street-side tree planting.
3. Welcome and Wayfinding Features: Installing welcoming signage with clear wayfinding instructions to guide visitors to parking areas and onward movement toward the World Heritage Site.
4. Woodland Parking: Designing car and coach parking within a landscaped woodland setting, incorporating a robust tree canopy for shading and view screening. The parking spaces will integrate greenery, Sustainable Urban Drainage System (SUDS) drainage, and electric charging points. The organic layout will seamlessly blend with the landscape, supported by tree canopy coverage for effective screening. Consideration will be given to planting that softens views into the coach park from the entrance.
5. Recreation and Connection: Establishing a new recreational shared foot and cycle path along the route of the former canal, connecting to the nearby community of Cefn-mawr.
6. Confluence/Nodal Points: Designating meeting points for multi-modal routes and creating orientation points for signage and wayfinding.
7. Dwell: Providing a meeting point or dwell space with seating and opportunities for public art and interpretation.
8. Green Infrastructure: Implementing structured planting for screening and softening of views, protecting habitats and biodiversity areas, and introducing temporary planting to precede further phased works.

Based on the above assessment two detail design options were developed using a contrasting approach and are outlined on the following pages.

From the initial concept design, two options were developed while retaining the identified spatial arrangement. These alternatives underwent detailed exploration to assess their impacts on layout and functionality. The dual approach facilitated a comprehensive examination of design considerations, including aesthetics, usability, and efficiency. Presenting two options aimed to provide a well-informed foundation for decision-making, aligning the chosen solution with project objectives and spatial requirements.

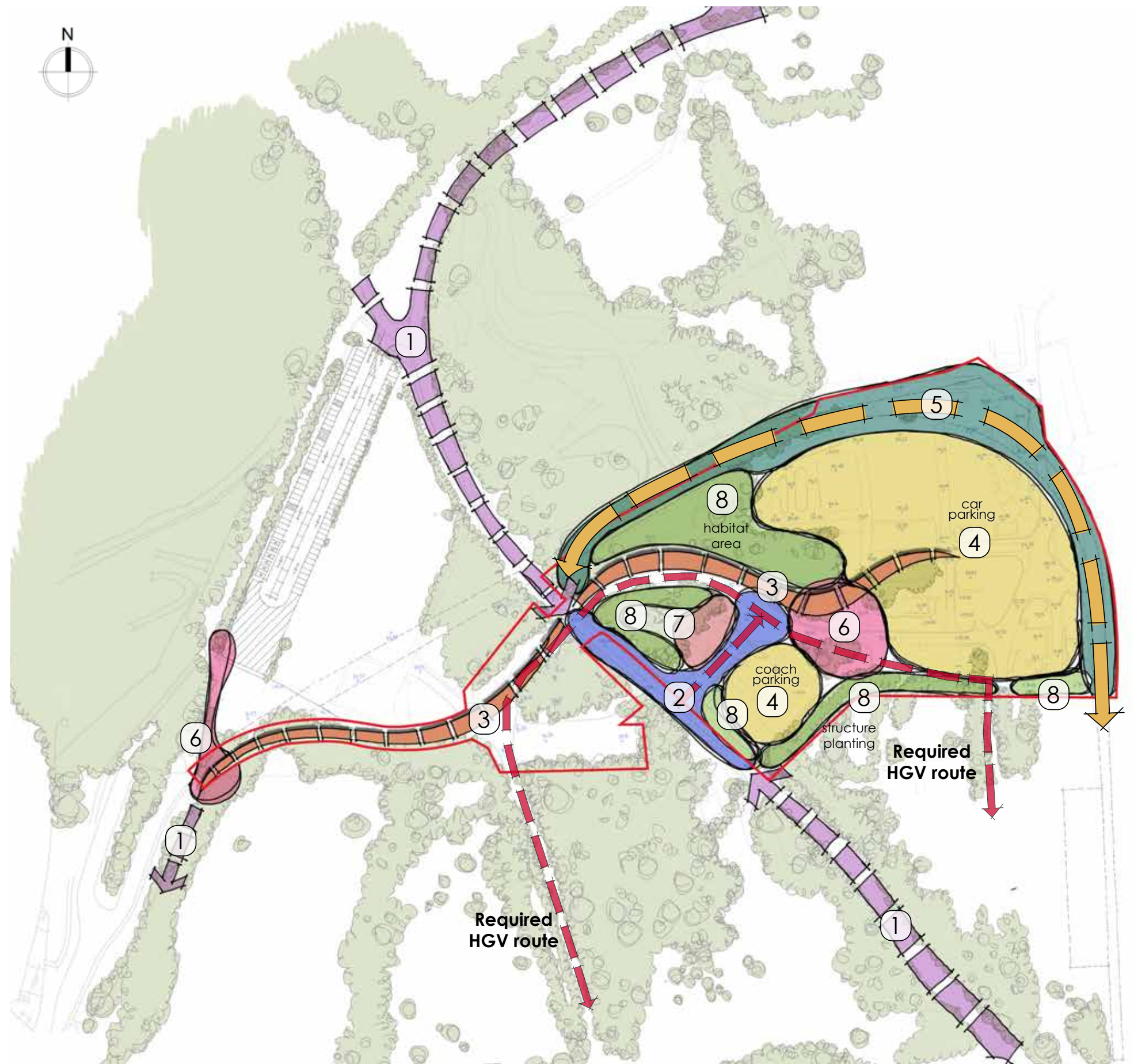


Figure 04-2: Car Park and Arrival Concept Design Plan

4.3 Design Option 1

Concept 1: Existing Levels Integration

The design approach focuses on seamlessly integrating the new car park within the existing topography and levels of the site. This concept capitalises on the natural contours of the land and the terraces of the former building foundations, minimising the need for extensive earthworks and alterations. By aligning with the existing levels, the car park becomes a harmonious extension of the landscape. Key Features:

- Main Entrance: Access to the site is served via the existing vehicular access point onto Queen Street.
- Preservation of Natural Grading: Concept 1 prioritises the preservation of the site's natural grading, avoiding unnecessary disruption to the terrain. This will give topographic interest whilst not only enhances the aesthetics of the car park but also reduces reducing the environmental impact.
- Minimised Earthworks: The concept minimises the need for extensive earth-moving activities, resulting in cost-effective construction and a faster implementation timeline.
- Visual Integration: The car park is designed to visually integrate with the surroundings, creating an aesthetically pleasing and unobtrusive addition to the landscape.
- Sustainable Drainage Solutions: Integration with existing levels allows for the incorporation of sustainable drainage solutions, utilising natural slopes and contours to manage stormwater runoff effectively.
- Series of Terraces: The layout meanders in a “zig zag” approach creating a series of terraced car parking bays. This in itself will be a one-way system but then present a series of junctions within its form.

Visitors to the site would arrive via the Queen Street Entrance and enter the site in a northern direction passing a welcome Hub/Kiosk to the left. Cars would then be directed right into the main body of the car park and enter a one-way system which would navigate up the changes in levels with a series of terraces to the next available space. Coaches would depart the main access road to the right into a coach parking area designed to minimise the reverse movement. Upon departing the vehicle visitors would be directed along a series of pedestrian routes set within the landscape to a central path leading south back to the point of arrival. From this nodal points, visitors would then progress in a eastern and then southern direction, passing under the Queen Street Bridge, meandering through the site to arrive at a connection point into the Trevor Basin. Public art would aid the legibility of the site through wayfinding and entrance signage. Vehicular movements were tested using swept path analysis to ensure the functionality and efficiency of junctions, validating the flow of vehicular traffic. This option provides 210 car parking spaces of which 25 (more than 10%) would be mobility standard spaces plus provision for 10 coaches.



Figure 04-3: Design Option 1

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| <p>1-Wayfinding feature
Strong linear wayfinding feature - structure or set in paving</p> <p>2-Arrival point
Gateway/ Welcome Area</p> <p>3-Structure planting and woodland enhancement/creation
Planting for screening, retained/enhance existing planting.
Woodland areas managed for habitat retention/creation and enhanced biodiversity, including removal of non native invasive species</p> <p>4-Coach park (9 spaces)
One way in and out, reverse movement necessary</p> <p>5-Mobility parking (24 spaces)
min 10% of total spaces, in line with Wrexham guidance</p> <p>6-'Welcome Hub'
Kiosk/Café/Bike Hire/electric bike charging point with spill-out amenity space, cycle parking</p> <p>7-Woodland car parking (210 spaces)
Parking spaces set in woodland, to include 'greening' of spaces and electric vehicle charging points</p> <p>8-Nodal points
Confluence points, pedestrian priority given</p> | <p>9-Heritage Trail
Recreational Route: Shared foot and cycleway following route of former canal arm linking to Cefn Mawr</p> <p>10-Existing car park
Phased closure for future repurposing</p> <p>11-Temporary green space
Area to be greened temporarily to safeguard future Visitor Centre location</p> <p>12-Improve highways boundaries
Set back fencing and upgrade to enable tree planting on approach to Welcome Point</p> <p>13-Signage and Wayfinding Improvements
Potential improvements to signage and wayfinding at junctions approaching the site</p> <p>14-Bridge structure
Structure to be reviewed to assess the impact of the proposed scheme</p> <p>15-Seating/art feature
Potential for seating/wayfinding/interpretation feature within woodland edge and promotion of views into future rewilding area</p> |
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4.4 Design Option 2

Option 2 takes an organic and innovative approach, prioritising accessibility and user experience. This design goes beyond the constraints of existing levels to create a more user-friendly and efficient parking facility. Key Features:

- Main Entrance: Access to the site is served via the existing vehicular access point onto Queen Street.
- Optimised Accessibility: Concept 2 prioritises user convenience to ensure easy navigation for both pedestrians and vehicles, enhancing the overall accessibility of the car park.
- Curved Pathways and Routes: Unlike traditional linear layouts, Concept 2 incorporates curved pathways and roads. This not only adds a dynamic and visually appealing element but also optimises traffic flow and minimises congestion.
- Green Spaces and Landscape: The organic design integrates green spaces and landscape elements throughout the car park, contributing to a more environmentally friendly and aesthetically pleasing environment.
- Visual Integrations: The layout considers the car park as a potential landscape focused space, designed to visually integrate with the surroundings, creating an aesthetically pleasing and unobtrusive addition to the landscape.
- Universal Design Principles: This concept incorporates universal design principles to ensure inclusive and accessibility for all users, including those with mobility challenges.
- Sustainable Drainage Solutions: Integration with existing levels allows for the incorporation of sustainable drainage solutions, utilising natural slopes and contours to manage stormwater runoff effectively.

Site visitors would arrive through the Queen Street Entrance, proceeding northward upon entry. Vehicles would then be guided to the right, leading into the primary section of the car park, where they would follow a one-way system along curved roads. Upon exiting their vehicles, visitors would be directed towards a central pedestrian spine, aligned with the site entrance road. This pathway would link to a central node, guiding visitors eastward and then southward beneath the Queen Street Bridge. The route meanders through the site, ultimately connecting to a point of entry into the Trevor Basin. Accessible spaces are provided in two locations, to the left of the arrival point and the first bays of the main vehicular route, both located on lower ground. Swept path analysis was undertaken to assess vehicular movements, ensuring the effectiveness and efficiency of junctions and validating the flow of traffic. This option offers 245 car parking spaces, including 24 (10%) designated for mobility standard spaces, along with provisions for accommodating 9 coaches. The proposed layout incorporates a one way system. Drivers typically find it easier to navigate and park in one-way systems, as they can anticipate the flow of traffic and follow a consistent path to access their parking spaces.



Figure 04-4: Design Option 2

1-Wayfinding feature
Strong linear wayfinding feature - structure or set in paving

2-Arrival point
Gateway/ Welcome Area

3-Woodland retention/creation
Retain/enhance existing woodland and create new woodland 'pockets'. Areas managed for habitat retention/creation and enhanced biodiversity, including removal of non native invasive species. Include 'amenity' green spaces set within clearings in woodland 'pockets', opportunities for interpretation and art, seating and natural and woodland play elements

4-Coach park (9 spaces)
One way in and out, reverse movement necessary

5-Mobility parking (24 spaces)
min 10% of total spaces, in line with Wrexham guidance

6-'Welcome Hub'
Kiosk/Café/Bike Hire/electric bike charging point with spill-out amenity space, cycle parking

7-'Entrance Square'
Confluence area with pedestrian priority

8-Woodland car parking (245 spaces)
Parking spaces set in woodland, to include 'greening' of spaces and electric vehicle charging points

9-Nodal points
Confluence points, pedestrian priority given

10-Heritage Trail
Recreational Route: Shared foot and cycleway following route of former canal arm linking to Cefn Mawr

11-'Archimedes Screw'
Ramp design based on Archimedes Screw

12-Existing car park
Phased closure for future repurposing

13-Temporary green space
Area to be rgreened temporarily to safeguard future Visitor Centre location

14-Improve highways boundaries
Set back fencing and upgrade to enable tree planting on approach to Welcome Point

15-Signage and Wayfinding Improvements
Potential improvements to signage and wayfinding at junctions approaching the site

16-Bridge structure
Structure to be reviewed to assess the impact of the proposed scheme

4.5 - Detail Design

A comprehensive review and assessment of the two layouts were conducted, evaluating the merits of each design. Subsequently, design option two was selected and brought forward based on its attributes and alignment with project objectives. The detail design is captured on the following page in Figure 04-6. A cost analysis was conducted to align the proposed design with the available budget, identifying and prioritising key elements, ultimately shaping the project in accordance with financial considerations. The following describes the changes from Concept to Detailed Design:

- The perimeter route identified within the initial concept along the old canal line has been identified as a future recreational route. As part of the wider LUF funding the area to the north of the site, and still part of the original Flexys site, is identified as a “Rewilding” project which will progressively develop as a restricted access brownfield nature reserve.
- The total area of the car park footprint was reduced. This allowed for a better co-ordination with the perimeter levels on the northern and eastern boundary whilst also providing a cost saving to maximise the available budget.
- A hierarchy of spaces and materials has been included, with different application of materials for the Accessible Bays, Standard Parking Bays, Overflow Parking Bays, Coach Parking.
- Introduction of an overflow car park, to address situations if the primary parking area reaches capacity during peak times or events. It serves as an additional space where vehicles can be directed when the main parking facility is full. Having an overflow car park helps manage traffic efficiently, prevents congestion, and ensures that visitors still have convenient access to parking even during high-demand periods (see section 4.8 for more details)
- The central pedestrian axis is retained and maintains the linear connection the main entrance, however it has been reduced in length.
- The drainage strategy identified the requirement for Sustainable Urban Drainage System (SUDS) and the introduction of new attenuation ponds. These will help prevent flooding by temporarily storing excess rainwater during heavy rainfall events. This temporary storage allows for a gradual release of water, reducing the risk of downstream flooding and erosion. They also aid the Biodiversity Net Gain of the site by allowing for the introduction of new habitat creation.
- Further thought was given to the function of the open space with the introduction of cycle parking and seating areas.
- A space and location for a future “Welcome Hub” is retained (the detail for the building does not form part of this application).

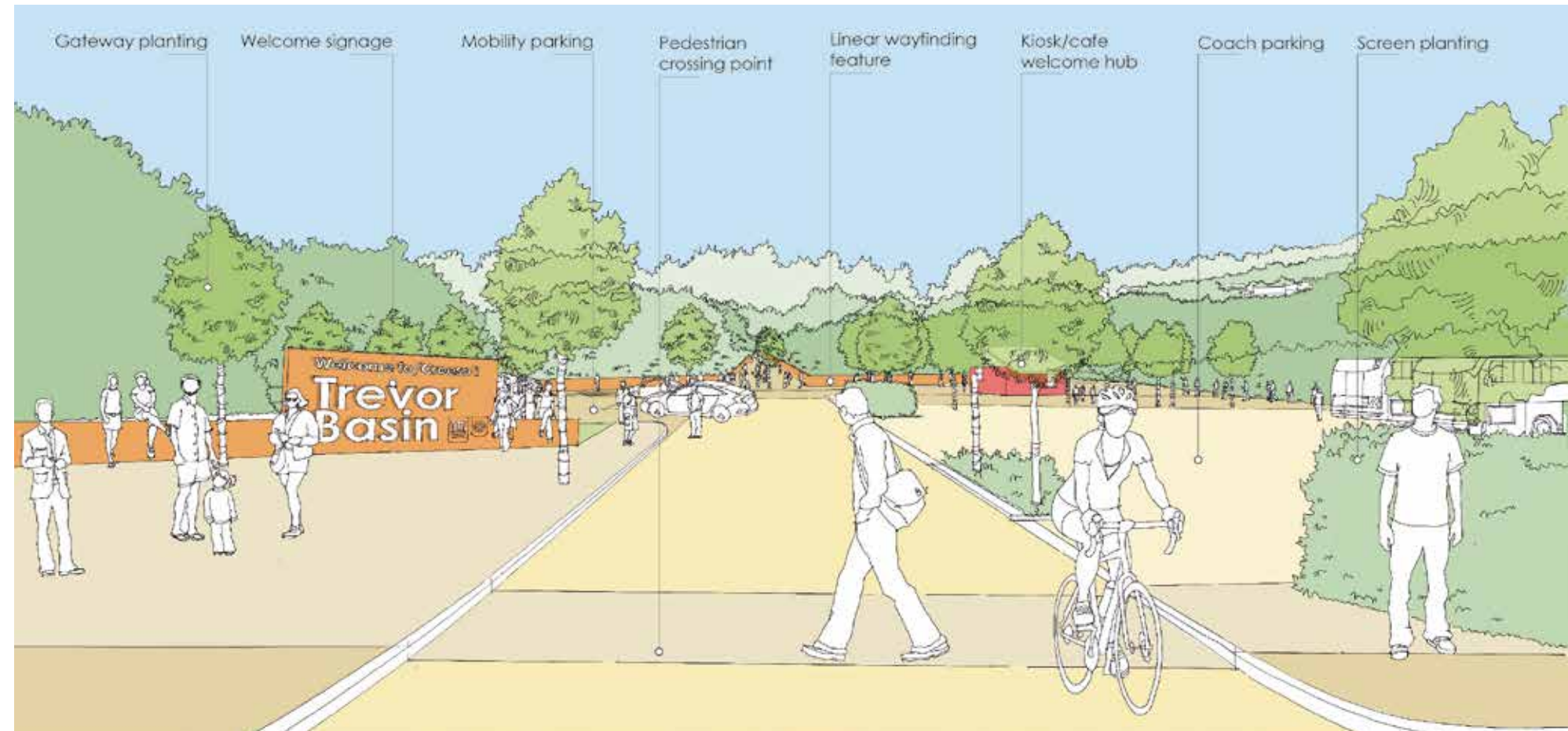


Figure 04-5: Illustration of Site Entrance