



Pembrokeshire Green

Infrastructure Assessment

Urban Tree Planting and Pollinator Strategies

Pembrokeshire County Council and

Pembrokeshire Coast National Park Authority

Final report

Prepared by LUC

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Pembrokeshire Green Infrastructure Assessment

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Chapter 1

Urban Tree Planting Strategies

1.1 Trees and woodlands are an essential element of our urban environment and crucial to sustainable growth and development. A healthy, well managed 'urban forest' has the potential to perform a range of environmental functions and provide multiple benefits for people and nature.

1.2 Pembrokeshire's urban tree planting strategy promotes a strategic approach to tree planting and management across 11 Pembrokeshire settlements. This will ensure that additional planting will deliver the greatest benefits and help to protect and enhance the distinctive character of the county's settlements into the future.

1.3 Whilst there is a resource implication to increasing the amount of urban trees across Pembrokeshire, the benefits that may be derived from this positive investment are many and varied. Increasing tree 'canopy cover' is a priority of the UK and Welsh government and comprises a central pillar in efforts to reach net zero emissions. Increasing woodland cover is an underpinning principle of the Welsh government's 2022 woodlands for Wales action plan [[See reference 1](#)]:

1.4 'Optimise the sustainable benefits that forestry, woodlands and trees can provide across rural, peri-urban, and urban areas to meet the needs of people and local communities.' (Woodland for Wales action plan, Cymru 2022).

1.5 Both mitigating and adapting to the effects of a changing climate are themes that are associated with many of the potential benefits of trees.

Components of Pembrokeshire's Urban Tree Planting Strategy

1.6 Pembrokeshire's urban tree planting strategy promotes a strategic approach to tree planting and management across 11 Pembrokeshire settlements.

1.7 Individual strategies for urban tree planting have been developed for each of the 11 settlements included within the strategy.

Overarching Principles

1.8 All of the individual settlement strategies are underpinned by a set of overarching principles. The overarching principles will guide the design and delivery of all tree planting projects across the settlement.

Tree Planting Zones and Sub-Principles for 11 Settlements

1.9 A spatial strategy for tree planting in each settlement has been developed. This comprises strategic tree planting zones that have been established for each settlement. Each tree planting zone has a set of accompanying sub-principles, which build on the overarching principles and provide more detail on where and how tree planting projects will likely need to come forward in each zone.

1.10 A set of set of tree planting typologies has been developed. Information on where the planting typologies and species recommendations may be used to develop project plans is indicated as part of the tree planting zones for each settlement.

Delivery

1.11 A framework and further guidance on delivery is also provided. This includes:

- The key steps required for bringing tree planting projects forward;
- Overview of standards for planting and maintenance; and
- Species recommendations and a framework for species selection.

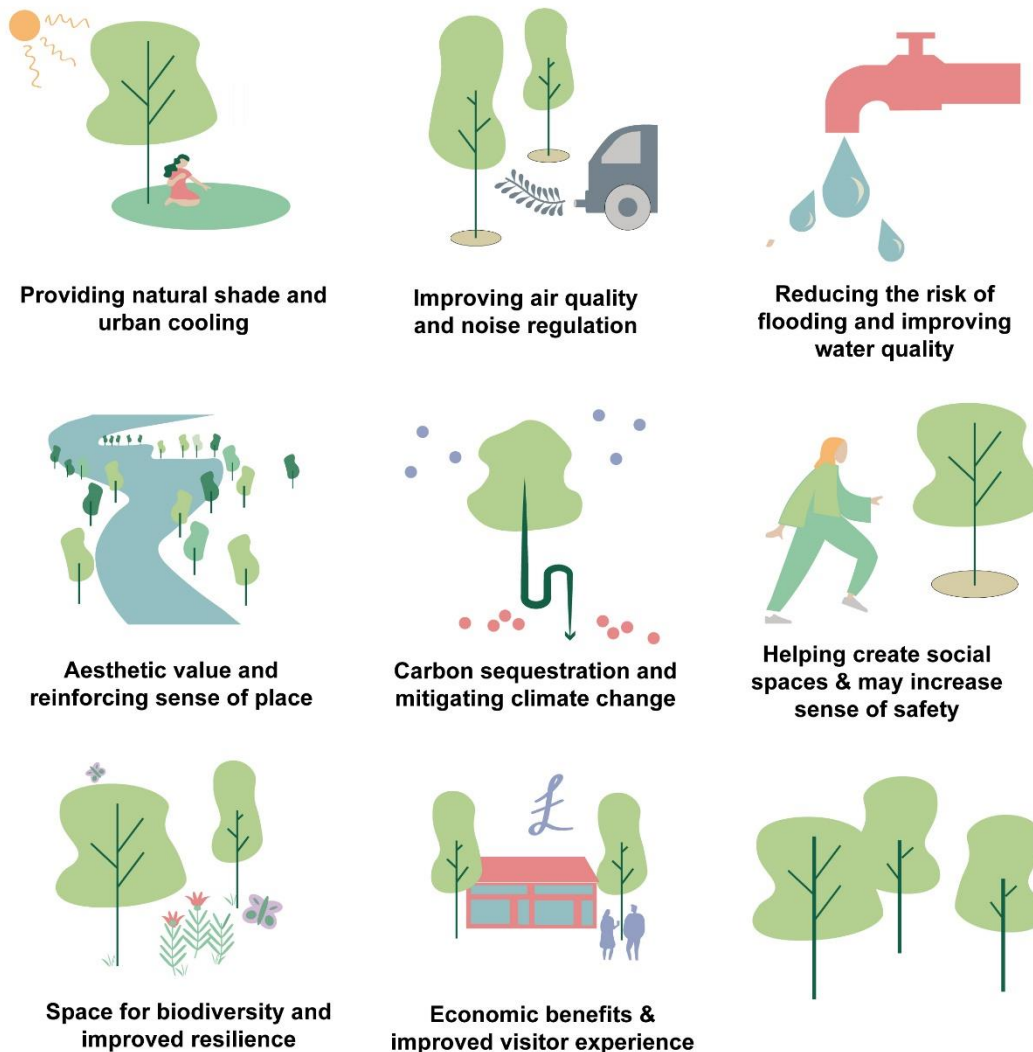
The key benefits of urban trees

1.12 Trees provide a wide range of environmental, social, health and wellbeing benefits.

1.13 Benefits of the project, as depicted in Figure 1.1 below, include:

- Providing natural shade and urban cooling.
- Improving air quality and noise regulation.
- Reducing the risk of flooding and improving water quality.
- Aesthetic value and reinforcing sense of place.
- Carbon sequestration and mitigation climate change.
- Helping create social spaces & may increase sense of safety.
- Space for biodiversity and improved resilience.
- Economic benefits & improved visitor experience.

Figure 1.1: The key benefits of urban trees



Trees enhance our environment

1.14 Trees provide natural shade and cool air.

- Trees provide shelter and reduce wind speed. Trees have been shown to have a cooling effect and reduce the surface temperature in some European cities by up to 12 degrees in some regions. In contrast, green spaces without trees have a negligible effect on surface temperature. [\[See](#)

reference 2] Trees have been found to reduce the risk of heat related morbidity and mortality and improve thermal comfort in outdoor spaces **[See reference 3]**.

1.15 Trees release the oxygen we breath and absorb carbon dioxide.

- A mature tree can store 22 kilograms of carbon every year. An average tree will uptake around 1 tonne of CO₂ in its lifetime. **[See reference 4]**

1.16 Trees provide shelter and food for wildlife.

- Shelter belts, avenues and tree lined streets can provide important linear wildlife corridors that are integrated into the urban setting. Trees can provide a range of habitat from nesting sites to food such as nectar, seeds and berries. One mature oak can support over 280 different species of invertebrates.

1.17 Tree alleviate impacts from flooding and reduce stormwater pollution.

- With appropriate siting and species choice, trees can reduce ground water run off and intercept pollution. This can in turn reduce the severity of flooding and help to protect river and marine water quality and aquatic life. It has been estimated that a 5% increase in tree canopy cover can reduce run-off by 2% **[See reference 5]**. Broadleaved trees have been shown to intercept around 38% of gross precipitation; slowing the flow of water during rainfall events. **[See reference 6]**

1.18 Trees enhance landscape character and can soften the built environment.

- The full range of planting types including street trees, parkland trees, hedgerows, community orchards or woodland all have the potential to reinforce sense of place and provide aesthetic value if planted in the right locations.

Trees provide social, health and wellbeing benefits

1.19 Trees intercept particulates and improve air quality.

- Trees can help to intercept and remove a number of pollutants from the atmosphere – including nitrogen oxide, ozone and particulates. Particulate levels can be up to 60% lower on tree lined streets than those without trees.

1.20 The presence of trees in urban areas has been associated with lower levels of crime.

- Some studies have shown that areas with high canopy trees have lower rates of crime when compared to areas with lower vegetation such as mown grass [See reference 7]. Public spaces with trees also tend to be used more, and a flow of people will increase informal surveillance and sense of safety.
- The presence of trees could reduce crime levels by as much as 7%. One study, conducted in the USA, found that apartment blocks surrounded by mature trees experienced 52% fewer reported crimes than those without greenery [See reference 8]. A review of literature by Wolf et al. [See reference 9] found that trees may reduce the incidence of various types of crime, although there may be influencing factors such as tree size, location and overall health status of trees in an area.

1.21 Trees help create social spaces and foster social inclusion.

- One study has shown a positive relationship between higher tree canopy cover and higher self-reported neighbourhood 'social capital', connection and association amongst individuals. [See reference 10]

1.22 Trees help reduce noise pollution.

- It has been shown that a 30-metre shelter belt of trees can reduce noise levels by around five to ten decibels. [See reference 11]

1.23 Trees can have economic benefits.

- It has been found that people visiting business districts are generally willing to pay more for goods and services in landscaped areas when compared to non-landscaped areas. The quality of landscaping on approach routes to business districts can positively influence visitor perceptions. **[See reference 12]** **[See reference 13]**

Chapter 2

Overarching Principles

2.1 The following section sets out a range of overarching principles that will inform all tree planting within the 11 settlements. The overarching principles are supported by a set of sub-principles that apply to each settlement and strategic tree planting zones. These have been developed to ensure all future urban tree planting helps to deliver the vision and objectives for green Infrastructure (GI) in Pembrokeshire.

2.2 These have been informed by the baseline review for the study (including pressures and drivers for each settlement), site visits and consultation with stakeholders. The urban tree planting principles have also been developed to ensure alignment with existing guidance, including the Tree and Woodland guidance (supplementary planning guidance to Pembrokeshire coast national park local development plan 2 – draft approved for public consultation) [See reference 14]. This document is due to be formally adopted by Pembrokeshire coast national park authority (PCNPA) (following a report of consultations) in 2023.

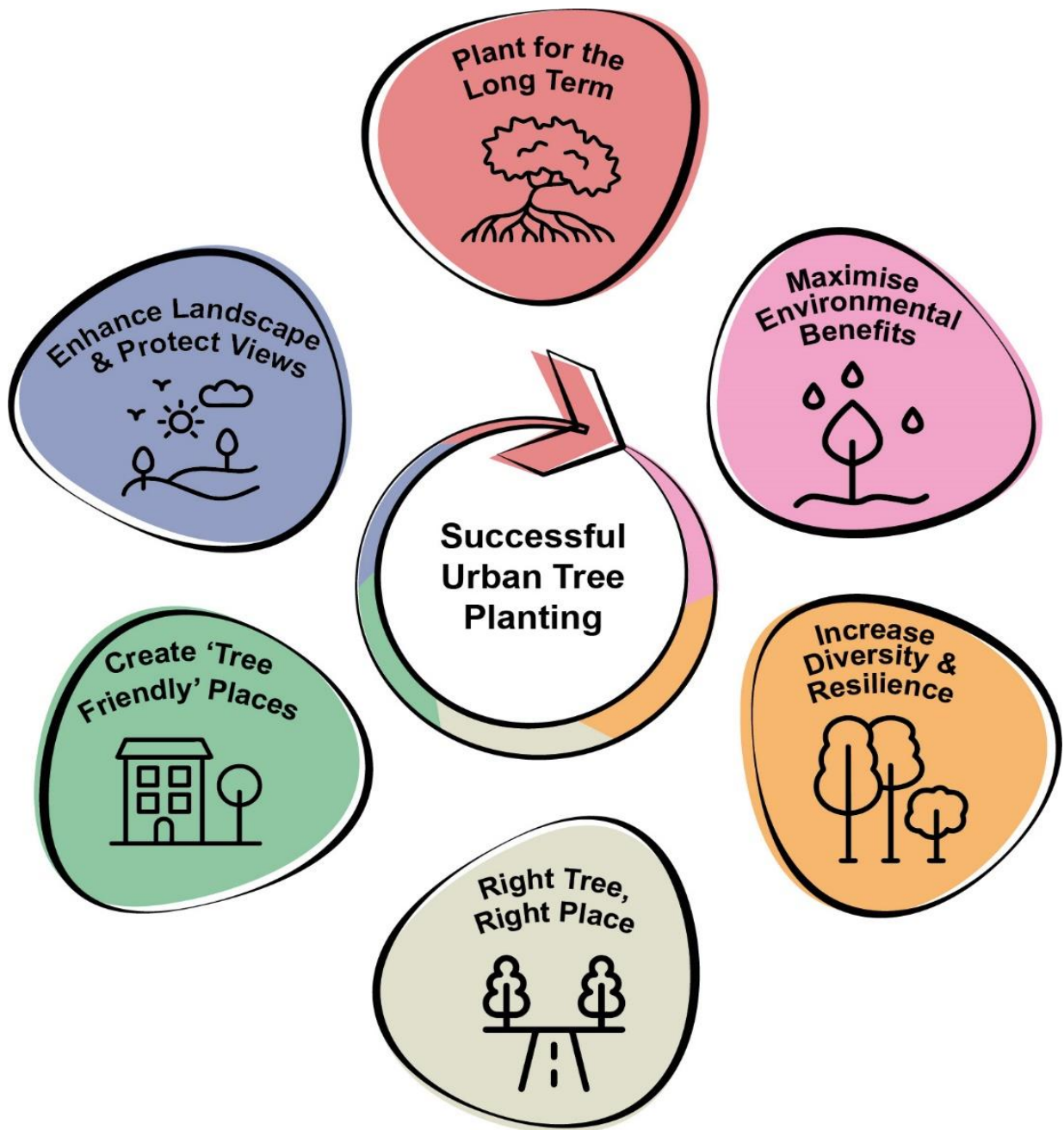
2.3 The overarching principles recognise that trees can provide multiple benefits for people, biodiversity and the wider environment. Trees that are able to reach full maturity, and trees with large canopies, provide greater benefits. In order to deliver healthy, mature trees, new urban tree planting must:

- Be well selected, planted and maintained.
- Have sufficient rooting space with uncompacted, fertile soil; and
- Have physical space to reach full maturity, without excessive pruning requirements.

2.4 The overarching principles also acknowledge that trees may potentially have disbenefits, which can be avoided with good planning and tree selection.

2.5 The overarching principles are set out under several headings. These are divided into those primarily relating to the design stage of a project, and those primarily relating to the delivery stage of the project.

Figure 2.1: Overarching Principles for Successful Tree Planting



Plant for the long term

Design

1a. Tree planting projects should deliver long lived, mature trees.

Opportunities for planting large canopy trees will be prioritised.

1b. Planting methods and tree pit design should be informed by recognised industry standards and guidance.

1c. The maximum possible rooting environment should be sought in hard landscape to allow trees to reach their full maturity.

Delivery

1d. Arrangements for ongoing maintenance should be agreed and confirmed prior to planting.

1e. Felled trees should be replaced at a 1:1 ratio as a minimum. The causes of the tree loss, i.e. disease, suitability of species, location should be considered when planning replacement planting. Ideally replacement planting should be located as close to the original tree(s) as possible, with the aim of restoring or increasing canopy cover in each settlement and locality. Individual trees or groups of trees that are planted as replacement for trees that have been removed or lost should ideally be Standard or Heavy Stand trees, unless it is deemed more appropriate to replace lost

trees with larger areas of woodland that may be best established with smaller tree stock (i.e. whips).

2.6 Figure 2.2 below highlights the following points for this principle:

- Trees should not interfere with the movement of traffic, pedestrians, and cyclists.
- The maximum possible rooting environment should be sought in hard landscapes to allow trees to reach their full maturity.
- Species choice should be informed by the desired size, height and crown shape for the space identified for the tree. This will ensure longevity of the specimen and minimise the risk of clashes with highways, utilities and buildings.
- Planting methods and tree pit design should be informed by recognised industry standards and guidance for both hard and soft landscape environments.
- Tree planting should accommodate long-lived, mature trees. Opportunities for planting large canopies should be prioritised.
- Choosing large crown specimens will provide additional shade during the summer months within areas of public realm.

Figure 2.2: Principle 1- Plant for the long term



Maximise environmental benefits

Design

2a. Integrate sustainable urban drainage (SuDS) with urban tree planting where possible.

2b. Species choice should be informed by likely water availability (i.e. tolerant of drought or periodic inundation).

2c. Integrate species that are good at intercepting pollution and particulates.

2d. Prioritise species that provide food and shelter for wildlife.

2e. Place trees to provide shade where needed without blocking light for residents.

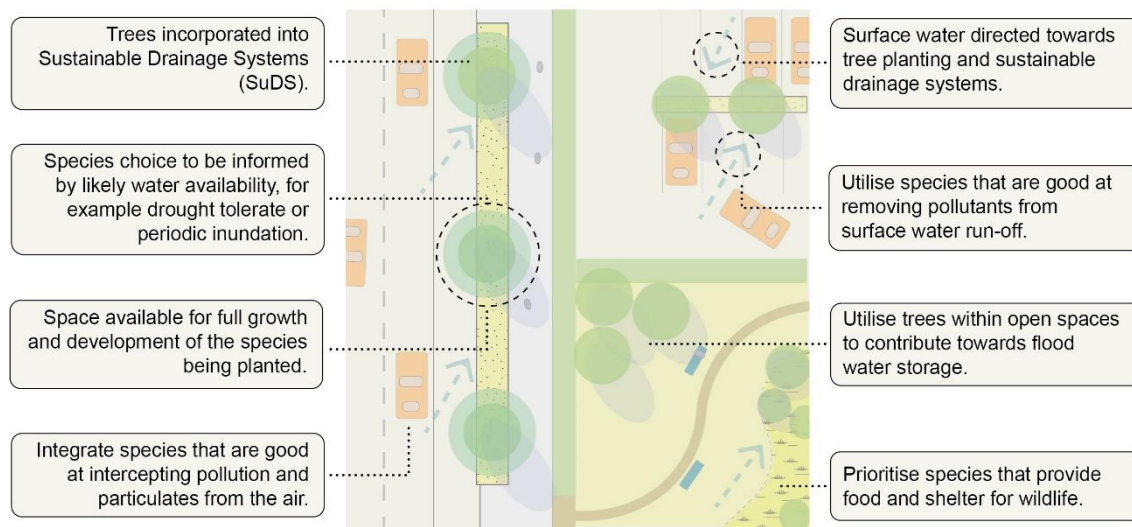
Delivery

2f. Involve specialist practitioners (such as drainage / flood engineers) and work collaboratively to deliver effective schemes.

2.7 Figure 2.3 below highlights the following points for this principle:

- Trees incorporated into sustainable drainage systems(SUDS).
- Species choice to be informed by likely water availability for example drought tolerate or periodic inundation.
- Space available for full growth and development of the species being planted.
- Integrate species that are good at intercepting pollution and particulates from the air.
- Surface water directed towards tree planting and sustainable drainage systems.
- Utilise species that are good at removing pollutions from surface water run-off.
- Utilise trees within open spaces to contribute towards flood water storage.
- Prioritise species that provide food and shelter for wildlife.

Figure 2.3: Principle 2- Maximise environmental benefits



Increase diversity and resilience

Design

3a. Increase the diversity of tree species across each settlement to develop resilience to pests, disease and climate change.

3b. Tree species will be informed by an understanding of the existing tree stock.

3c. Trees should not be planted on existing high value habitats, such as semi-natural wildflower grasslands or heathland where planting would be detrimental to habitat quality.

Delivery

3d. New tree planting and tree management should follow robust biosecurity measures.

3e. Source planting stock locally and within Wales.

3f. Where necessary, consult Natural Resources Wales concerning designated sites or existing high value habitats when planning tree planting projects.

2.8 Figure 2.4 below highlights the following points for this principle:

- Source planting stock locally and within Wales.
- Tree species to be informed by an understanding of the existing tree stock, including species within private and public spaces.
- Utilise a diverse selection of species to increase resilience to pests, disease and climate change.
- Trees should not be planted on existing high value habitats, such as semi-natural wildflower grasslands or heathland.

Figure 2.4: Principle 3- Increase diversity and resilience



Right tree, right place

Design

4a. New tree planting should be informed by an understanding of site constraints, local conditions and landscape character.

4b. Species choice should aim to limit the need for unnecessary additional maintenance or excessive pruning requirements.

4c. Trees with narrow (or fastigate) canopies should be specified on sites where wide spreading canopies would present a maintenance issue.

4d. Potential nuisance issues from trees should be considered, including allergenic properties, fruit drop and honeydew.

4e. Select planting sites and trees species to reduce risk of damage to infrastructure and property.

Delivery

4f. Consult with the wider community early to ensure plans are understood and sufficient opportunity is provided for stakeholders to contribute.

2.9 Figure 2.5 below highlights the following points for this principle:

- Buffer zones between residential areas and sources of pollution.

- Ornamental trees mark gateways into built up areas.
- Community orchards are easily accessible for residents.
- Existing woodland buffered and expanded with a wider diversity of species.
- Fastigate canopies used along roads.
- Landscape character enhanced and views of detracting features screened.

Figure 2.5: Principle 4- Right tree, right place



Create 'tree friendly' places

Design

5a. Ensure the layout and design of new developments and infrastructure can accommodate the growth of mature, large canopy trees.

5b. Ensure new tree planting does not interfere with infrastructure. Ensure new utilities maximise growing space for trees.

Delivery

5c. Ensure new tree planting is considered as part of all public realm, infrastructure, and development projects.

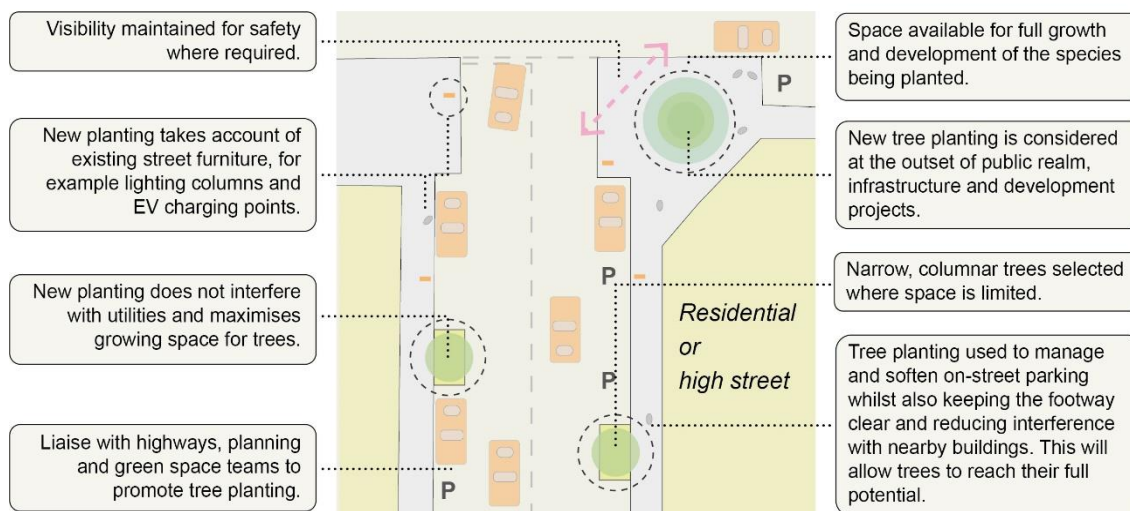
5d. Ensure trees are considered from the start of all design and development projects.

5e. Liaise with green space teams, planning departments and highways to promote tree planting.

2.10 Figure 2.6 below highlights the following points for this principle:

- Visibility maintained for safety where required.
- New planting takes account of existing street furniture, for example lighting columns and EV charging points.
- New planting does not interfere with utilities and maximises growing space for trees.
- Liaise with highways, planning and green space teams to promote tree planting.
- Space available for full growth and development of the species being planted.
- New tree planting is considered at the outset of public realm, infrastructure, and development projects.
- Narrow, columnar trees selected where space is limited.
- Tree planting used to manage and soften on-street parking whilst also keeping the footway clear and reducing interference with nearby buildings, this will allow.

Figure 2.6: Principle 5- Create 'tree friendly' places



Enhance landscape and protect views

Design

6a. Ensure tree planting enhances and doesn't detract from, or negatively impact, heritage features or townscape character. Sufficient consideration will need to be given to Listed Buildings and features, Scheduled Monuments, archaeology, and Locally Listed features.

6b. Trees are used to frame views and vistas.

6c. Maintain key views that are valued by the community or protected by policy.

6d. Ensure tree planting in settlements within and adjacent to the Pembrokeshire Coast National Park (PCNP) is informed by the PCNP Tree

and Woodland Guidance. This guidance sets out opportunities and considerations for siting new trees and woodlands, informed by the sensitivities of various landscape types within PCNP. This is of particular importance for any woodlands or shelterbelts which may be considered within peri-urban areas or rural areas adjacent to the settlements considered in this study. Settlements included within this strategy that are located within the boundary of PCNP include:

- Newport
- St Davids
- Saundersfoot
- Tenby

Delivery

6e. Ensure appropriate visibility is maintained along roads and footways for safety into the future.

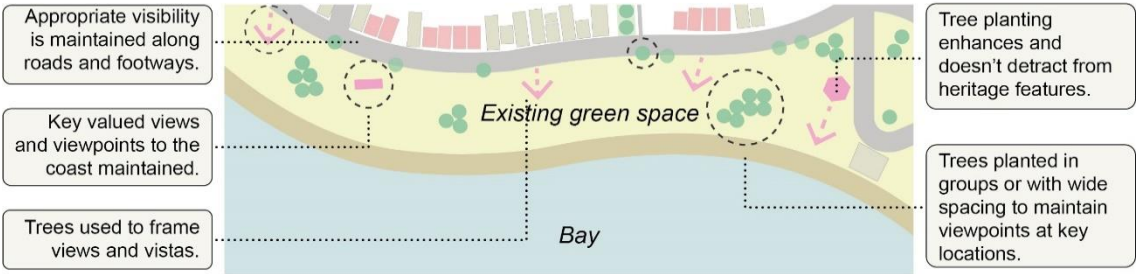
6f. All planting proposals and management of existing trees located within and adjacent to Conservation Areas should be planned in consultation with both the Historic Building Conservation Officer and Landscape Officer at Pembrokeshire County Council (PCC). Early consultation with Cadw, Dyfed Archaeological Trust (DAT), landowners and occupiers will be undertaken to understand the key historic environment considerations of individual sites.

2.11 Figure 2.7 below highlights the following points for this principle:

- Appropriate visibility is maintained along roads and footways.

- Key valued views and viewpoints to the coast maintained.
- Trees used to frame views and vistas.
- Tree planting enhances and doesn't detract from heritage features.
- Tree planted in groups or with wide spacing to maintain viewpoint at key locations.

Figure 2.7: Principle 6- Enhance landscape and protect views



2.12 Tree Planting Zones and Sub-Principles for 11 Settlements build on the Overarching Principles above and provide additional detail on planning and delivering new tree planting. Sub-Principles are set out on the Urban Tree Planting Strategy page for each settlement.

Chapter 3

Tree Planting Zones and Sub-Principles for 11 Settlements

3.1 Strategic Tree Planting Zones have been established for each settlement and can be accessed via the links below. Each Strategic Tree Planting Zone has a set of accompanying Sub-Principles, which build on the Overarching Principles and provide additional detail to inform the future delivery of tree planting projects.

3.2 Tree planting typologies have also been developed, outlining species recommendations and tree planting guidance for specific environmental conditions.

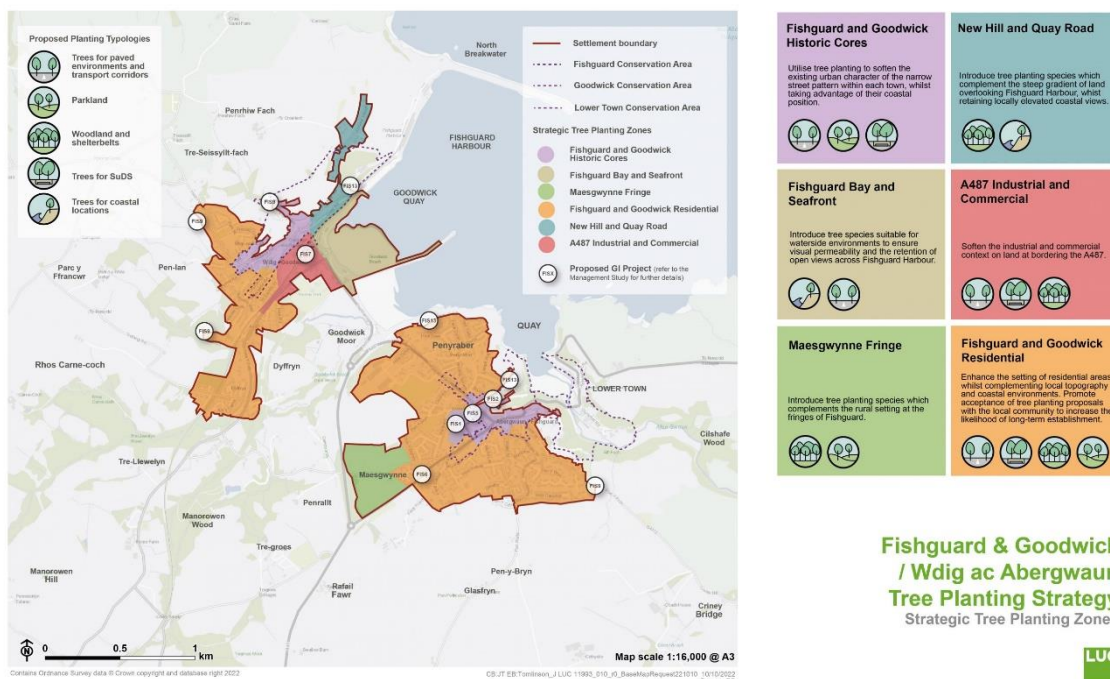
- Fishguard and Goodwick tree planting zones and sub-principles.
- Haverfordwest tree planting zones and sub-principles.
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- Neyland tree planting zones and sub-principles.
- Pembroke tree planting zones and sub-principles.
- Pembroke Dock tree planting zones and sub-principles.
- Saundersfoot tree planting zones and sub-principles.
- St Davids tree planting zones and sub-principles.
- Tenby tree planting zones and sub-principles.

Fishguard and Goodwick Tree Planting Zones and Sub-Principles

3.3 Tree Planting Zones and Sub-Principles for Fishguard and Goodwick are shown on the map and below. They include:

- Fishguard and Goodwick historic cores
 - Utilise tree planting to soften the existing urban character of the narrow street pattern within each town, whilst taking advantage of their coastal position.
- New Hill and Quay Road
 - Introduce tree planting species which complement the steep gradient of land overlooking Fishguard Harbour, whilst retaining locally elevated coastal views.
- Fishguard Bay and seafront
 - Introduce tree species suitable for waterside environments to ensure visual permeability and the retention of open views across Fishguard Harbour.
- Maesgwynne Fringe
 - Introduce tree planting species which complements the rural setting at the fringes of Fishguard.
- A487 industrial and commercial
 - Soften the industrial and commercial context on land at bordering the A487.
- Fishguard and Goodwick residential
 - Enhance the setting of residential areas whilst complementing local topography and coastal environments. Promote acceptance of tree planting proposals with the local community to increase the likelihood of long-term establishment

Figure 3.1: Fishguard and Goodwick Strategic Tree Planting Zones



Zones and Sub-Principles

3.4 Land encompassed within Fishguard Planting Zones, Goodwick CA and Lower Town CA includes the spaces between buildings and existing trees within the designation. All planting proposals and management of existing trees located within and adjacent to Conservation Areas should be planned in consultation with both the Historic Building Conservation Officer and Landscape Officer at PCC.

Fishguard and Goodwick's historic cores

- Review landscape management practices to ensure the retention of panoramic harbourside views at key locations along the Slade and Penslade in Fishguard. Longer distance views towards the wider coastline,

the hills of Dinas and Newport to the North should also be restored at strategic locations along the footway.

- Promote the integration of tree planting, particularly in locations where there is little presence of trees to promote a positive contribution to townscape character. Whilst trees are not a defining characteristic of the historic urban areas and town centre (such as Fishguard High Street / West Street), opportunities should be sought to soften the built environment. Tree planting should enhance and not detract from the setting of heritage assets and distinctive street pattern within Fishguard and Goodwick Conservation Areas. Tree planting proposals should have regard to the orientation of existing built features. This includes responding to the pattern of the streetscape in terms of bays and 'nodes' which break up the façade.
- Due to the distinctive nature of the topography in Fishguard, tree planting proposals should be sensitively integrated along High Street and Kensington Street in order to retain the availability of long distance views. Similarly, the hillside setting of Goodwick significantly contributes to the character and setting of the town and long distance views should be conserved. Tree planting along the length of narrow streets will generally be inappropriate. Trees may be best placed at key entrances, fringes and nearby wider junctions leading into the Conservation Area boundaries, utilising trees with a narrow form to maintain sightlines where needed.
- Tree planting should be used to add interest and diversity to any areas incidental green space within built up areas (such as at Fishguard one way system). Planting several additional large parkland trees within Lota Park should be prioritised as a key opportunity, diversifying the range of species.

Fishguard Bay and seafront

- Use tree planting to frame routes to and from Fishguard and Goodwick, at The Parrog.

- New planting should include renovation of existing ornamental planting areas and tree groups, incorporating ornamental trees to provide aesthetic interest and diversify the range of species.
- Ensure trees are selected and managed to maintain views to the bay and for safety, raising canopies where appropriate.
- Use trees to mark routes and entrances towards key facilities and seating areas, such as the play area, aquarium and car park.
- Ensure tree species are appropriately selected to withstand the exposed location.
- Where possible, place trees to screen views of infrastructure and industrial buildings associated with the ferry port.

Maesgwynne Fringe

- Use tree planting to mark the entrance to Fishguard from the north, utilising open roadside verges for low density tree planting along the edges of adjacent agricultural land.
- Use tree planting to soften the interface between surrounding rural areas and the urban fringe, seeking opportunities to engage local landowners.
- Connect and buffer existing shelter belts and small parcels of woodland by gapping up and thickening existing field boundaries; creating corridors between the urban forest and wider landscape.

Fishguard and Goodwick residential

- Utilise tree planting to enhance the setting of residential streets and complement views in more elevated areas. Sufficient consideration should be given to species selection, ultimate canopy size and maintenance requirements to promote long-term establishment and reduce interference with buildings and services (e.g. telegraph lines / lighting columns).
- Avoid proposals which conflict with private vehicular access points on residential streets.

- Prioritise tree planting in areas with the least site constraints, such as larger areas of amenity grassland and verges (e.g. around Stop and Call).
- Use tree planting to buffer and screen busy route corridors nearby residential areas (e.g. A487), utilising roadside verges for avenues or small groups of trees where appropriate. Where possible, incorporate trees within Sustainable Urban Drainage Systems or swales to reduce surface water run off from roads.
- Tree planting proposals should avoid obstruction of highways, footpaths of Public Rights of Way (PRoW) within the residential context.
- Promote community ownership of proposed tree planting to increase the likelihood of long-term establishment.

New Hill and Quay Road

- Tree planting at elevated, hilly residential areas should be low density, focussing on appropriately locating individual trees or small groups to compliment local topography. Key views towards the quay, harbour and local heritage assets should be maintained.
- Use tree planting to enhance the urban fringe and help reduce the visual impact of built development. Create links and buffer adjacent habitat areas and peri-urban woodlands, engaging with surround landowners where possible.

A487 industrial and commercial

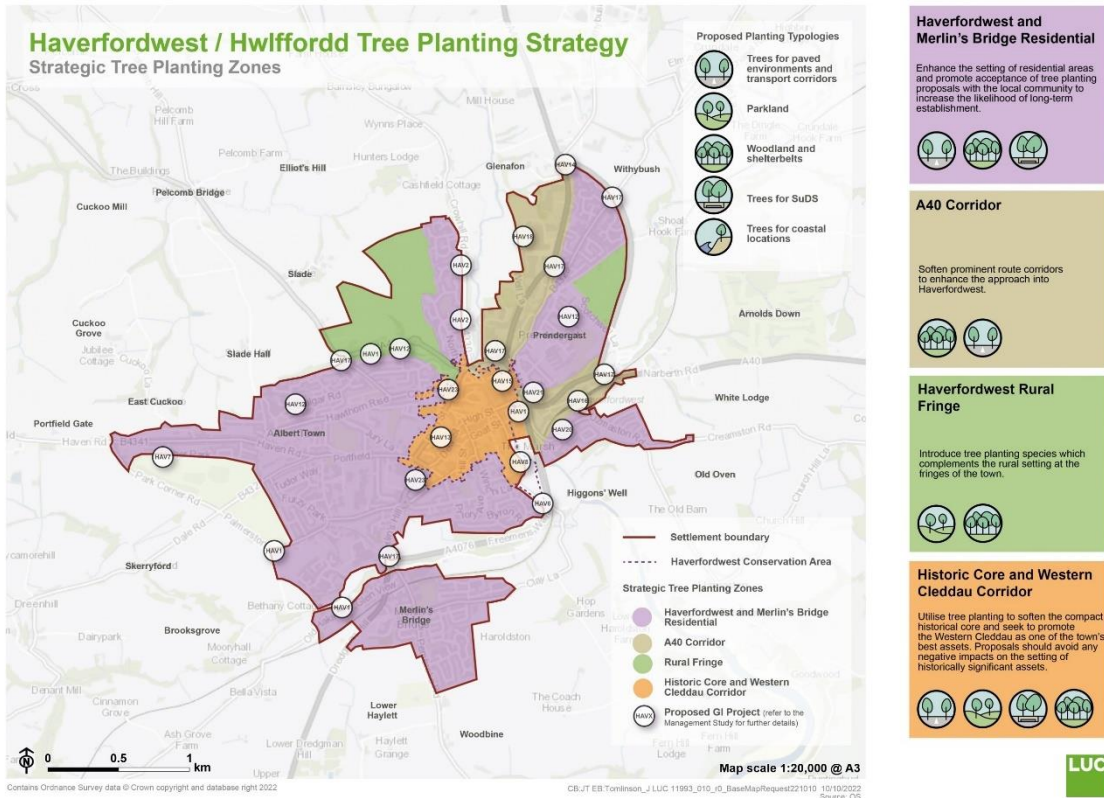
- Utilise tree planting to screen and soften industrial and commercial areas.
- Prioritise planting in areas with least constraints and 'quick win' locations, including the boundaries of adjacent open spaces (e.g. Phoenix Park, Wern Road).
- Incorporate tree planting at Phoenix Road Car Park, utilising perimeter verges and greening the expanse of hard landscape. Avoid fruit bearing trees in areas where this may cause a nuisance.

Haverfordwest tree planting zones and sub-principles.

3.5 Tree Planting Zones and Sub-Principles for Haverfordwest are shown on the map and below. They include:

- Haverfordwest and Merlin's bridge residential
 - Enhance the setting of residential areas and promote acceptance of tree planting proposals with the local community to increase the likelihood of long-term establishment.
- A40 Corridor
 - Soften prominent route corridors to enhance the approach into Haverfordwest.
- Haverfordwest rural Fringe
 - Introduce tree planting species which complements the rural settings at the fringes of the town.
- Historic Core and Western Cleddau Corridor
 - Utilise tree planting to soften the compact historical core and seek to promote the Western Cleddau as one of the town's best assets. Proposals should avoid any negative impacts on the setting of historically significant assets.

Figure 3.2: Haverfordwest Strategic Tree Planting Zones



Zones and Sub-Principles

3.6 Land encompassed within Haverfordwest Conservation Area includes the spaces between buildings and existing trees within the designation. PCC should therefore be contacted prior to the commencement of works on existing trees subject to a Tree Preservation Order (TPO) or those located within the boundary of Haverfordwest Conservation Area.

Haverfordwest and Merlin's Bridge residential

- Utilise tree planting to enhance the setting of residential areas, creating tree lined streets where possible. Sufficient consideration should be given to species selection, ultimate canopy size and maintenance requirements

to promote long-term establishment and reduce interference with buildings and services (e.g. telegraph lines / lighting columns).

- Prioritise tree planting in areas with the least site constraints, such as larger areas of amenity grassland and verges, including areas with minimal recreational value due to slope / small size etc.
- Avoid proposals which conflict with private vehicular access points on residential streets.
- Tree planting proposals should avoid obstruction of highways and Public Rights of Way (PRoW) within the residential context.
- Incorporate tree planting across social housing sites, integrating well-spaced parkland trees where space allows. Ensure sightlines are maintained for safety. Avoid creating areas of dense planting that may encourage antisocial behaviour, prioritising well-spaced high canopy trees, or narrow fastigate species. Consult with, and engage, nearby residents throughout the process to increase the likelihood of long term success. Ensure sufficient space between tree planting and residential dwellings to maintain views and access to light.
- Enhance tree canopy cover within parks and open spaces as a priority and key opportunity for incorporating larger trees in the urban context.

A40 Corridor

- Use tree planting to buffer and screen busy route corridors, industry and commercial buildings, utilising roadside verges for avenues or small groups of trees where appropriate. Where possible, incorporate trees within Sustainable Urban Drainage Systems or swales to reduce surface water run-off from roads and help enhance the quality of adjacent water courses.
- Use tree planting to mark key entrance points into the Haverfordwest. Prioritise the use of species with aesthetic quality such as spring blossom at key gateway areas.
- Ensure replacement planting of existing trees (e.g. at roundabouts) is an ongoing requirement, to maintain or increase canopy cover.

- Implement positive management and protection of adjacent existing woodland (e.g. Scotchwell Woodland) as a key asset; providing multiple environmental benefits and visual screening of the road.

Haverfordwest rural Fringe

- Enhance the interface between the fringes of the urban area and the surrounding rural area. Strengthen and restore field boundaries through additional planting and the incorporation of standard trees.
- Create additional links between the urban area and small fragmented areas of surrounding woodland.

Historic Core and Western Cleddau Corridor

- Ensure that tree planting proposals enhance the setting of the compact urban core and reinforce the distinctive street pattern within Haverfordwest Conservation Area. Proposals should avoid detrimental impacts on heritage assets. All planting proposals should be prepared in conjunction with both the Historic Building Conservation Officer and Landscape Officer at PCC.
- Utilise tree planning to frame views and link the urban setting of Haverfordwest Conservation Area to the surrounding rural landscape.
- Opportunities should be sought for the integration of tree planting to provide a positive contribution to the townscape character and appearance. Specific opportunities include tree planting at key nodes within the street network and in public spaces.
- Review and reconfigure parking provision in the town centre (e.g. Dew Street) to incorporate trees within the dense urban environment, where the opportunity arises. Small sections of on street parking could be re-configured to provide greater width and rooting environment for the growth of suitable street trees.

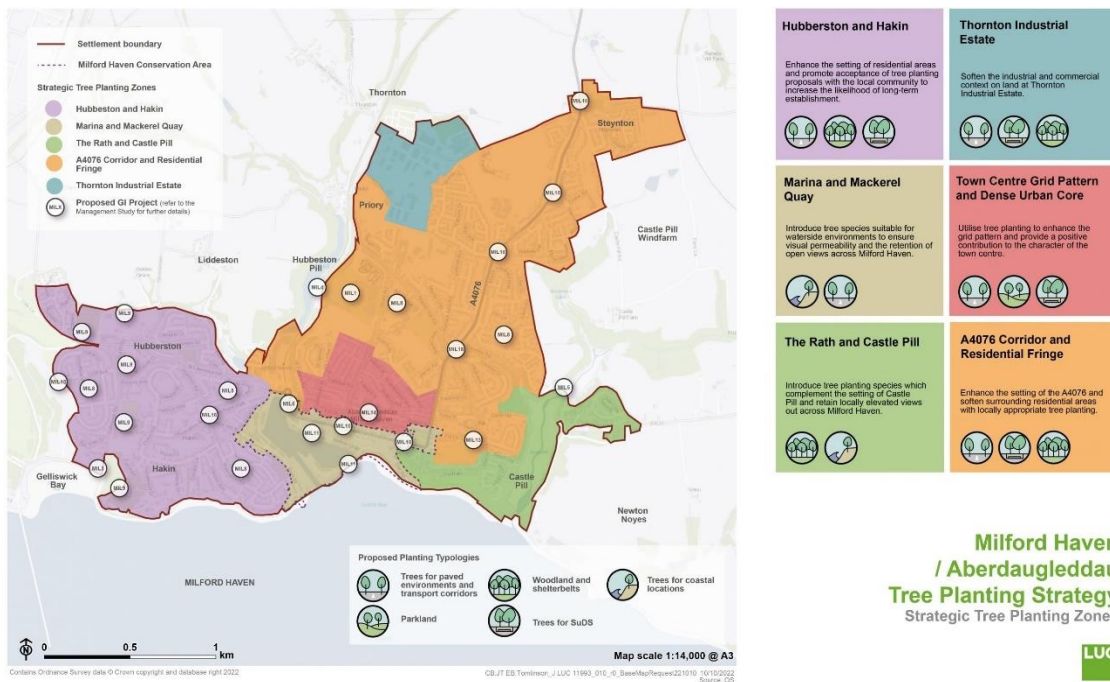
- Mark entrance points to the historic core area with tree planting and continue to increase tree cover, including designed SuDS, along the river (e.g., nearby the Riverside Shopping Centre).

Milford Haven tree planting zones and sub-principles.

3.7 Tree Planting Zones and Sub-Principles for Milford Haven are shown on the map and below. They include:

- Hubberston and Hakin
 - Enhance the setting of residential areas and promote acceptance of tree planting proposals with the local community to increase the likelihood of the long-term establishment.
- Marina and Mackerel Quay
 - Introduce tree species suitable for waterside environments to ensure visual permeability and the retention of open views across Milford Haven.
- Thornton industrial estate
 - Soften the industrial and commercial context on land at Thornton industrial estate.
- Town Centre grid pattern and dense urban core
 - Utilise tree planting to enhance the grid pattern and provide a positive contribution to the character of the town centre.
- The Rath and Castle Pill
 - Introduce tree planting species which complement the setting of Castle Pill and retain locally elevated views out across Milford Haven.

Figure 3.3: Milford Haven Strategic Tree Planting Zones



Zones and Sub-Principles

3.8 Land encompassed within Milford Haven Conservation Area includes the spaces between buildings and existing trees within the designation. PCC should therefore be contacted prior to the commencement of works on existing trees subject to a Tree Preservation Order (TPO) or those located within the boundary of Milford Haven Conservation Area.

Hubberston and Hakin

- Prioritise tree planting in areas with the least site constraints, such as larger areas of amenity grassland and verges, including areas with minimal recreational value due to slope / small size etc.
- Implement infill planting on streets with existing trees and where there are gaps, to strengthen existing tree corridors, which are small and fragmented.

- Incorporate tree planting across housing estates, integrating well-spaced parkland trees where space allows. Ensure sightlines are maintained for safety. Avoid creating areas of dense planting that may encourage antisocial behaviour, prioritising well-spaced high canopy trees, or narrow fastigate species. Consult with, and engage, nearby residents throughout the process to increase the likelihood of long-term success. Ensure sufficient space between tree planting and residential dwellings to maintain views and access to light.
- Avoid proposals that conflict with private vehicular access points on residential streets.
- Tree planting proposals should avoid obstruction of highways and Public Rights of Way (PRoW) within the residential context.
- Enhance tree canopy cover within parks and open spaces. Prioritise planting of large canopy trees where space permits.

Thornton industrial estate

- Utilise tree planting to screen and soften industrial and commercial areas.
- Ensure that proposed tree planting complements the scale of existing built form. Where space permits, the potential exists to accommodate large trees within the industrial and commercial setting.

Marina and Mackerel Quay

- Integrate additional tree planting at the Marina and Quay with suitable species to create areas with shelter, whilst also maintaining visual permeability and views out to the sea. Consider the incorporation of additional trees when renovating existing planted areas.
- Ensure landscape management and future tree planting maintains views to the coast from elevated areas (e.g. key viewpoints from Hamilton Terrace).

- Use trees to mark and define different zones leading to the Marina and Quay, e.g. from entrances to the waterfront from cycle routes, Nelson Quay and leading down from Victoria Road.
- Consider integrating trees to break up the expansive car park area, ensuring the location does not interfere with existing uses. Integrate trees in small clusters to create a microclimate to improve growing conditions, and allow the incorporation of shared growing pits / rooting space.
- Use tree planting in hard landscape to enhance the setting of local facilities and restaurants, and screen detracting features such as the car park on Nelson Quay.

Town Centre grid pattern and dense urban core

- Extend and link up existing street tree planting at key centres (i.e. Charles Street) to create green routes and enhance the streetscape. Ensure tree planting compliments and does not detract from the distinctive grid pattern of the urban area. Incorporate trees nearby wider junctions and to mark entrances to the main shopping areas, using trees with a narrow form where necessary to maintain sightlines.
- Utilise tree planting to soften larger areas of hard landscape such as car parking areas (e.g. Robert Street). And other visually detracting features.
- Reconfigure on street parking where the opportunity arises to provide additional space for tree pits and width for tree growth.

The Rath and Castle Pill

- Sensitively incorporate additional low density tree planting or small groups of trees on grassland at The Rath. Ensure tree planting is located to maintain visual permeability to the coast from residential areas, seating areas and other viewpoints.
- Trees should be located lower down on sloped areas, with particular consideration given to eventual height and form. Particular attention

should be given to selecting species that can withstand the exposure, taking note of species growing nearby.

- Buffer and expand existing woodland at Castle Pill / Deadman's Lake and seek opportunities to enhance woodland edge treatments on adjacent agricultural land.

A4076 Corridor and Residential Fridge

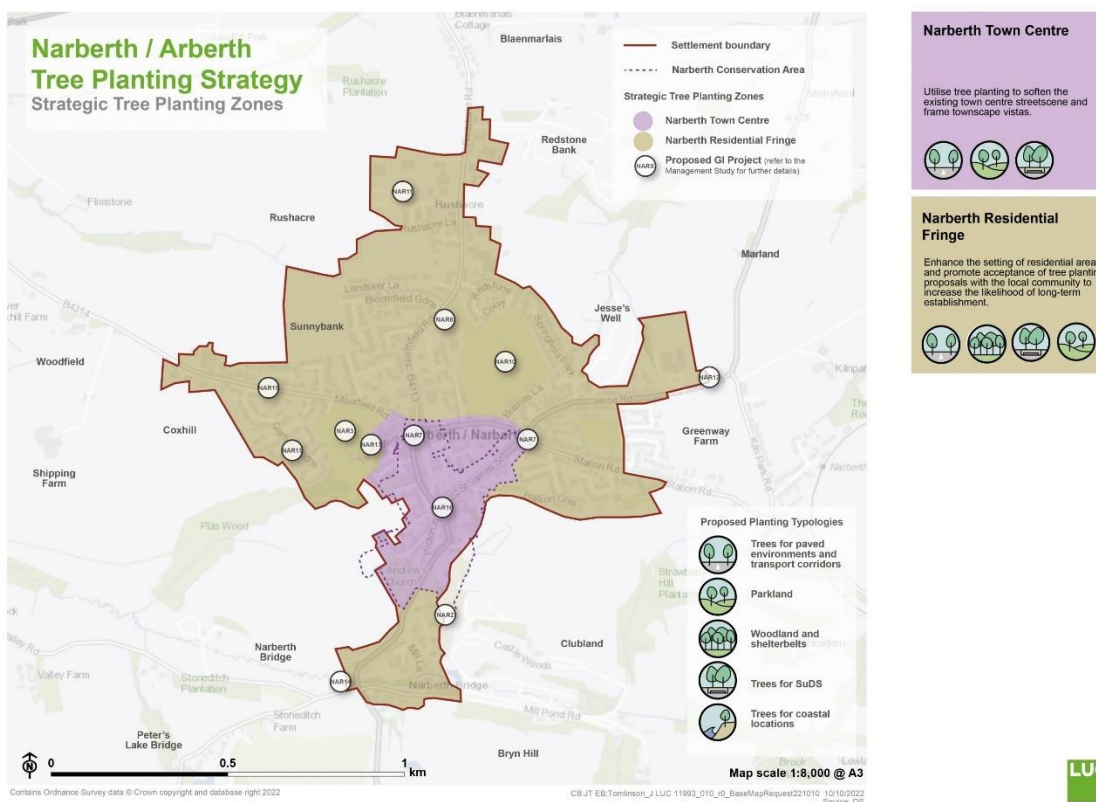
- Use tree planting to buffer and screen busy route corridors, utilising roadside verges for avenues or small groups of trees where appropriate.
- Use ornamental tree species to mark key gateways and entrances towards Milford Haven.
- Strengthen links to larger areas of woodland adjacent to Deadman's Lake, incorporating additional planting at adjacent amenity green space (e.g. Steynton Road / Mount Pleasant Way)
- Utilise tree planting to enhance the setting of residential areas, creating tree-lined streets where possible. Sufficient consideration should be given to species selection, ultimate canopy size and maintenance requirements to promote long-term establishment and reduce interference with buildings and services (e.g. telegraph lines / lighting columns).
- Prioritise tree planting in areas with the least site constraints, such as larger areas of amenity grassland and verges, including areas with minimal recreational value due to slope / small size etc.
- Avoid proposals which conflict with private vehicular access points on residential streets.
- Tree planting proposals should avoid obstruction of highways and Public Rights of Way (PRoW) within the residential context.
- Enhance the character of local open spaces and sport facilities with boundary trees, incorporating larger canopy parkland trees where space allows. Ensure sightlines are maintained to provide a sense of safety and security.

Narberth tree planting zones and sub-principles.

3.9 Tree Planting Zones and Sub-Principles for Narberth are shown on the map and below. They include:

- Narberth Town Centre
 - Utilise tree planting to soften the existing town centre street scene and frame townscape vistas.
- Narberth Residential Fringe
 - Enhance the setting of residential areas and promote acceptance of tree planting proposals with the local community to increase the likelihood of long-term establishment.

Figure 3.4: Narberth Strategic Tree Planting Zones



Zones and Sub-Principles

3.10 Land encompassed within Narberth Conservation Area includes the spaces between buildings and existing trees within the designation. PCC should therefore be contacted prior to the commencement of works on existing trees subject to a Tree Preservation Order (TPO) or those located within the boundary of Narberth Conservation Area.

Narberth Town Centre

- Ensure tree planting complements and does not detract from the distinctive townscape character.

- Tree planting opportunities within public areas in the town centre are highly constrained. Trees may be best placed at key entrances, fringes and wider junctions, utilising narrow form trees to maintain sightlines where needed.
- Where space allows, use ornamental tree species to demarcate key gateways and entrances towards Narberth town centre (such as the A478 / B4314 Junction).
- Utilise tree planting to soften hard landscape areas and create a sense of arrival at key visitor hubs (such as Townsmoor Car Park and route towards the town centre).
- Where trees are removed or lost, the replacement of appropriately located trees should be a priority within the town centre.

Narberth Residential Fringe

- Seek opportunities to deliver tree planting adjacent to water courses and ditches on the fringes of the urban area. This may be best delivered as wide shelterbelts and woodland corridors that strengthen existing field patterns.
- Enhance the character of local open spaces and sport facilities with boundary trees, seeking opportunities to plant larger canopy parkland trees as a priority (such as at Townsmoor Park). Ensure sightlines are maintained to provide a sense of safety and security.
- Utilise tree planting to enhance the setting of residential areas, creating tree lined streets where possible. Sufficient consideration should be given to species selection, ultimate canopy size and maintenance requirements to promote long-term establishment and reduce interference with buildings and services (e.g. telegraph lines / lighting columns).
- Prioritise tree planting in areas with the least site constraints, such as larger areas of amenity grassland and verges. This includes areas with minimal recreational value due to small size (such as some of the wider roadside verge areas along Cox Hill).

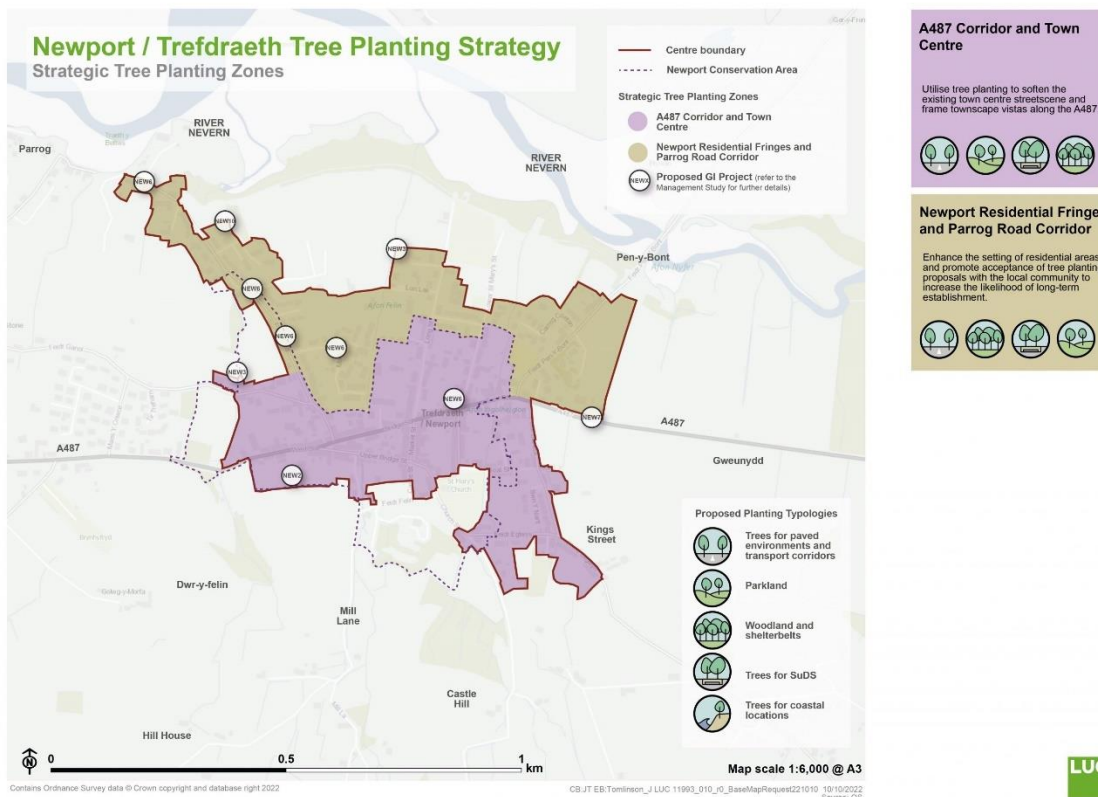
- Avoid proposals which conflict with private vehicular access points on residential streets.
- Tree planting proposals should avoid obstruction of highways and Public Rights of Way (PRoW) within the residential context.

Newport tree planting zones and sub-principles.

3.11 Tree Planting Zones and Sub-Principles for Newport are shown on the map and below. They include:

- A487 Corridor and Town Centre
 - Utilise tree planting to soften the existing town centre street scene and frame townscape vistas along the A487.
- Newport residential Fringe and Parrog Road Corridor
 - Enhance the settings of residential areas and promote acceptance of tree planting proposals with the local community to increase the likelihood of long-term establishment.

Figure 3.5: Newport Strategic Tree Planting Zones



Zones and Sub-Principles

3.12 Land encompassed within Newport conservation area includes the spaces between buildings and existing trees within the designation. Pembrokeshire County council (PCC) should therefore be contacted prior to the commencement of works on existing trees subject to a Tree Preservation Order (TPO) or those located within the boundary of Newport conservation area.

3.13 Newport is located within the boundary of Pembrokeshire Coast National Park (PCNP). The development of detailed plans for future tree and woodland planting should take account of PCNP Tree and Woodland Guidance. Detailed assessment of ‘urban’ Landscape Character Areas (such as Newport) is not included in the PCNP guidance, due to the limited opportunity for new woodland

planting in these areas. However, the generic guidance within this document would still apply.

A487 Corridor and Town Center

- Use ornamental tree species to demarcate key gateways and entrances towards Newport.
- Strengthen links to existing woodland along the settlement edge, such as areas of woodland nearby Newport Castle. This may include strengthening existing field boundaries through the development of shelter belts and woodland corridors.
- Tree planting opportunities within public areas in the town centre are highly constrained. Trees may be best placed at key entrances, fringes and wider junctions, utilising narrow form trees to maintain sightlines where needed.
- Where trees are removed or lost, the replacement of appropriately located trees should be a priority. Where space allows, seek opportunities to incorporate additional trees at key hubs of activity (e.g. near Long Street Car Park).
- Promote the planting of small trees within residential gardens, focussing on areas where there is the least opportunity for planting within the public realm.

Newport Residential Fringes and Parrog Road Corridor

- Utilise tree planting to enhance the setting of residential areas, creating tree lined streets where possible. Sufficient consideration should be given to species selection, ultimate canopy size and maintenance requirements to promote long-term establishment and reduce interference with buildings and services (e.g. telegraph lines / lighting columns).

- Prioritise tree planting in areas with the least site constraints, such as larger areas of amenity grassland and verges. This includes areas with minimal recreational value due to small size (such as some of the wider roadside verge areas along Parrog Road).
- Avoid proposals which conflict with private vehicular access points on residential streets.
- Tree planting proposals should avoid obstruction of highways and Public Rights of Way (PRoW) within the residential context.
- Enhance the character of local open spaces and sport facilities with boundary trees, incorporating larger canopy parkland trees where space allows (such as open space adjacent to Newport Skate Park). Ensure sightlines are maintained to provide a sense of safety and security.
- Use tree planting to soften hard landscape areas and features that may detract from enjoyment of the wider landscape. Such car parking areas (e.g. Parrog Road Car Park). New tree planting should ensure key views to the river and coast are maintained.

Neyland Tree Planting Zones and Sub-Principles

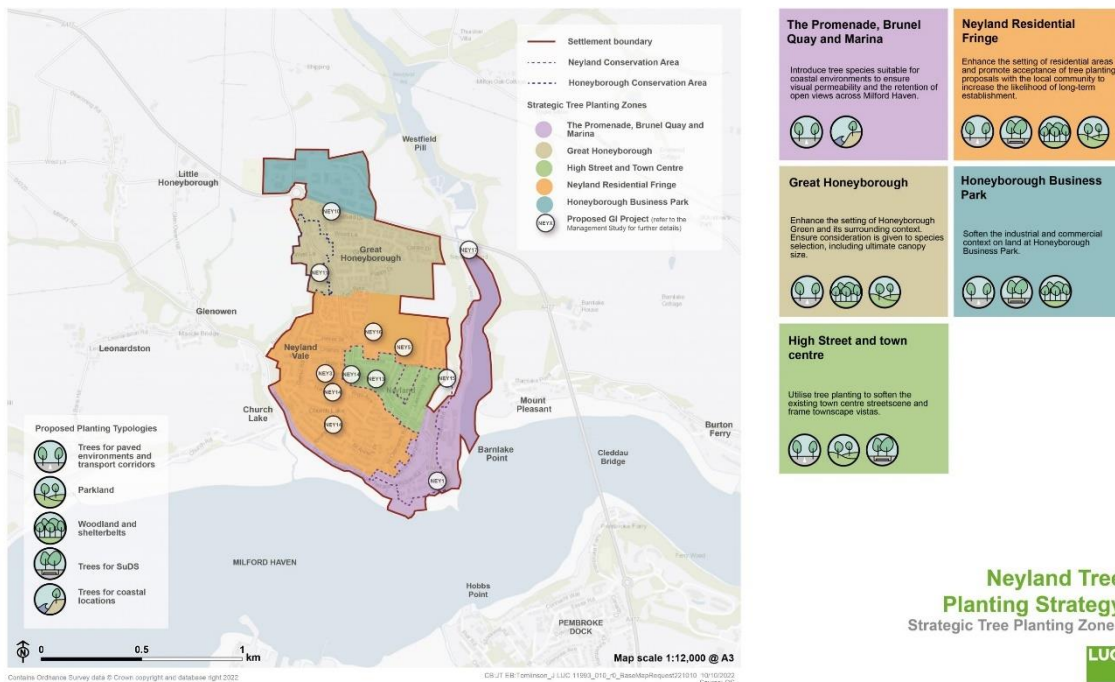
3.14 Tree Planting Zones and Sub-Principles for Newport are shown on the map and below. They include:

- The Promenade, Brunel Quay and Marina
 - Introduce tree species suitable for coastal environments to ensure visual permeability and the retention of open views across Milford Haven
- Neyland Residential Fringe
 - Enhance the setting of residential areas and promote acceptance of tree planting and promote acceptance of tree planting proposals with

the local community to increase the likelihood of long term establishment

- Great Honeyborough
 - Enhance the setting of Honeyborough Green and its surrounding context. Ensure consideration is given to species selection, including ultimate canopy size.
- Honeyborough Business Park
 - Soften the industrial and commercial context on land at Honeyborough business Park

Figure 3.6: Neyland Strategic Tree Planting Zones



Zones and Sub-Principles

3.15 Land encompassed within Neyland Conservation Area and Honeyborough Conservation Area includes the spaces between buildings and existing trees

within the designated areas. Pembrokeshire County Council (PCC) should therefore be contacted prior to the commencement of works on existing trees subject to a Tree Preservation Order (TPO) or those located within the boundary of either conservation area.

The Promenade, Brunel Quay and Marina

- Consider integrating trees to soften the expansive car park areas and enhance the setting of key arrival points, whilst ensuring the location of new trees does not interfere with existing uses. Integrate trees in small clusters to create a microclimate to improve growing conditions and allow incorporation of shared growing pits / rooting space in hard landscape.
- Ensure landscape management and future tree planting maintains key views, such as from the promenade and seating areas along Station Road. This should be achieved utilising well-spaced trees with clear stems / high canopies. Widely spaced, small groups of trees may also be appropriate at the edges of small areas of green space set back from the seafront.
- Utilise tree planting to soften and screen industrial areas and green routes along Station Road and Gaddam Reach.

Great Honeyborough

- Implement infill planting and new planting of flowering trees along Honeyborough Road, enhancing a key route towards the centre of Neyland.
- Maintain or increase tree canopy cover at Honeyborough Green. Ensure planting density and tree form / size, maintains the village green character.
- Protect and enhance belts for trees to act as a buffer and screen for the A477 and adjacent industrial area.

High Street and Town Centre

- Ensure tree planting complements and does not detract from the distinctive townscape character.
- Ensure views from key routes (such as the High Street) are not obscured by inappropriate tree planting. Trees may be best placed at key entrances, fringes and wider junctions, utilising narrow form trees to maintain sightlines where needed. Maintain long range views from the edge of the area from elevated viewpoints (such as at Cambrian Road).
- Use small specimen trees to soften hard landscape areas and create a sense of arrival Atkey visitor hubs (such as High Street Car Park).
- Protect, and if appropriate increase, canopy cover at incidental areas of green space leading off the High Street to maintain and enhance townscape character (e.g. at Windsor Gardens, Lawrenny Street, Railway Terrace).

Neyland Residential Fringe

- Utilise tree planting to enhance the setting of residential areas, creating tree lined streets where possible. Sufficient consideration should be given to species selection, ultimate canopy size and maintenance requirements to promote long-term establishment and reduce interference with buildings and services (e.g. telegraph lines / lighting columns).
- Avoid proposals which conflict with private vehicular access points on residential streets.
- Tree planting proposals should avoid obstruction of highways and Public Rights of Way (PRoW) within the residential context.
- Prioritise tree planting in areas with the least site constraints, such as larger areas of amenity grassland and wide verges. This includes areas with minimal recreational value due to small size.
- Where possible, link up and extend existing, fragmented rows of street trees within grass verges (e.g. along Riverside Avenue).

- Enhance the character of local open spaces, sport and community facilities with boundary trees, seeking opportunities to plant larger canopy parkland trees as a priority (such Askeland Community Hub). Ensure sightlines are maintained to provide a sense of safety and security.

Honeyborough Business Park

- Increase tree cover to soften the views towards industrial development. This may include wider verges at key entrances (such as the A477 roundabout).
- Ensure greening of streets through tree planting, especially where any upgrades of access roads or car parks is undertaken. Utilise tree planting to screen buildings to nearby residential areas and the wider landscape. Ensure new tree planting is required as part of future industrial development.

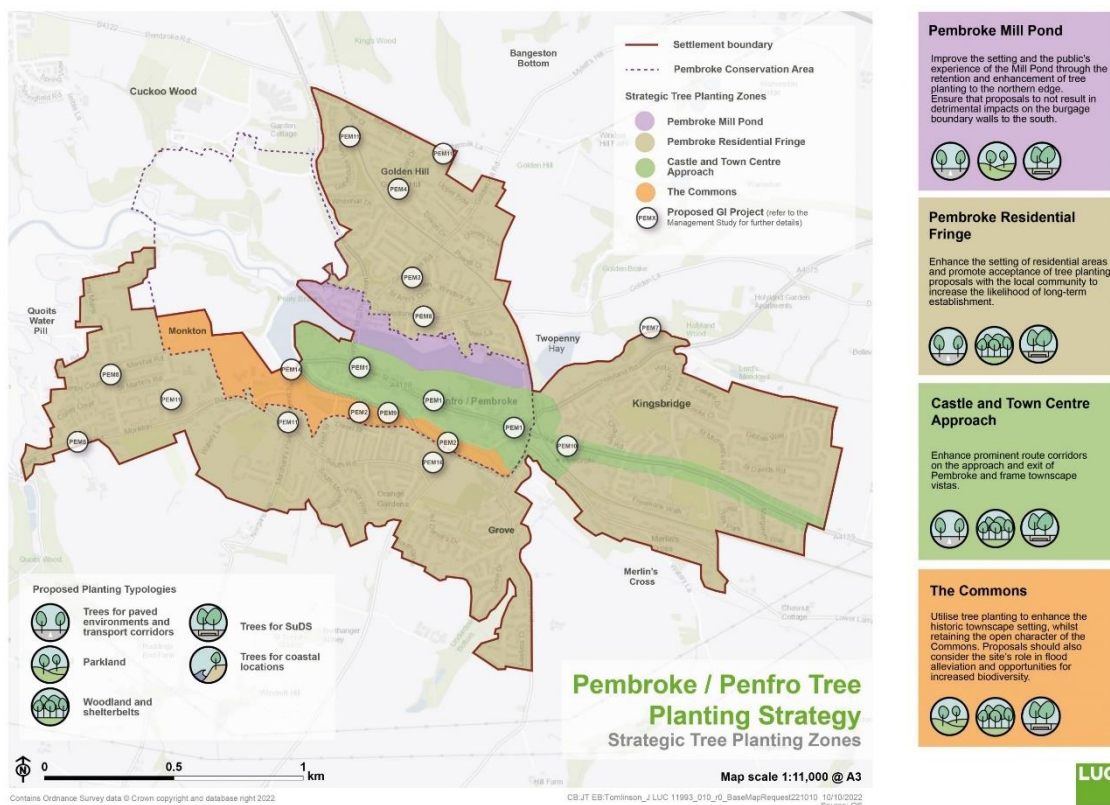
Pembroke Tree Planting Zones and Sub-Principles

3.16 Tree Planting Zones and Sub-Principles for Pembroke are shown on the map and below. They include:

- Pembroke Mill Pond
 - Improve the setting and the public's experience of the Mill Pond through the retention and enhancement of tree planting to the northern edge. Ensure that proposals do not result in detrimental impacts on the burgh boundary walls to the south.
- Pembroke Residential Fringe
 - Enhance the setting of residential areas and promote acceptance of tree planting proposals with the local community to increase the likelihood of long term establishment.

- Castle and Town Centre Approach
 - Enhance prominent route corridors on the approach and exit of Pembroke and frame townscape vistas.
- The Commons
 - Utilise tree planting to enhance the historic townscape setting, whilst retaining the open character of the Commons. Proposals should also consider the site's role in flood alleviation and opportunities for increased biodiversity.

Figure 3.7: Pembroke Strategic Tree Planting Zones



Zones and Sub-Principles

3.17 Land encompassed within Pembroke Conservation Area includes the spaces between buildings and existing trees within the designation.

Pembrokeshire County Council (PCC) should therefore be contacted prior to the commencement of works on existing trees subject to a Tree Preservation Order (TPO) or those located within the boundary of Pembroke Conservation Area.

Pembroke Mill Pond

- Maintain and enhance tree cover along the northern edge of the Mill Pond as a key environmental asset, habitat and visual amenity.
- Tree planting in close proximity to the burgage wall will generally be inappropriate. Views and structural integrity of this heritage feature should not be negatively impacted by additional tree planting. Any tree planting proposals will need to be developed in consultation with relevant statutory consultees.

Pembroke Residential Fringe

- Utilise tree planting to frame views and vistas across the varied roofscape of Pembroke town centre. Consideration should be given to ultimate tree canopy size when specifying species.
- Sufficient consideration should be given to species selection and maintenance requirements to promote long-term establishment and reduce interference with buildings and services (e.g. telegraph lines / lighting columns).
- Prioritise tree planting in areas with the least site constraints, such as larger areas of amenity grassland and verges, including areas with minimal recreational value due to slope / small size etc. (e.g. Long Mains & Bush Hill).

- Avoid proposals which conflict with private vehicular access points on residential streets. Tree planting proposals should avoid obstruction of highways and Public Rights of Way (PRoW) within the residential context.

Castle and Town Centre Approach

- Tree planting proposals should have regard to existing building lines and the orientation of existing development along Main Street. This includes responding to the pattern of the streetscape in terms of bays, 'nodes' and courtyard gardens which break up the facade.
- Utilise tree planting to minimise the visual impact of parked cars on the streetscape as well as the landscape setting of historic streets and buildings.
- Use tree planting to mark routes and entrances to Main Street. Ensure new planting does not impede with the range of uses of the area, including events.
- Utilise tree planting to soften larger areas of hard landscape and areas of car parking (e.g. near West Street / Common Road). Incorporate engineered Sustainable Drainage Systems (SuDS) as part of tree pit design to maximise water storage capacity and reduce surface water run-off to nearby water courses.

The Commons

- Ensure species selection continues to enhance the diversity of trees on the Commons, a key element that contributes to the special interest and character of the Pembroke Conservation Area.
- Protect and maintain the existing population of trees. Undertake a planned programme of planting to ensure a stock of young and developing trees. Implement infill planting to enhance existing rows and avenues of trees.
- Introduce small, ornamental trees at some of the key entrances as markers and to improve the sense of arrival.

- Use tree planting in the east of The Commons to partially screen views towards more recent development to help maintain the historic character of the area

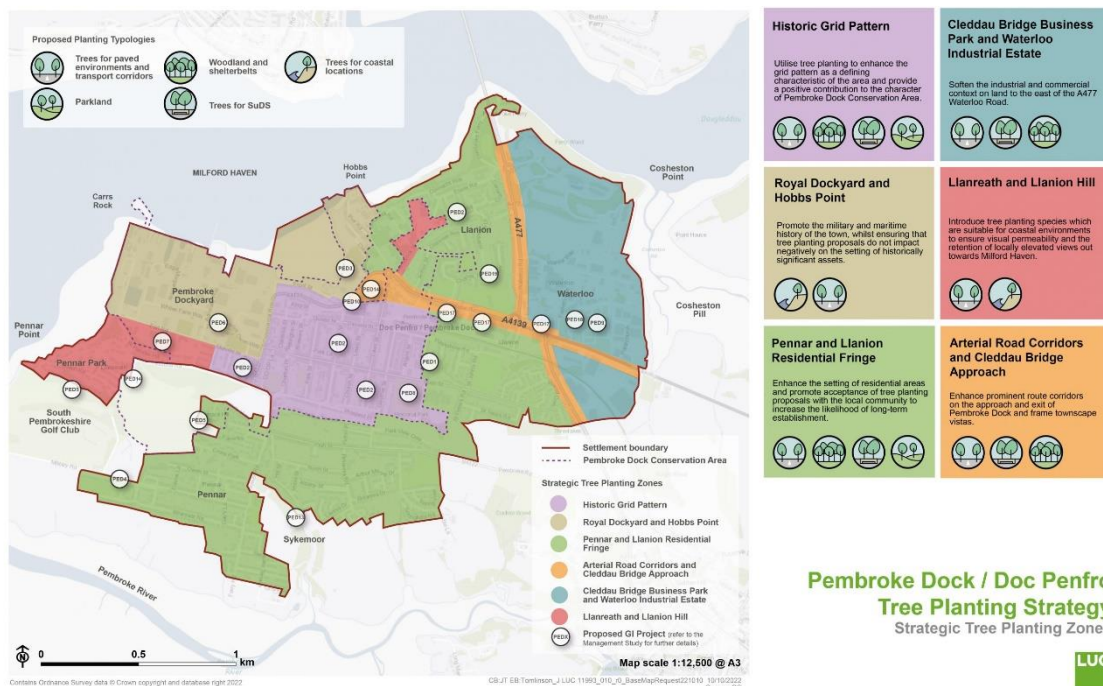
Pembroke Dock Tree Planting Zones and Sub-Principles

3.18 Tree Planting Zones and Sub-Principles for Pembroke Dock are shown on the map and below. They include:

- **Historic Grid Pattern**
 - Utilise tree planting to enhance the grid pattern as a defining characteristic of the area and provide a positive contribution to the character of Pembroke Dock Conservation Area.
- **Cleddau Bridge Business Park and Waterloo Industrial Estate**
 - Soften the industrial and commercial context on land to the east of the A477 Waterloo Road
- **Royal Dockyard and Hobbs Point**
 - Promote the military and maritime history of the town, whilst ensuring that tree planting proposals do not impact negatively on the setting of historical significant assets.
- **Llanreath and Llanion Hill**
 - Introduce tree planting species which are suitable for coastal environments to ensure visual permeability and the retention of locally elevated views out toward Milford Haven.
- **Pennar and Llanion Residential Fringe**
 - Enhance the setting of residential areas and promote acceptance of tree planting proposals with the local community to increase the likelihood of long term establishment
- **Arterial Road Corridors and Cleddau Bridge Approach**

- Enhance prominent route corridors on the approach and exit of Pembroke Dock and frame townscape vistas.

Figure 3.8: Pembroke Dock Strategic Tree Planting Zones



Zones and Sub-Principles

3.19 Land encompassed within Pembroke Dock Conservation Area includes the spaces between buildings and existing trees within the designation. Pembrokeshire County Council (PCC) should therefore be contacted prior to the commencement of works on existing trees subject to a Tree Preservation Order (TPO) or those located within the boundary of Pembroke Dock Conservation Area.

Historic Grid Pattern Town

- Ensure that tree planting proposals enhance the setting of the distinctive historic grid pattern and do not result in detrimental impacts on heritage assets. All planting proposals should be prepared in conjunction with both the Historic Building Conservation Officer and Landscape Officer at PCC.
- Whilst trees are not a particular characteristic of the grid pattern area, opportunities should be sought for tree planting to provide a positive contribution to the townscape character and appearance. Consideration should be given to the introduction of a hierarchy of tree planting to preserve and reinforce the distinctive grid pattern. Proposed categories within the hierarchy are outlined below.
 1. Street where a replenishment programme is required for an existing tree avenue (either a long-term replacement strategy for mature specimens or as a response to ash dieback);
 2. Statement street where tree avenues could be accommodated (within an existing central reservation or within wide pavements);
 3. Street where tree planting could be included within 'nodes' through the partial reconfiguration of existing parking etc; and
 4. Street which is narrow and heavily constrained where tree planting would be limited to gateway specimens (to frame a vista or with the aim of retaining key views).
- Tree planting proposals should have regard to existing building lines and the orientation of existing development. This includes responding to the pattern of the streetscape in terms of bays and 'nodes' which break up the façade.
- Utilise tree planting to minimise the visual impact of parked cars on the streetscape as well as the landscape setting of historic streets and buildings.

- Consider ultimate tree canopy size in order to maintain key views and vistas towards key buildings within Pembroke Dock Conservation Area.
- Promote variation in the age structure of tree planting within Memorial Park, particularly along the boundary and as part of the central axial point, as a proactive mechanism of long-term tree management.
- Promote tree planting (using appropriate species) within rear gardens to make an increased contribution to urban greening within the grid pattern streetscape.

Royal Dockyard and Hobbs Point

- Utilise tree planting to enhance the setting of the Pembroke Dock Conservation Area and do not result in any detrimental impacts on heritage assets. All planting proposals should be prepared in conjunction with both the Historic Building Conservation Officer and Landscape Officer at PCC.
- Enhance the townscape setting and complement the existing avenues of mature trees located on Meyrick Owen Way. Utilise tree planting to conserve the framed vista from the former Royal Dockyard entrance to the Pembroke Dock Heritage Centre.
- Soften the hard and soft streetscape of arterial routes such as the A4139 Western Way.
- Explore opportunities to increase the network of street trees on Fort Road in order to delineate the route as a key corridor leading to West Martello Tower and the waterfront.
- Diversify the structure of the existing woodland on Carriage Drive / The Terrace to allow light to penetrate the ground flora and support pollinator species.

Pennar and Llanion

- Utilise tree planting to enhance the setting of residential streets and complement the topography, ensuring sufficient consideration is given to species selection, ultimate canopy size and maintenance requirements to promote long-term establishment.
- Avoid proposals which conflict with private vehicular access points on residential streets;
- Tree planting proposals should avoid obstruction of highways and Public Rights of Way (PRoW) within the residential context.
- Promote community ownership of proposed tree planting to increase the likelihood of long- term establishment.

Arterial Road Corridors and Cleddau Bridge Approach

- Ensure high-crowned species are specified to ensure the availability of appropriate visibility splays and pedestrian access within the existing thoroughfares.
- Where appropriate, consider the use of large species with wide canopy coverage for use in the provision of shade. Avoid fruit bearing trees in areas of proposed seating provision or pedestrian footways.

Cleddau Bridge Business Park and Waterloo Industrial Estate

- Ensure that proposed tree planting complements the scale of existing built form. Where space permits, the potential exists to accommodate large trees within the industrial and commercial setting.

Llanreath and Llanion Hill

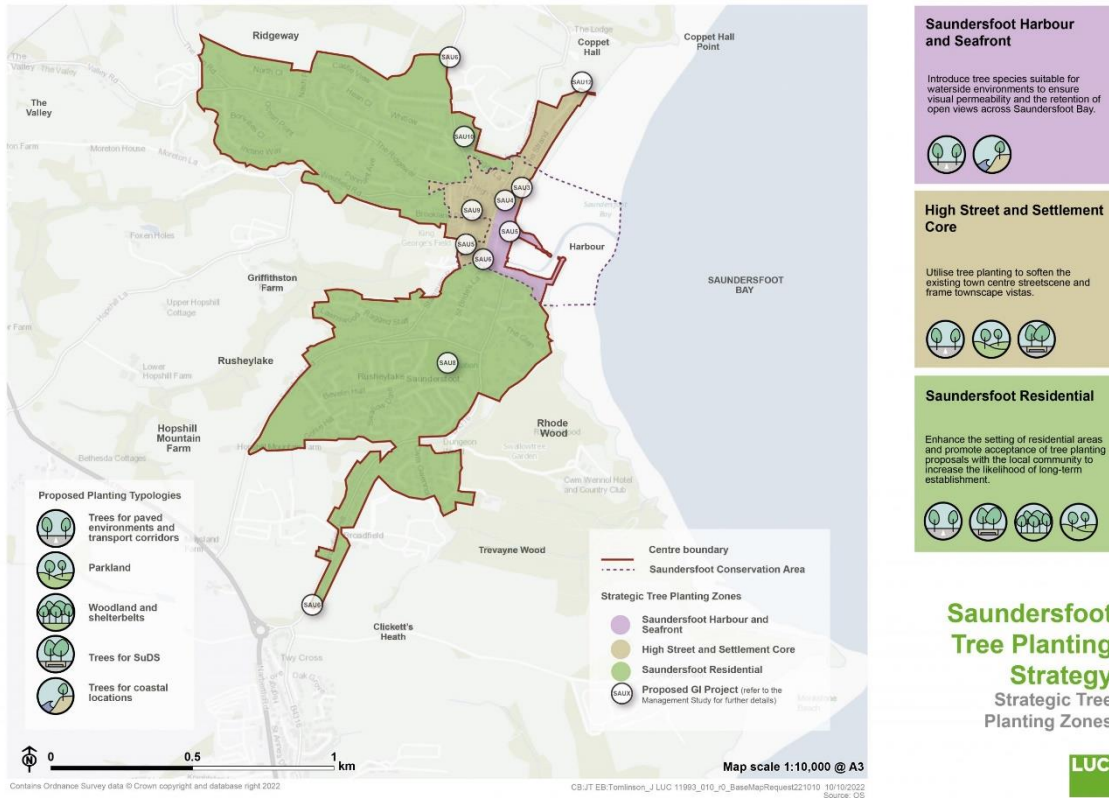
- Retain existing vistas by avoiding interruption of sea views from bordering residential properties.
- Ensure consideration is given to species selection (including ultimate canopy size and maintenance requirements) and the inclusion of salt tolerant species due to the proximity of the waterfront.
- Avoid proposals that conflict with private vehicular access points on residential streets.
- Tree planting proposals should avoid obstruction of highways and Public Rights of Way (PRoW) within the residential context.

Saundersfoot Tree Planting Zones and Sub-Principles

3.20 Tree Planting Zones and Sub-Principles for Saundersfoot are shown on the map and below. They include:

- Saundersfoot Harbour and Sea front
 - Introduce tree species suitable for waterside environments to ensure visual permeability and the retention of open views across Saundersfoot Bay
- High Street and Settlement Core
 - Utilise tree planting to soften the existing town centre streetscene and frame townscape vistas.
- Saundersfoot Residential
 - Enhance the setting of residential areas and promote acceptance of tree planting proposals with the local community to increase the likelihood of long term establishment.

Figure 3.9: Saundersfoot Strategic Tree Planting Zones



Zones and Sub-Principles

3.21 Land encompassed within Saundersfoot Conservation Area includes the spaces between buildings and existing trees within the designation. Pembrokeshire County Council (PCC) should therefore be contacted prior to the commencement of works on existing trees subject to a Tree Preservation Order (TPO) or those located within the boundary of Saundersfoot Conservation Area

3.22 Saundersfoot is located within the boundary of Pembrokeshire Coast National Park (PCNP). The development of detailed plans for future tree and woodland planting should take account of PCNP Tree and Woodland Guidance [See reference 15].

Saundersfoot Harbour and Seafront

- Integrate additional tree planting at the harbour and seafront with suitable species to create areas with a sense of shelter, whilst also maintaining visual permeability and views out to the sea. Consider the incorporation of additional trees when renovating existing planted areas.
- Use trees to mark and define different zones leading to the harbour, such as the near the interface between the harbour and The Strand.
- Consider integrating trees to break up the expansive car park area, ensuring the location does not interfere with existing uses. Integrate trees in small clusters to create a microclimate to improve growing conditions and allow the incorporation of shared growing pits / rooting space.

High Street and Settlement Core

- Ensure that tree planting proposals enhance the setting of the compact core and do not result in detrimental impacts on heritage assets or the settlement's historic fabric. All planting proposals should be prepared in conjunction with PCNPA.
- Review tree management practices to ensure the availability of views and vistas towards the coast and sheltered valley which forms a rural backdrop.
- Opportunities should be sought for tree planting to provide a positive contribution to townscape character and the setting of Saundersfoot Conservation Area.
- Strengthen links between the settlement core and surrounding woodland by enhancing and linking field boundaries and shelter belts to the north. Planting should also be considered alongside nearby watercourses to reduce surface water run-off and improve water quality.
- Enhance routes into and through the settlement core, seeking opportunities to incorporate tree planting within hard landscape areas, including the B4316, and Brooklands Close car park. Integrate Sustainable Drainage Systems (SuDS) design as part of tree pits where possible.

Saundersfoot Residential

- Utilise tree planting to enhance the setting of residential streets and complement views in more elevated areas. Sufficient consideration should be given to species selection, ultimate canopy size and maintenance requirements to promote long-term establishment and reduce interference with buildings and services (e.g. telegraph lines / lighting columns).
- Avoid proposals that conflict with private vehicular access points on residential streets. Tree planting proposals should avoid obstruction of highways and Public Rights of Way (PRoW) within the residential context.
- Use tree planting to mark the approaches to Saundersfoot along prominent route corridors (e.g. B4316), utilising roadside verges for avenues or small groups of trees where possible. Promote community ownership of proposed tree planting to increase the likelihood of long-term establishment. Support community interest in pockets of urban woodland (e.g. Saundersfoot Plantation) to engage communities in the wider interest of tree care and management.
- Utilise tree planting at the fringes of residential areas to help screen tourism development, which often acts as a key detracting landscape feature.
- Strengthen field boundaries and shelterbelts, through gapping up and new tree planting, on the urban fringe to connect the urban forest to existing valley woodlands.

St Davids Tree Planting Zones and Sub-Principles

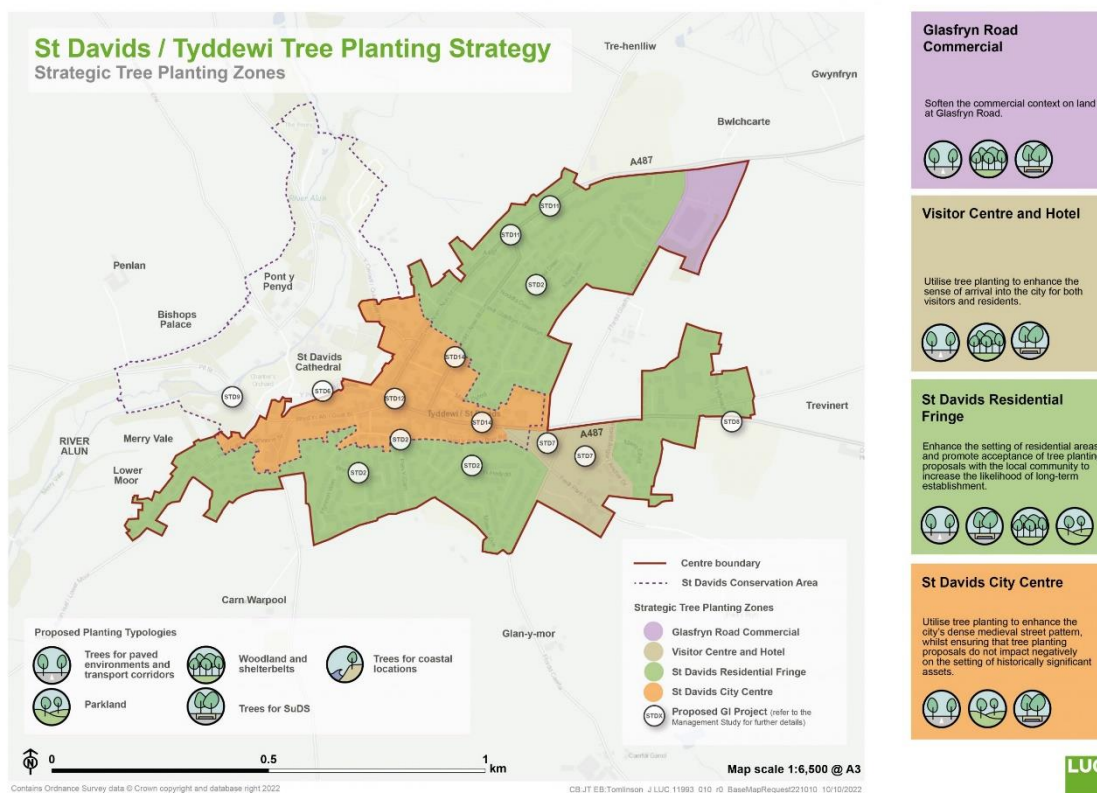
3.23 Tree Planting Zones and Sub-Principles for St Davids are shown on the map and below. They include:

- Glasfryn Road Commercial

Chapter 3 Tree Planting Zones and Sub-Principles for 11 Settlements

- Soften the commercial context on land at Glasfryn Road
- Visitor Centre and Hotel
 - Utilise tree planting to enhance the sense of arrival into the city for both visitors and residents
- St Davids Residential Fringe
 - Enhance the setting of residential areas and promote acceptance of tree planting proposals with the local community to increase the likelihood of long term establishment.
- St Davids City Centre
 - Utilise tree planting to enhance the city's dense medieval street pattern, whilst ensuring that tree planting proposals do not impact negatively on the setting of historically significant assets.

Figure 3.10: St Davids Strategic Tree Planting Zones



Zones and Sub-Principles

3.24 Land encompassed within St David's Conservation Area includes the spaces between buildings and existing trees within the designation. Pembrokeshire County Council (PCC) should therefore be contacted prior to the commencement of works on existing trees subject to a Tree Preservation Order (TPO) or those located within the boundary of St David's Conservation Area.

3.25 St Davids is within Pembrokeshire Coast National Park (PCNP). The development of detailed plans for future tree and woodland planting should take account of PCNP Tree and Woodland Guidance[See reference 16]. Detailed assessment of 'urban' Landscape Character Areas (such as St Davids) is not included in the PCNP guidance, due to the limited opportunity for new woodland planting in these areas. However, the generic guidance within this document would still apply.

Glasfryn Road Commercial

- Utilise tree planting to screen and soften industrial and commercial areas
- Due to the open nature and expansive views of surrounding farmland, large scale woodland planting will likely be inappropriate. Screening and buffering of roads, industrial & commercial buildings should be through strengthening existing field boundaries and shelterbelts.

Visitor Centre and Hotel

- Maintain existing canopy cover and use additional tree planting to mark the arrival to St Davids and entrances to key hubs, where space allows.
- Enhance the sense of arrival and provide additional partial screening of the car park with well-spaced trees, whilst still maintaining an open feel.

St Davids Residential Fringe

- Utilise tree planting to enhance the setting of residential areas, creating tree lined streets where possible. Sufficient consideration should be given to species selection, ultimate canopy size and maintenance requirements to promote long-term establishment and reduce interference with buildings and services (e.g. telegraph lines / lighting columns).
- Avoid proposals that conflict with private vehicular access points on residential streets.
- Ensure sightlines are maintained for safety, avoid creating areas of dense planting that may encourage antisocial behaviour, prioritising well-spaced high canopy trees, or narrow fastigiate species.
- Prioritise tree planting in areas with the least site constraints, such as larger areas of amenity grassland and verges, including areas with minimal recreational value due to slope / small size etc.
- Use tree planting to buffer and screen residential areas from route corridors and mark the approach to St Davids (e.g. A487), utilising roadside verges for avenues or small groups of trees where appropriate. This may include incorporating groups of trees on wider grass verges along Nun Street.

St David's City Centre

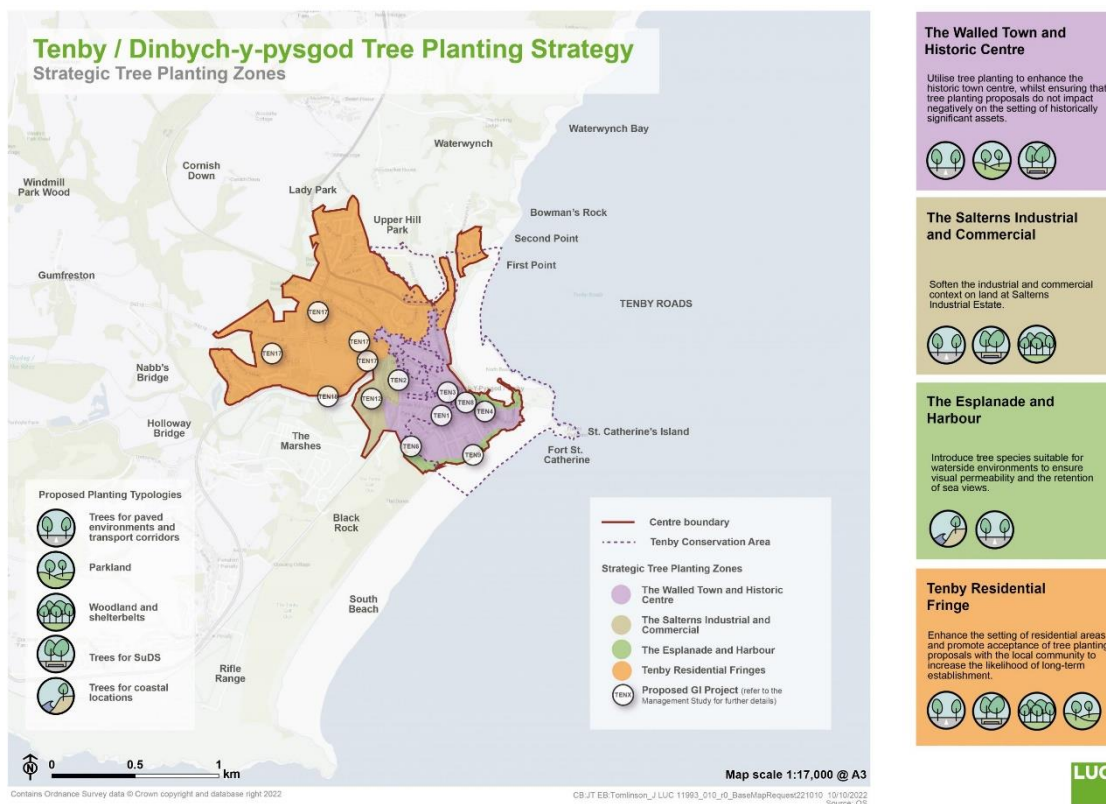
- Ensure replacement planting of existing trees (if lost or removed) is an ongoing requirement to maintain and ideally increase canopy cover. Whilst there are relatively few trees within the built-up areas of the conservation area, there are several groups of deciduous trees that positively contribute to the streetscape.
- Many of the city centre streets are narrow, with minimal opportunity for additional street tree planting. Trees may be best placed at key entrances, fringes and wider junctions, utilising narrow form trees to maintain sightlines where needed.

Tenby Tree Planting Zones and Sub-Principles

3.26 Tree Planting Zones and Sub-Principles for Tenby are shown on the map and below. They include:

- The Walled Town and Historic Centre
 - Utilise tree planting to enhance the historic town centre, whilst ensuring the tree planting proposals do not impact negatively on the setting of historically significant assets.
- The Salterns Industrial and Commercial
 - Soften the industrial and commercial context on land at Salterns Industrial Estate.
- The Esplanade and Harbour
 - Introduce tree species suitable for waterside environments to ensure visual permeability and the retention of sea views.
- Tenby Residential Fringe
 - Enhance the setting of residential areas and promote acceptance of tree planting proposals with the local community to increase the likelihood of long term establishment.

Figure 3.11: Tenby Strategic Tree Planting Zones



Zones and Sub-Principles

3.27 Land encompassed within Tenby Conservation Area includes the spaces between buildings and existing trees within the designated areas. Pembrokeshire County Council (PCC) should therefore be contacted prior to the commencement of works on existing trees subject to a Tree Preservation Order (TPO) or those located within the boundary of Tenby Conservation Area.

3.28 Tenby is located within the boundary of Pembrokeshire Coast National Park (PCNP). The development of detailed plans for future tree and woodland planting should take account of PCNP Tree and Woodland Guidance [See reference 17]. Detailed assessment of ‘urban’ Landscape Character Areas (such as Tenby) is not included in the PCNP guidance, due to the limited

opportunity for new woodland planting in these areas. However, the generic guidance within this document would still apply.

The Walled Town and Historic Centre

- Ensure tree planting complements and does not detract from the distinctive townscape character. Tree planting proposals should have regard to existing building lines and the orientation of existing development. This includes responding to the pattern of the streetscape in terms of bays and 'nodes' which break up the facade.
- Views towards and along the length of the town wall should be maintained, ensuring any new tree planting does not significantly impede views or conflict with heritage assets / underground archaeology.
- Utilise tree planting to minimise the visual impact of parked cars on the streetscape as well as the landscape setting of historic streets and buildings.
- Where opportunity arises and where appropriate, consider re-purposing small areas of on street parking to accommodate tree planting within hard landscape (e.g, wider sections along High Street & St Julian's Street).
- Tree planting in many locations may be best placed at wider junctions and pedestrian areas, utilising narrow form trees to maintain sightlines where needed.

The Salterns Industrial and Commercial

- Increase tree cover to soften the views towards industrial development. This could include the boundaries of car parking areas (such as The Green Car Park).
- Maintain and increase canopy cover at The Green, protecting the site as a key green asset and helping to mitigate visually detracting features and commercial buildings.

- Ensure greening of streets through tree planting, especially where any upgrades of access roads or car parks is undertaken. Ensure new tree planting is required as part of future industrial development.

The Esplanade and Harbour

- Ensure landscape management and future tree planting maintains key views, such as from the promenade and seating areas along Battery Road. This should be achieved utilising well-spaced trees with clear stems / high canopies. Widely spaced, small groups of trees may also be appropriate at the edges of small areas of green space set back from the seafront.
- Utilise small scale tree planting to soften and filter the visual impact of features such as Seafront Car Park. Tree planting may be best located in small numbers to mark entrances and focussed around existing facilities such toilet blocks and near the skate park / play park.
- Integrate trees in small clusters to create a microclimate to improve growing conditions within exposed locations, and to allow the incorporation of shared growing pits / rooting space in hard landscape.

Tenby Residential Fringes

- Utilise tree planting to enhance the setting of residential areas, creating tree lined streets where possible. Sufficient consideration should be given to species selection, ultimate canopy size and maintenance requirements to promote long-term establishment and reduce interference with buildings and services (e.g. telegraph lines / lighting columns).
- Prioritise tree planting in areas with the least site constraints, such as larger areas of amenity grassland and wide verges. This includes areas with minimal recreational value due to small size (e.g. Heywood Court, The Glebe)
- Avoid proposals which conflict with private vehicular access points on residential streets.

- Tree planting proposals should avoid obstruction of highways and Public Rights of Way (PRoW) within the residential context.
- Integrate flowering trees at wider verges and junctions along Narbeth Road to demarcate key routes towards Tenby.

Tree Planting Typologies

3.29 Species selection should be informed by a thorough understanding of the site and the other key elements discussed above. A set of tree planting typologies and suggested species lists have been developed which can be drawn upon when developing tree planting schemes. The lists do not set out all possible options and further work would be required to determine suitability for any specific site. Final species choice will need to consider stock availability and project budget. Reference should also be made to the Guidance on the Selection of Trees and Shrubs in Pembrokeshire [\[See reference 18\]](#), as published by Pembrokeshire Nature Partnership. The key principle of ‘right tree, right place’ should always be adhered to.

- Trees for paved environments and transport corridors
- Parkland
- Woodland and shelterbelts
- Trees for Sustainable Drainage Systems (SuDS)
- Trees for coastal locations

3.30 It is recommended that current guidance from Natural Resources Wales (NRW) is referred to when preparing species lists for tree planting projects. It should be recognised that in some settings it may be appropriate to consider the planting of non-native species, where they are well suited to the environmental conditions and non-invasive. This is especially important when taking account of future expected challenges to growing conditions as a result of climate change. This is likely to be particular consideration when planting within the urban area and within hard landscape settings. Native species should ideally form the principal component of woodland planting schemes. The effect

of species choice on landscape character should also be considered, especially within the National Park.

3.31 Pembrokeshire is now experiencing the impacts of ash dieback (*Hymenoscyphus fraxineus*), a fungal disease affecting the ash (*Fraxinus excelsior*) tree. As a consequence, the planting of ash has not been included within the species recommendations.

Trees for paved environments and transport corridors

3.32 Paved environments and areas of hard landscape can present considerable constraints on the rooting environment of trees. However, there are various design solutions that can be implemented to improve the success of planting trees within these settings. The key constraints on the rooting environment and growth of trees in paved environments include limited rooting volume and impermeable surfacing that limits water infiltration and exchange of gases. Trees planted along transport corridors are also likely to be subject to high levels of air pollution and run-off from roads (such as salt from road gritting). Many potential planting locations within paved environments will also call for narrow form or fastigiate trees due to space constraints above ground.

3.33 Trees species recommended below meet the following requirements:

- At least moderately tolerant of drought conditions; and
- Do not cause serious issues with 'fruit litter' which would pose notable maintenance or safety issues.

3.34 Sub-categories have been developed that meet the criteria above, but also meet other criteria for specific scenarios:

- Narrow form or fastigiate trees

Chapter 3 Tree Planting Typologies

- Trees which may have some tolerance for salt run-off within the rooting environment, or tolerance to air pollution
 - Field maple (*Acer campestre*)
 - Horse chestnut (*Aesculus hippocastanum*)
 - Cappadocian maple (*Acer cappadocicum*)
 - Italia alder (*Alnus cordata*)
 - Strawberry tree (*Arbutus unedo*)
 - Cornelian cherry (*Cornus mas*)
 - Hackberry (*Celtis australis*)
 - Turkish hazel (*Corylus colurna*)
 - Sea buckthorn (*Hippophae salicifolia*)
 - Japanese privet (*Ligustrum japonicum*)
 - Sweet gum (*Liquidambar styraciflua*)
 - European hop-hornbeam (*Ostrya carpinifolia*)
 - Persian ironwood (*Parrotia persica*)
 - Black pine (*Pinus nigra*)
 - Scots pine (*Pinus sylvestris*)
 - European dwarf cherry (*Prunus fruticosa*)
 - Sargent's cherry (*Prunus sargentii*)
 - Sessile oak (*Quercus patraea*)
 - Whitebeam (*Sorbus aria*)
 - Wild service tree (*Sorbus torminalis*)
 - Silver lime (*Tilia tomentosa*)
- Narrow form, columnar or fastigate trees for paved environments
- Lienco field maple (*Acer campestre* 'Lienco')

- Fastigate hornbeam (*Carpinus betulus* 'Fastigiata')
- Ginkgo (*Ginkgo biloba* 'Fastigiata')
- Sea buckthorn (*Hippophae salicifolia* 'Streetwise')
- Sweet gum (*Liquidambar styraciflua* 'Slender Silhouette')
- Rowan (*Sorbus aucuparia* 'Streetwise')
- Small-leaved lime (*Tilia cordata* 'Greenspire')
- Trees suited to transport corridors
- Field maple (*Acer campestre*)
- Red maple (*Acer rubrum*)
- European nettle tree (*Celtis australis*)
- Honey locust (*Gleditsia triacanthos*)
- Sea buckthorn (*Hippophae salicifolia*)
- Sweet gum (*Liquidambar styraciflua*)
- Black pine (*Pinus nigra*)
- London plane (*Platanus x hispanica*)
- Cherry plum (*Prunus cerasifera*)
- Callery pear (*Pyrus calleryana*)
- Sessile oak (*Quercus patraea*)
- Swedish whitebeam (*Sorbus intermedia*)
- Silver lime (*Tilia tomentosa*)

Parkland

3.35 Parks, open spaces and areas suitable for woodland planting will likely present some of the highest quality environments for the growth of trees. Tree

planting in parks may provide opportunities for the planting of large canopy specimen trees, where opportunities may be less frequent elsewhere (e.g. in paved environments).

3.36 Parkland: trees native to Pembrokeshire

- Alder (*Alnus glutinosa*)
- Silver birch (*Betula pendul*)
- Downy birch (*Betula pubescens*)
- Hazel (*Corylus avellana*)
- Hawthorn (*Crataegus monogyna*)
- Holly (*Ilex aquifolium*)
- Aspen (*Populus tremula*)
- Wild cherry (*Prunus avium*)
- Sessile oak (*Quercus petraea*)
- Goat willow (*Salix caprea*)
- Rowan (*Sorbus aucuparia*)
- Yew (*Taxus baccata*)
- Wild service tree (*Sorbus torminalis*)
- Wych elm (*Ulmus glabra*)

3.37 Silver birch and Downy Birch are absent from St Davids peninsula. Do not plant here or near lowland heath where it may be highly invasive.

3.38 Wild service trees have restricted distribution, mainly around the Cleddau estuary.

3.39 Parkland, specimen trees: summer flowering

- Indian horse chestnut (*Aesculus indica*)

Chapter 3 Tree Planting Typologies

- Sweet chestnut (*Castanea sativa*)
- Northern catalpa (*Catalpa speciosa*)
- Honey locust (*Gleditsia triacanthos*)
- Walnut (*Juglans regia*)
- Golden rain tree (*Koelreuteria paniculata*)
- Tulip tree (*Liriodendron tulipifera*)
- Magnolia (*Magnolia grandiflora*)
- False acacia (*Robinia pseudoacacia*)
- Small-leaved lime (*Tilia cordata*)
- European lime (*Tilia x europaea*)
- Silver lime (*Tilia tomentosa*)

3.40 Parkland, specimen trees: spring flowering trees

- Box elder (*Acer negundo*)
- Norway maple (*Acer platanoides*)
- Sycamore (*Acer pseudoplatanus*)
- Horse chestnut (*Aesculus hippocastanum*)
- Italian alder (*Alnus cordata*)
- Hornbeam (*Carpinus betulus*)
- Katsura tree (*Cercidiphyllum japonicum*)
- Magnolia (*Magnolia acuminata*)
- Wild cherry (*Prunus avium*)
- Bird cherry (*Prunus padus*)
- Sargent's cherry (*Prunus sargentii*)
- Sessile oak (*Quercus petraea*)

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- English oak (*Quercus robur*)
- White willow (*Salix alba*)
- Wild service tree (*Sorbus torminalis*)

3.41 Small domestic gardens and highly constrained sites:

- Service berry (*Amelanchier canadensis*)
- Snowy mespilus (*Amelanchier lamarkii*)
- Strawberry tree (*Arbutus unedo*)
- Box (*Buxus sempervirens*)
- Kousa (*Cornus kousa*)
- Hazel (*Corylus avellana*)
- Hawthorn (*Crataegus monogyna*)
- Spindle (*Euonymus europaeus*)
- Common laburnum (*Laburnum anagyroides*)
- Japanese privet (*Ligustrum japonicum*)
- Magnolia (*Magnolia x loebneri*)
- Crab apple (*Malus sylvestris*)
- Medlar (*Mespilus germanica*)
- Mulberry (*Morus* spp.)
- Cherry plum (*Prunus cerasifera*)
- Wild plum (*Prunus domestica*)
- Stag's horn sumach (*Rhus typhina*)

Woodland and shelterbelts

3.42 It is recommended that appropriate native species form a significant component of larger scale woodland planting projects. Criteria should be referred to where application to a woodland creation grant funding scheme is being considered. It is recommended that current guidance from Natural Resources Wales (NRW) is referred to when preparing species lists for tree planting projects. It should also be recognised that there may be a need to look beyond lists of native species to develop resilience within populations at a landscape scale. The effect of species choice on landscape character should also be considered, especially within the Pembrokeshire Coast National Park.

3.43 Woodlands and shelterbelts: canopy trees (no more than 50% of a single species within a mix. Ideally at least five key species should be included, with each making up at least 10% of the total mix).

3.44 Broadleaved species:

- Sycamore (*Acer pseudoplatanus*)
- Common alder (*Alnus glutinosa*)
- Silver birch (*Betula pendula*)
- Downy birch (*Betula pubescens*)
- Sweet chestnut (*Castanea sativa*)
- Hawthorn (*Crataegus monogyna*)
- Beech (*Fagus sylvatica*)
- Aspen (*Populus tremula*)
- Wild cherry (*Prunus avium*)
- Sour cherry (*Prunus cerasus*)
- Sessile oak (*Quercus petraea*)
- English oak (*Quercus robur*)

Chapter 3 Tree Planting Typologies

- Rowan (*Sorbus aucuparia*)
- Small-leaved lime (*Tilia cordata*)
- Common lime (*Tilia x europaeus*)
- Large-leaved lime (*Tilia platyphyllos*)

3.45 Coniferous species:

- Himalayan cedar (*Cedrus deodara*)
- Cedar of Lebanon (*Cedrus libani*)
- Shore pine (*Pinus contorta*)
- Scots pine (*Pinus sylvestris*)
- Coastal redwood (*Sequoia sempervirens*)
- Western red cedar (*Thuja plicata*)

3.46 Woody shrubs (which will generally need to form 30% or less of the species mix):

- Hazel (*Corylus avellana*)
- Spindle (*Euonymus europaeus*)
- Alder buckthorn (*Frangula alnus*)
- Common juniper (*Juniperus communis*)
- Wild privet (*Ligustrum vulgare*)
- Bog myrtle (*Myrica gale*)
- Blackthorn (*Prunus spinosa*)
- Purging buckthorn (*Rhamnus cathartica*)
- Goat willow (*Salix caprea*)
- Grey willow (*Salix sinerea*)
- Common osier (*Salix viminalis*)

- Common elder (*Sambucus nigra*)
- Common wayfaring tree (*Viburnum lantana*)
- Guelder rose (*Viburnum opulus*)

Trees for Sustainable Drainage Systems (SuDS)

3.47 Sustainable Drainage Systems (SuDS) design can involve the creation of a variety of growing conditions. This may include infrequently or frequently flooded vegetated swales and habitat areas. Some SuDS schemes incorporate highly engineered storage systems, including tree pits with structural soils which are very free draining. In these situations, rooting environments may become fully saturated, but then dry out relatively quickly. Trees will need to have a degree of tolerance to waterlogging but also drought in these settings.

3.48 Suitable for engineered SuDS with structural soils:

- Box elder (*Acer negundo*)
- Red maple (*Acer rubrum*)
- Silver maple (*Acer saccharinum*)
- Italian alder (*Alnus cordata*)
- Alder (*Alnus glutinosa*)
- Dogwood (*Cornus sanguinea*)
- Honey locust (*Gleditsia triacanthos*)
- Sweet gum (*Liquidambar styraciflua*)
- London plane (*Platanus x hispanica*)
- Oriental plane (*Platanus orientalis*)
- Spanish oak (*Quercus palustris*)

3.49 Tolerant of waterlogging:

- Common alder (*Alnus glutinosa*)
- White willow (*Salix alba*)
- Eared willow (*Salix aurita*)
- Goat willow (*Salix caprea*)
- Grey willow (*Salix cinerea*)
- Bay willow (*Salix pentandra*)
- Swamp cypress (*Taxodium distichum*)

Trees for coastal locations

3.50 Trees for coastal locations (also suitable for planting into hard landscape areas):

- Sycamore (*Acer pseudoplatanus*)
- Grey alder (*Alnus incana*)
- Italian alder (*Alnus cordata*)*
- Service berry (*Amelanchier canadensis*)
- Hazel (*Corylus avellana*)
- Hawthorn (*Crataegus monogyna*)
- Broom (*Cytisus scoparius*)
- Honey locust (*Gleditsia triacanthos*)*
- Sea buckthorn (*Hippophae salicifolia*)*
- Holly (*Ilex aquifolium*)
- Juniper (*Juniperus communis*)
- Crab apple (*Malus sylvestris*)

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- Black pine (*Pinus nigra*)*
- Stone pine (*Pinus pinea*)
- Monterey pine (*Pinus radiata*)
- Scots pine (*Pinus sylvestris*)
- Silver poplar (*Populus alba*)
- Black poplar (*Populus nigra*)
- Aspen (*Populus tremula*)
- Blackthorn (*Prunus spinosa*)
- Common pear (*Pyrus communis*)
- Rowan (*Sorbus aucuparia*)
- Turkey oak (*Quercus cerris*)*
- Holm oak (*Quercus ilex*)*
- Sessile oak (*Quercus petraea*)*
- English oak (*Quercus robur*)
- Eared willow (*Salix aurita*)
- Goat willow (*Salix caprea*)
- Grey willow (*Salix cinerea*)
- Elder (*Sambucus nigra*)
- Swedish whitebeam (*Sorbus intermedia*)*
- Wild service tree (*Sorbus torminalis*)*
- Silver lime (*Tilia tomentosa*)*
- European gorse (*Ulex europaeus*)

Chapter 4

Delivery- Urban Trees Strategies

The tree planting process

4.1 The practical delivery of tree planting projects may require the co-ordination of a range of stakeholders, specialists and interested parties. It is therefore beneficial to set out a high level process or 'framework' for delivery. An outline process plan can be used as the starting point for any tree planting project throughout the 11 settlements and can be amended as necessary. The process plan can also form the basis of a checklist and programme that project partners can work to.

4.2 Proposals for tree planting may come from a range of parties, including Pembrokeshire County Council (PCC) or Town Councils, or community groups. It is recommended that a project or planting list is developed each bare-root planting season (which will likely run from around October up to March at the latest). Sufficient time will be required to make sure all necessary checks are undertaken (such as trial pit excavations or soil testing) and to confirm if any planning or permissions for planting are required. If suitable requests come forward from community groups or residents and funds are available for planting, trees could be added to the planting programme for that year.

4.3 The amount of planning, resources and level of expertise required for tree planting projects will vary considerably depending on the location. For example, requirements for small scale planting in soft landscape (such as a local park or grass verge) will be much less than planting in a hard landscape area where underground conditions are unknown.

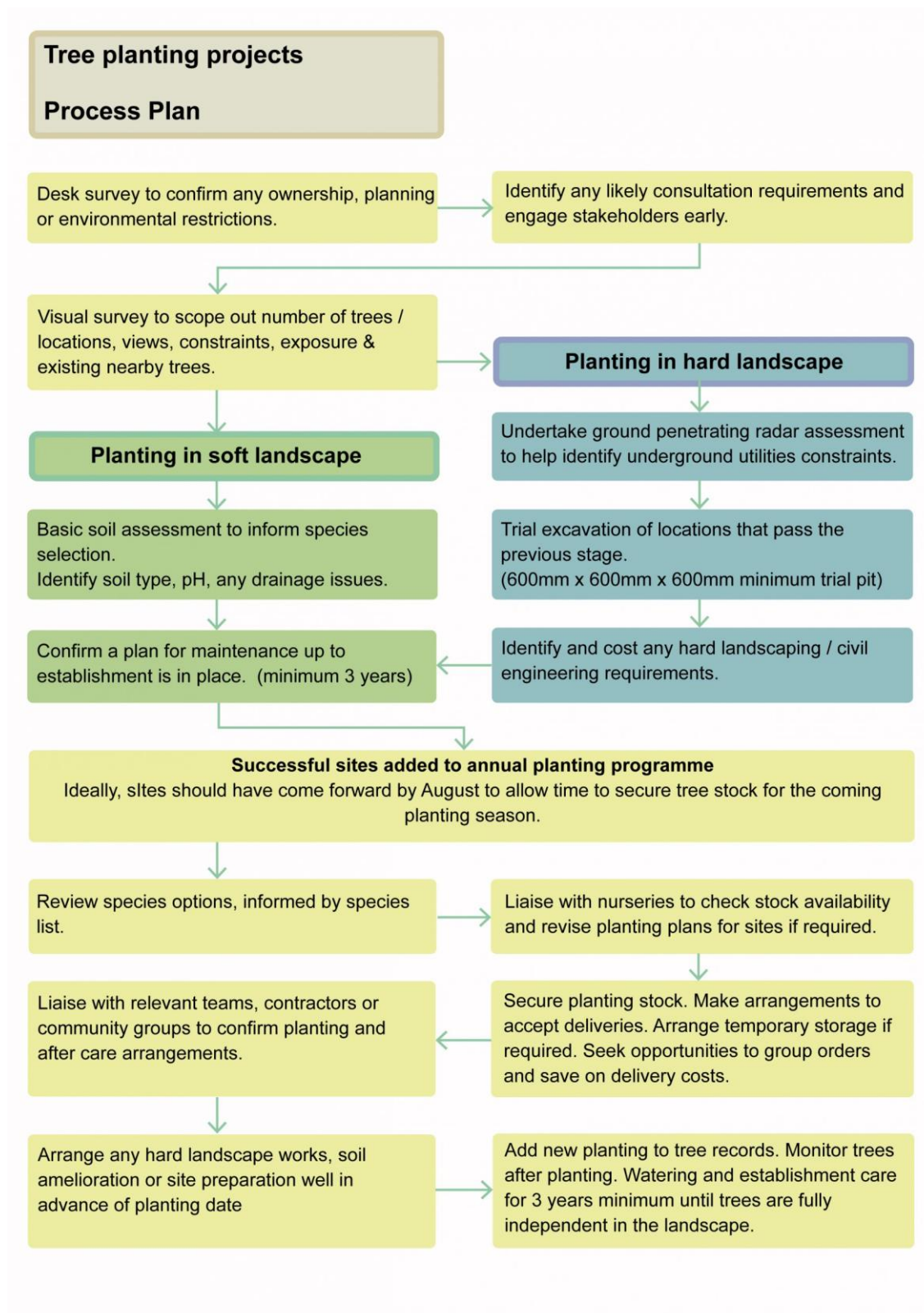
4.4 A high level process plan for tree planting projects is shown in figure 4.1 below and includes the following:

- Tree planting projects process plan
 - Desk survey to confirm any ownership, planning or environmental restrictions.
 - Identify and likely consultation requirements and engage stakeholders early
 - Visual survey to scope out number of trees/locations, views, constraints, exposure and existing nearby trees
- Planting in hard landscape
 - Undertake ground penetrating radar assessment to help identify underground utilities constraints
 - Trial excavation of locations that pass the previous stage (600mm x 600mm minimum trial pit)
 - Identify and cost any hard landscaping/civil engineering requirements
- Planting in soft landscape
 - Basic soil assessment to inform species selection. Identify soil type, PH any drainage issues
 - Confirm a plan maintenance up to establishment is in place (minimum 3 years)
- Successful sites added to annual planting programme
 - Ideally, sites should have come forward by August to allow time to secure tree stock for the coming planting season
 - Review species options informed by species list.
 - Liaise with nurseries to check stock availability and revise planting plans for sites if required
 - Secure planting stock. Make arrangements to accept deliveries. Arrange temporary storage if required. Seek opportunities to group orders and save on delivery costs
 - Liaise with relevant teams, contractors or community groups to confirm planting and after care arrangements.

Chapter 4 Delivery- Urban Trees Strategies

- Arrange any hard landscape works, soil amelioration or site preparation well in advance of planning date
- Add new planting to tree records. Monitor trees after planting. Watering and establishment care for 3 years minimum until trees are full independent in the landscape.

Figure 4.1: High level process plan for tree planting projects



Key components for the successful establishment of trees

4.5 The key components for successful establishment of trees can be broadly divided as follows:

1. Species selection

- Selecting the right tree for the location, taking into account site constraints.

2. The rooting environment

- Providing an appropriate rooting environment, with a sufficient volume of soil of the correct specification.

3. Planting and aftercare

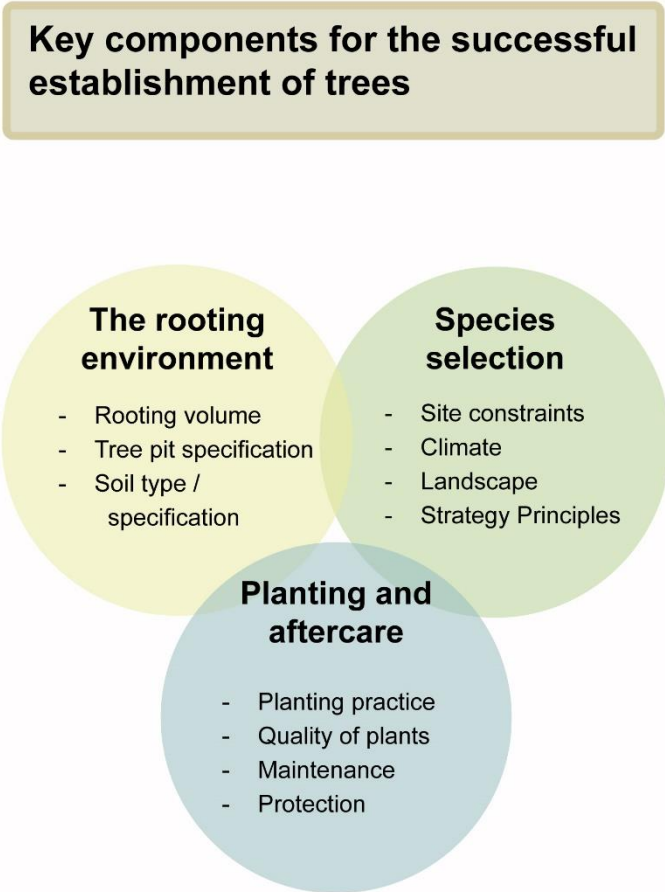
- Using good practice throughout the whole process from ordering plants to planting and maintenance

4.6 Figure 4.2 below, highlights the following points for each component:

- The rooting environment
 - Rooting volume
 - Tree pit specification
 - Soil type/specification
- Species selection
 - Site constraints
 - Climate
 - Landscape
 - Strategy Principles

- Planting and aftercare
 - Planting practice
 - Quality of plants
 - Maintenance
 - Protection

Figure 4.2: Key components for succesful establishment of trees



Species selection

4.7 There are a wide range of factors that need to be considered when selecting suitable species for any tree planting scheme. It is widely accepted that healthy, large canopy climax trees will generally deliver the greatest benefits. The planting of large trees should therefore be prioritised wherever possible. However, site constraints (such as narrow streets, safety considerations, proximity to structures and utilities) may determine that smaller species or cultivars will need to be selected.

4.8 Whatever the eventual mature size of tree, benefits will only be derived if trees are healthy and ongoing vitality can be guaranteed. Trees that lack vigour and are struggling to survive will not provide the intended benefits. Furthermore, trees in poor health will require more maintenance, are more susceptible to pathogens and will ultimately result in a waste of time and resources. Trees therefore need to be suitable for the environment and site they are being planted, the overarching requirement for species selection will therefore be 'right tree, right place'. Understandably, aesthetic considerations often influence tree selection to a significant degree, however, this should always be secondary to the trees ability to thrive at the site in question.

Key considerations for species selection

Site characteristics and constraints

4.9 Site characteristics and constraints will need to be assessed for all tree planting schemes. The scale of this task will vary depending on the location and type of planting being proposed. Key site constraints that will need to be considered include:

Below ground / rooting environment

- Soil characteristics (pH, soil type, compaction or drainage issues)
- The presence and location of utilities
- Available rooting volume and surfacing (is the site paved / trafficked)
- Likely pollution run off / flood risk

4.10 The constraints and challenges for the rooting environment posed by planting within hard landscapes are generally greater than planting within soft landscapes (such as parks and open spaces).

Above ground

- Available growing space (i.e. nearby buildings and utilities)
- Exposure and climate (salt spray, wind exposure, shade etc.)
- Views (i.e. vistas that need to be maintained for safety or aesthetic / landscape or heritage appreciation)
- Pollution
- Surrounding habitat and existing tree population
- Landscape character
- Other site use and access issues

Tree species diversity

4.11 Diverse populations of trees are more resilient to a range of environmental threats, such as pests and diseases, which can proliferate in single species plantings and may potentially threaten entire species of trees. Expected changes in climate will also place challenges to the healthy growth of some trees and potentially exacerbate some pest and disease issues. New tree planting should therefore aim to diversify the species mix at any given site.

Whilst single species avenues and streets may still be appropriate, overall species selection throughout a settlement or sub-area should avoid no more than around 20% of the same species overall. As noted under site characteristics and constraints, an assessment of the existing tree population should be undertaken. This should include an assessment of the current tree species mix which can be factored into species selection.

Providing for biodiversity

4.12 Trees provide habitats and food sources for a wide range of wildlife. Larger trees provide space for roosting, perching and nesting (such as birds and bats). Fruits, berries and seeds provide a food source for birds and mammals, and many invertebrates rely on trees both for food (such nectar from flowers) and for other aspects of their life cycle (such as laying eggs / overwintering etc.). Opportunities to plant trees that provide food, shelter and habitat for other wildlife should be prioritised. However, in some locations there may be other site constraints that may limit the use of some trees for the purpose (such as large fruit which may cause a significant maintenance issue that can't be appropriately managed).

4.13 Native species, having been present alongside other native wildlife for longer, will generally support a wider range of other wildlife than non-native species. However, the exclusive use of native species in all areas should not be considered absolutely essential. There are many non-native tree species with beneficial attributes that may be more resilient to the predicted impacts of climate change. This is especially the case within urban environments, and these species should also be considered when selecting species for tree planting projects, as long as they are not invasive. The focus should be on species which are most appropriate to the locality, and that are most likely to thrive in future conditions. Species which are most closely related to native species will generally be most appropriate.

Species selection for 11 settlements across Pembrokeshire

4.14 Species selection should be informed by a thorough understanding of the planting site and the other key elements discussed above. A set of planting typologies and suggested species lists have been developed which can be drawn upon when developing tree planting schemes. The lists do not set out all possible options and further work would need to be done to determine suitability for any specific site. Final species choice may also end up being influenced by stock availability and project budget. However, the key principle of ‘right tree, right place’ should always be adhered to.

- Trees for paved environments and transport corridors;
- Parkland;
- Woodland and shelterbelts;
- Trees for Sustainable Drainage Systems; and
- Trees for coastal locations.

4.15 It is recommended that current guidance from Natural Resources Wales relating to Tree Health in Wales [\[See reference 19\]](#) is referred to when preparing species lists for tree planting projects. Native species should ideally form the major component of significant woodland planting schemes. The effect of species choice on landscape character should also be considered, especially within the Pembrokeshire Coast National Park (Tree and Woodland Guidance (Supplementary Planning Guidance to Pembrokeshire Coast National Park Local Development Plan 2 – draft approved for public consultation [\[See reference 20\]](#)). This document is due to be formally adopted by Pembrokeshire Coast National Park Authority (PCNPA) (following a report of consultations) in 2023.

4.16 Species recommendations for the planting typologies listed above are set out under Tree Planting Zones and Sub-Principles for 11 Settlements.

The rooting environment

4.17 For trees to grow to optimum health and their full potential, they require an appropriate volume of soil with sufficient organic matter, nutrients, suitable pH, the ability to hold enough water and sufficient drainage. Aeration is essential and determines the ability of the tree to access water and nutrients. Soil aeration can be compromised through the following key factors:

- Soil sealing with hard surfaces which prevent exchange of oxygen and other gases between above and below ground environments (mainly an issue in hard landscape environments);
- Poor drainage or high-water tables (which can be due to natural ground conditions and also be artificially created through poor design); and
- Soil compaction through previous use or mismanagement of soils (such as through the use of heavy machinery when soil is wet).

4.18 Other soil characteristics such as soil pH, soil texture and water holding capacity may have a significant bearing on species selection. Further information on specific species requirements will need to be determined where required.

Tree pit (rooting environment) standards for 11 settlements in Pembrokeshire

4.19 It is not possible to provide a simple off the shelf tree planting pit that will apply to all sites. Tree planting pits can range from very simple to highly technical solutions requiring specialist design input and expertise. More complex designs are generally only ever required to address a particular constraint or limitation at a site. The principle for most tree planting with regard to the rooting environment will be to seek the most simple solution, whilst adopting appropriate arboricultural practice. Some projects may only require digging a planting hole, placing the tree and backfilling with the existing soil, ensuring topsoil and sub soil are kept separate. Simple tree pit design should

be the starting point although further work and design input may be required in response to specific site constraints. A comprehensive reference text; *Trees in Hard Landscapes: A Guide for Delivery*. (Trees and Design Action Group, 2014) may be referred to for further guidance on overcoming specific site constraints when planting in hard landscapes.

Trees in soft landscape

4.20 Providing a suitable rooting environment in soft landscape areas will generally be more straight forward than providing a suitable rooting environment in hard landscape (paved) areas. Site assessments will need to identify any specific issues which may impede root growth, including significant drainage issues or soil compaction and soil pH which may significantly restrict healthy plant growth or species choice. Good arboricultural practice should be followed where any soil issues need to be rectified. The soil used to back fill the planting hole should be the material that was excavated. If for any reason this is not possible, the soil used to backfill the planting should be as close as possible in characteristics to the surrounding soil.

Trees in hard landscape

4.21 A key limiting factor in the growth of urban trees is a lack of suitable soil volume for root growth. Proposals for planting in hard landscape areas should ensure that there is sufficient rooting volume for the species being planted for the tree to reach maturity and deliver the intended benefits. This is a challenge, as underground space is often needed for competing uses in the urban areas. The largest possible rooting volume should be sought where possible. If cost is a major consideration for delivering a project within a hard landscape area, it may be more appropriate to reduce the overall number of trees and provide larger rooting volume for a smaller number of trees. Key strategies for ensuring adequate rooting volumes beneath hard landscape areas include:

- Increasing the rooting environment as much as possible through load bearing planting substrates (structural soils) or modular soil cells (generally a high cost solution);
- Creating a continuous trench which enable roots to spread into the space between trees, creating a shared rooting environment. This generally means the overall rooting environment per tree can be reduced; and
- Creating 'break out zones' that enable roots to exploit adjoining soil areas that may provide a wider rooting environment.

4.22 New trees can still be planted in areas where soil volumes are limited, however, it should be accepted that such trees will likely not reach their full potential (maturity, size or life expectancy).

Guideline (minimum) soil volumes

4.23 Minimum guideline soil volumes are set out below, which is determined by the eventual size of tree. Guidelines are provided for tree rooting environments made up from a 'multipurpose' topsoil that complies with British Standards (BS 3882:2015 Specification for Topsoil). Separate soil volume guidelines are also provided for structural (load bearing) soils, which generally need to be larger due to the higher stone content, having a smaller proportion of mineral soil and organic matter.

Very small trees <5 metres

- Uncompacted loam soils: 6m³ (5m³ if shared); and
- Structural soils: 8m³ (6m³ if shared).

Small trees (5-10m)

- Uncompacted loam soils: 12m³ (9.5m³ if shared); and
- Structural soils: 15m³ (12m³ if shared).

Medium trees (10-15m)

- Uncompacted loam soils: 20m³ (16m³ if shared); and
- Structural soils: 26m³ (20m³ if shared).

Large trees (15-25m)

- Uncompacted loam soils: 28m³ (24m³ if shared); and
- Structural soils: 36m³ (28m³ if shared).

Massive trees (>25m)

- Uncompacted loam soils: 36m³ (30m³ if shared); and
- Structural soils: 45m³ (35m³ if shared).

4.24 Columnar or fastigate trees will generally require less rooting volume than trees with spreading or wide canopy types. In some circumstances it may be appropriate to reduce the guideline soil volumes by as much as half for trees with a narrow form.

Tree pit opening

4.25 The top surface of tree planting locations should ideally be open, loose textured soil. Open tree pits with exposed soils also provides the opportunity to apply mulches which can maintain healthy soil structure and biological activity, helping to ensure water infiltration and the exchange of oxygen and carbon dioxide.

4.26 It is important that soils over tree roots are protected from compaction and are ideally not subject to pedestrian traffic. There are a range of solutions that may be employed including the use of tree grilles, post and rail tree guards, slightly raised kerbs (ensuring surface water can still be diverted into the tree

pit) or simply placing trees to the side of footways and out of the way of pedestrian routes where possible.

4.27 If hard surfacing is unavoidable above tree pits, provision must be made for water infiltration and aeration to the root zone. This will generally determine the use of permeable surface material, gravels or non-permeable surfaces with large diameter aeration vents and tubes.

Incorporating the tree rooting environment as part of Sustainable Drainage Systems (SuDS).

4.28 Wherever possible, new tree pits should contribute towards Sustainable Drainage Systems (SuDS). Trees may be incorporated into a range of different SuDS (such as wetlands or rain gardens) to improve functionality. Individual tree pits may also be designed as a standalone SuDS feature. If designed correctly, the removal of hard landscape can help to accept excess surface water runoff, and rainwater can be diverted into the tree rooting environment to provide a water source and improve tree health. An appropriate and effective drainage system to ensure excess water can be removed to avoid anaerobic conditions. Larger volume tree rooting environments that can accommodate multiple trees will generally function better as part of SuDS schemes due to higher water storage capacity.

Underground services

4.29 When proposing to plant any trees, especially those along the highway or in hard landscape areas, it is essential that the tree pit and root growth does not cause direct or indirect damage to underground utilities or services. As noted in the process plan above, service investigations will be required to determine the viability of planting proposals. There are a range of design solutions that can be employed to address potential conflict, and relevant utilities companies / highways departments may need to be consulted. Each situation needs to be assessed and resolved on a case by case basis. The cost of designing out

some potential conflict may be significant and will need to be considered early in the project. Bespoke design solutions may be required, including the options for ensuring the protection of underground services at each location.

Planting methods and aftercare

Sourcing trees

4.30 The purchase of healthy trees that are free from pests and diseases is a key component of the successful establishment of new tree planting. Ideally tree stock should be sourced locally and be of known provenance. Biosecurity is a high priority and all up to date measures and requirements to limit the spread of tree pathogens must be adhered to. Tree suppliers have a responsibility to ensure that planting stock and any soil is free from pests and diseases throughout the supply chain. Tree nurseries should be able to provide an audit trail of the transfer and ownership of tree stock from seed to the planting site. Tree stock for new planting should be:

- UK grown and sourced
- Subject to nursery quarantine for a full growing season following importation from overseas (trees should not be imported directly and planted in the landscape)
- From nurseries that are an accredited member of a plant health assurance scheme that follows up to date national guidance and are able to provide a full audit trail for tree stock

4.31 It is beneficial for those overseeing tree planting projects to visit suppliers prior to placing orders. This is advisable for small orders of trees and essential where large numbers of trees are being ordered.

Size and type of tree stock

4.32 Larger tree stock is more costly and will require more intensive aftercare, such as irrigation. Small trees tend to establish quicker than larger tree planting stock and will grow faster due to a more favourable root to shoot ratio. Small trees are much more prone to vandalism and accidental damage within urban environments and therefore larger trees are generally more appropriate and more likely to survive, given appropriate aftercare. The cost of available tree stock size is also a major consideration as larger trees are considerably more expensive and haulage costs will make up a larger percentage of the overall costs. In most situations a 'happy medium' will need to be struck, obtaining stock of a reasonable size that is suitable for individual specimen tree planting in hard landscape environments and soft landscape situation such as parks. Smaller stock will generally be suitable for planting hedgerows, woodlands, shelterbelts and community orchard areas.

4.33 Trees are available either as bare root, root balled (root and soil wrapped in hessian sheet), or pot grown. Each has its benefits and limitations. Bare root trees will generally be the stock of choice for larger woodland, shelter belt of hedge planting schemes. Bare root trees do present a logistical challenge as they need to be planted as soon as possible after being received, and it will generally only be practical to store them for very short periods of time. Most trees can be obtained as pot grown plants. Whilst the purchase and transport of pot grown specimens will generally be more expensive, the use of pot grown trees will generally mean more flexibility with when trees can be planted. Pot grown trees can be carefully stored throughout the planting season if needed and if space is available.

4.34 In practice, and depending on availability, this is likely to mean sourcing the follow types and sizes of tree stock for many planting schemes:

Planting in hard landscape:

- Standard (8-10cm girth), or Selected Standard (10-12cm girth) (likely pot grown).

Planting in soft landscape (specimen or individual parkland trees):

- Light Standard (6-8cm girth), or
- Standard (8-10cm girth) (likely pot grown).

Planting in soft landscape (Woodland or shelter belt planting):

- Whips or feathered whips (likely bare root)
- (single stem trees, or with few side branches, just one or several years old).

Spacing trees

4.35 For individual specimen trees, parkland trees or trees in hard landscape, sufficient space should be allowed between trees so they can develop full crowns when mature. Other factors may need to be considered when determining spacing such as the amount of shade that may be cast along individual streets. Canopy density and form will also have a bearing on these design decisions. Where views, such as view to the coast needs to be maintained, very low density planting (widely spaced), or planting small groups or trees widely spaced may be more appropriate.

4.36 Woodlands or shelter belts, planted with small whips or feathered trees, will generally be planted closer together. In this scenario, trees will generally need to be planted between 2 and 3 metres apart. Trees within this kind planting will generally benefit from ongoing active woodland management. This may include some thinning as the planting develops to increase the distance between some trees, create open areas and to diversify the structure of the planting.

Planting trees

4.37 The main tree planting season extends from November to March (inclusive). Bare root and root balled trees are generally only available in autumn and early winter and need to be planted whilst dormant. Whilst most trees can be obtained as pot grown specimens, which can in theory be planted at any time of year, successful establishment will be more challenging if planted during summer months. The aim should be to complete all annual tree planting within the main tree planting season.

4.38 Trees need to be planted into prepared soil that is reasonably free from weeds and large stones. Additional organic matter or fertiliser will generally not need to be added to existing soil unless a specific soil issue has been identified and requires rectification. If organic matter is incorporated this should not be incorporated in the base of the planting pit or beneath the root ball. The sides and base of the planting hole may be lightly broken up to aid drainage. Trees should be planted with the base of the stem / root flare at the same level as it developed in the nursery. Soil should be firmed around tree roots / the root ball so there are no air gaps, but without compacting the soil.

4.39 All new trees should be water thoroughly immediately after planting.

4.40 Ideally all tree planting will be mulched with a suitable, weed free organic mulch (such as weed free compost of a suitable pH, or fine bark). This helps to retain moisture, maintain a good soil structure and reduce weed competition. Mulch should be up to 75mm deep (not mounded against trunk) and extend up to 1 metre from the tree stem.

Tree staking and protection

4.41 There are a wide range of systems for providing support to the tree after planting. Tree support ensures that soil remains in contact with the roots of the tree during establishment, reducing excessive 'rocking' of the roots in the wind.

However, some movement of the stem in the wind is important to encourage the development of structural main stem wood that will support the tree in long term. The most appropriate approach for most applications will be double staking trees (usually timber stakes), as low down on the tree as possible, whilst also keeping roots in contact with the ground. Rubber ties can be used to secure the tree to the stakes. Stakes should be placed either side of the main rootball and measures should be taken to ensure that stakes and ties do not rub on tree stems.

4.42 Other types of tree protection during the establishment period will likely be required in most circumstances. Stem guards (such as weldmesh attached to tree stakes) will generally be the most effective solution in urban areas. Biodegradable tree tubes will generally be the most effective solution for woodland areas, shelter belts of orchard planting.

Aftercare

4.43 All new tree planting will need to be maintained during the establishment phase until it is fully independent in the landscape. As noted in the process plan above, a plan for ongoing maintenance should be confirmed during the planning process of any project. Key annual maintenance operations should include:

- Weed control at the base of trees, maintaining a weed and grass free area extending 1 metre from the main stem. Herbicide use should be reduced as much as is reasonably possible, with weeds controlled by other methods where practical. Weeding should be undertaken for at least the first three years for most planting, although ideally as part of a 60 month maintenance period.
- Top up and maintain a mulch layer extending 1 metre (up to 75mm deep) from the main stem (which will also help to reduce weeding requirements). Mulching can continue once trees are fully established but is most important during the establishment phase.
- Irrigation to ensure healthy growth and development.

- Newly planted trees should be water when planted. Watering should continue throughout the main growing season for at least the first three years until established.
- During establishment, frequency is more important than the volume of water, especially during the first season. If growing healthily from the second season, the frequency can be reduced slightly in favour of less frequent applications of more water. As a benchmark, trees may need to be visited for irrigation up to 12 times throughout the growing season.
- During periods of dry and hot weather, irrigation frequency may need to be increased. As trees develop during the establishment phase the amount of irrigation will need to be increased to account for the addition surface area of roots and leaves.
- Irrigation requirements will vary depending on species, stock size and location. Large, newly planted trees will require larger quantities of water than smaller trees.
- Tree stakes, ties and protection should be checked, adjusted and replaced whenever required. New trees should be inspected at least annually to monitor the success of the scheme and identify any pest and disease, or other issues

Chapter 5

Pollinator Strategies

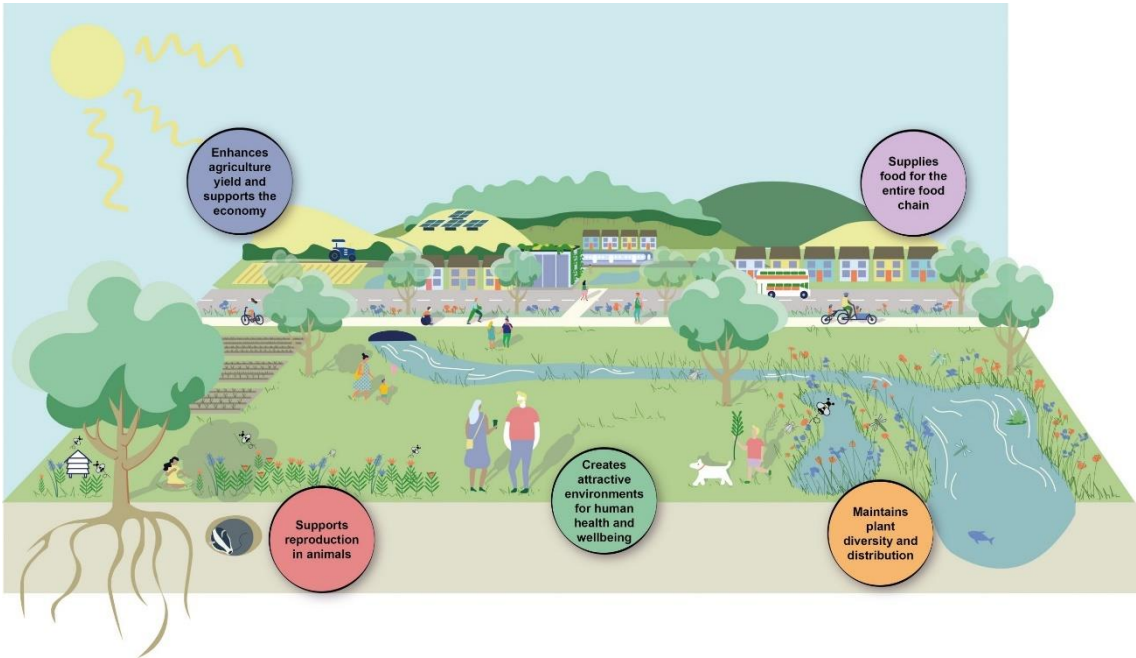
The importance of pollinators

5.1 Pollinators are an essential part of our environment. They include species such as honey bees, bumblebees, solitary bees, parasitic wasps, hover flies, butterflies, moth and some species of flies and beetles.

5.2 Pollinators increase the diversity of wildflower species, contributing to enhanced biodiversity and improved ecological resilience. They are of intrinsic value in their own right as part of our natural heritage, and some, such as bees and butterflies, are widely appreciated by the public.

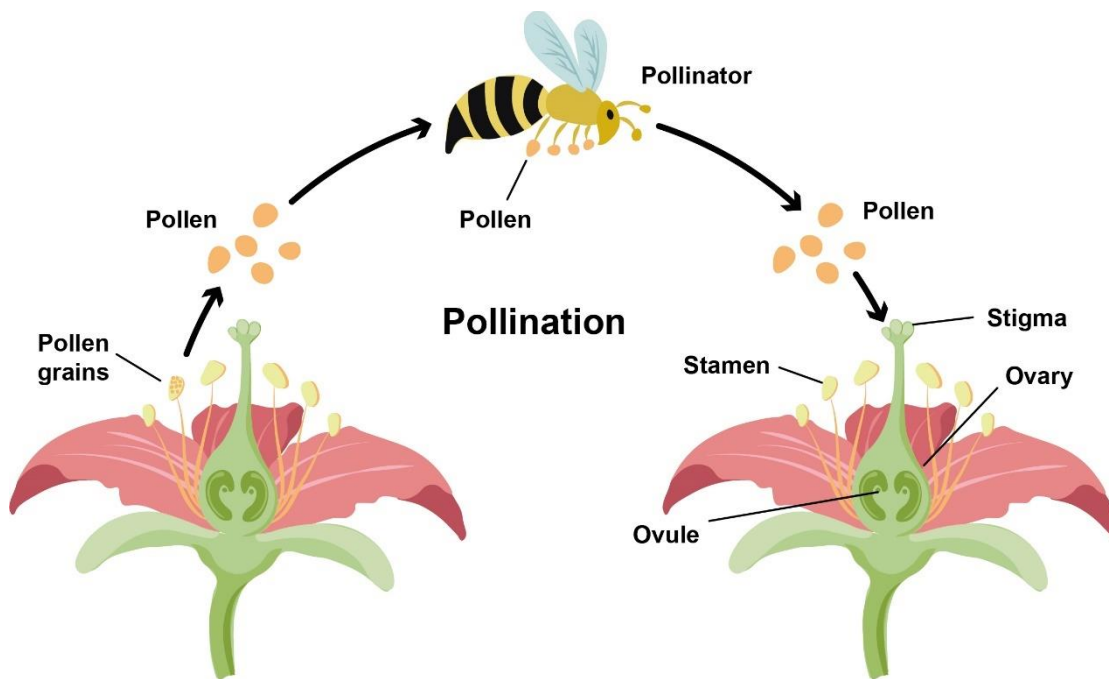
5.3 These species are important as they provide food security for many types of crops and nitrogen fixing plants that are important in improving productivity of pastures for livestock grazing. The value of pollination [\[See reference 21\]](#) to agriculture in the UK was estimated at £690 million. Pollinators therefore make our food bills much lower than they would be if we had to hand pollinate crops. The value of honey [\[See reference 22\]](#) produced in Wales alone is also considerable with a wholesale value in excess of £2 million in 2011.

Figure 5.1: Benefits of Pollinators



5.4 Pollinators are relatively easy to provide for as long as the plants they need at various stages of their life cycle are preserved or retained. Pollinators require food in the form of pollen and nectar foraged from a variety of flowering plant species; and diverse vegetation structure, e.g. hedgerows, scrub and tall grass for shelter, nesting and overwintering such as burrows and holes in tree trunks. In order to support a variety of pollinator species, nectar sources need to be available from early spring through to late autumn.

Figure 5.2: Pollination



Policy context

National

5.5 Well-being of Future Generations (Wales) Act 2015 [See reference 23] recognises the importance that the Welsh Government places on our nature and its biodiversity. Along with six other goals, the Act puts in place the 'Resilient Wales' goal: 'A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change).' All public bodies in Wales will have to work towards this and all of the goals as required under the Act, adopting the principles outlined in the Act.

5.6 Central to the Environment (Wales) Act 2016 [See reference 24] puts in place a new more integrated approach to managing our natural resources in

order to achieve long-term sustainability. Actions for pollinators are delivered through the State of Natural Resources Report [\[See reference 25\]](#), a National Natural Resources Policy [\[See reference 26\]](#) and Area Statements [\[See reference 27\]](#).

5.7 The Nature Recovery Plan for Wales (2015) [\[See reference 28\]](#), sets out Welsh Government's commitment to biodiversity in Wales. It includes objectives for safeguarding species and habitats of principal importance and improving their management and tackling key pressures on species and habitats.

5.8 The Action Plan for Pollinators in Wales [\[See reference 29\]](#) details a Vision for Pollinators in Wales, and puts that into the context of the Welsh Government's priorities and policies. It also lays out an Agenda for Action – the outcomes and areas for action that have been identified and how we will work towards them.

Regional

5.9 The South West Wales Area Statement [\[See reference 30\]](#) identifies the key risks, opportunities and priorities that we all need to address to build the resilience of our ecosystems and support sustainable management of the natural resources. Opportunities identified include targeting the planting of native species and connecting nearby habitats such as grasslands, where species and thrive and spread.

Local

5.10 The Pembrokeshire Local Biodiversity Action Plan [\[See reference 31\]](#) includes information and action plans on the priority habitats and species in Pembrokeshire. It includes visions to maintain and enhance the number and distribution of Marsh Fritillaries and Brown Hairstreak butterflies in Pembrokeshire – two of the county's most notable pollinator species.

Key threats

5.11 There is widespread concern over the status of pollinators, as many insect groups including bees, butterflies, moths and hoverflies have declined dramatically in the UK and globally both in their abundance and diversity. The loss of meadow habitat in Britain has led to half of the 27 species of bumble bee to decline [\[See reference 32\]](#), with three already being extinct. Approximately two thirds of moths are in long term decline and over 70% of butterflies are declining.

5.12 The key threats facing pollinators include habitat loss, climate change and the use of pesticides.

5.13 Habitat loss, notably decline in wildflower rich grasslands, is the most significant cause of pollinator decline. Wales has lost 97 percent [\[See reference 33\]](#) of its wildflower meadows since the 1930s.

5.14 Increased use of pesticides has resulted in a major impact on pollinators and the plants on which they depend. The use of neonicotinoid pesticides are of particular concern with research [\[See reference 34\]](#) showing that even minute traces of these toxic chemicals in crop pollen or wildflowers play havoc with the ability of bees to navigate, with catastrophic consequences for the survival of their colony. Herbicides do not directly harm pollinators, but their excessive use can diminish the supply of flowering plants on which they depend.

5.15 The disruption of seasonal patterns and shifting of flowering periods due to climate change can deprive pollinators of critical food supplies. This is especially true for specialist species who depend on only a few plants. Climate change is predicted to decrease bee species richness by eight to 18 percent [\[See reference 35\]](#) in some areas and it is also known that the geographic range of bumbles is shrinking as their synchrony between flowering plants and their pollinators is being disrupted.

Flagship pollinators in Pembrokeshire

5.16 In Wales, 1500 [\[See reference 36\]](#) species of insect are pollinators. Outlined below are some of the nationally rare and threatened species of pollinators found in Pembrokeshire.

Bees

5.17 The decline of a range of pollinator species more previously widespread in Wales has been well reported. Typically inland populations of, for example, Shril Carder Bee, Brown-banded Bee and the Longhorn Bee [\[See reference 37\]](#) have been lost because remaining areas of lowland semi-natural habitats tend to be small, fragmented and poorly connected, confining remaining populations to coastal habitats. In Wales at least 64 species of bee are in decline. The Pembrokeshire Coast National Park is considered one of the most significant areas for bees in Wales.

Butterflies

5.18 Butterflies are undergoing a serious, long-term and ongoing decline in the UK. The overall pattern suggests 76% of the UK's resident and migrant butterflies have declined in either abundance or occurrence (or both) over the past four decades [\[See reference 38\]](#). In Wales there have been significant decreases in abundance for habitat specialists according to UK Butterfly Monitoring Scheme [\[See reference 39\]](#).

Moths

5.19 Moths are also important contributors to pollination. In Wales there are over 1700 moths [\[See reference 40\]](#) as well as many migrant species.

However, there has been a significant decline in abundance and range of moths.

5.20 In Pembrokeshire, the majority of moth populations are stable although they should still be conserved for their contribution towards pollination. Species of moth found within Pembrokeshire include the six-spot burnet, narrow-bordered five spot burnet, five spot burnet, mint moth, oak egger, eye hawk moth, poplar hawk moth, flame carpet, barred red, puss moth, ruby tiger, cinnabar, red-necked footman, red underwing and flame shoulder moth.

Hoverflies

5.21 Hoverflies have seen a decline across the UK as shown from various data recording schemes. Hoverflies feed exclusively on nectar and pollen which makes them important pollinators. They are able to travel greater distances [\[See reference 41\]](#) than many other pollinator species which adds to their significance within fragmented habitats. Species found in Wales include the marmalade fly, common banded hoverfly, drone-fly and the hornet mimic hoverfly.

Linking with wider initiatives

Bee Friendly Initiative

5.22 Bee Friendly [\[See reference 42\]](#) is the Action Plan for Pollinators Task Force's scheme to encourage organisations and communities throughout Wales to take action to help pollinators. All pollinators are included: honey bees, bumble bees and solitary bees, some wasps, butterflies, moths and hoverflies, and some beetles and flies.

5.23 The Four Goals for Bee Friendly are:

4. Food – providing pollinator-friendly food sources in your area;
5. Five Star accommodation – providing places for insect pollinators to live;
6. Freedom from pesticides and herbicides – committing to avoid chemicals that harm pollinators; and
7. Fun – involving all the community and telling people why you are helping pollinators.

National Monitoring Schemes

5.24 Keeping track of progress of the 11 settlement pollinator strategies are fundamental in sharing and promoting success and learning from potential mistakes. Where relevant, information should be communicated to wildlife organisations or recorded systems. Suggested recording schemes and relevant projects are bullet pointed below.

- UK Pollinator Monitoring Scheme [\[See reference 43\]](#);
- UK Butterfly Monitoring Scheme [\[See reference 44\]](#);
- BeeWalk [\[See reference 45\]](#);
- Get Britain Buzzing [\[See reference 46\]](#);
- Urban Buzz [\[See reference 47\]](#);
- The Great British Bee Count [\[See reference 48\]](#);
- Big Butterfly Count [\[See reference 49\]](#);
- National Moth Night [\[See reference 50\]](#);
- Obsidentify [\[See reference 51\]](#);
- Seek by iNaturalist [\[See reference 52\]](#); and
- iRecord [\[See reference 53\]](#).

Purpose of the pollinator strategies

5.25 The Pollinator Strategies for the 11 settlements all have the same underlying purpose. This is to:

- Outline priority actions that will create, maintain, enhance and connect pollinator habitat;
- Increase the abundance and diversity of pollinator species in the long term;
- Contribute to a thriving and resilient Pembrokeshire-wide pollinator network;
- Describe appropriate actions and methods for management and monitoring; and
- Identify potential delivery partners.

Structure of the pollinator strategies

5.26 The Pollinator Strategies are divided into three sections:

Overarching pollinator strategies

5.27 The overarching pollinator principles [\[See reference 54\]](#) are intended to guide the design and delivery of the pollinator projects identified in the Settlement Management Plans as well as new pollinator projects in the future.

Pollinator Trails

5.28 Pollinator Trails [\[See reference 55\]](#) have been produced for the individual 11 settlements. These include a map showing:

- Key existing pollinator assets;
- Strategic pollinator corridors; and
- Key projects.

5.29 The key projects can be cross referenced between the Settlement Management Plans for each settlement. Some of these are included as the ‘kick starter’ projects for each settlement.

Delivery

5.30 The delivery [\[See reference 56\]](#) section is applicable to all settlements. It outlines the types of factors to consider when managing and maintaining the different types of pollinator-related actions that are included in the Settlement Management Plans.

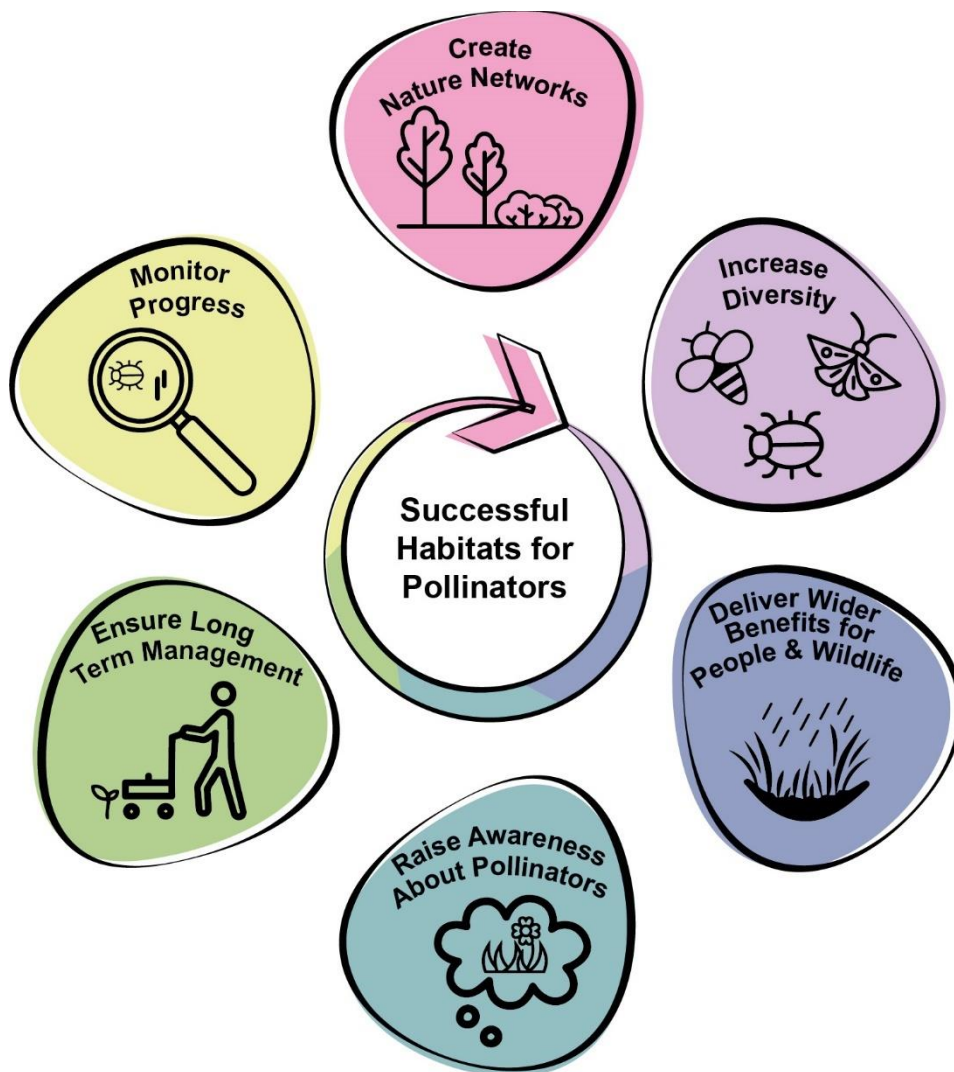
Chapter 6

Overarching Pollinator Principles

6.1 The following section sets out a range of Overarching Pollinator Principles that will inform the design and delivery of protection, enhancement and connection of pollinator habitat within the 11 Settlements. The Overarching Pollinator Principles are supported by a set of Sub-Principles that apply to each Settlements. Clicking the subheadings of each Sub-Principle will expand further explanatory text.

6.2 The Pollinator Principles have been informed by the baseline review of pressures and threats towards pollinators, site visits and consultation with stakeholders.

Figure 6.1: Successful Habitats for Pollinators



1. Create nature networks

1a. Protect and enhance existing pollinator habitat

6.3 Pollinator abundance is usually highest in places where there are existing areas of wildflower-rich grassland, heathland, and woodlands where these are well connected for example by hedgerows or flower-rich margins. Protecting,

and enhancing these existing sites so that they become bigger and better will help buffer them against adjacent land-use pressure and provide greater climate resilience.

1b. Create new pollinator habitat, particularly on embankments and slopes

6.4 More pollinator habitat is needed to create large and stable populations. Embankments and slopes are quick-wins for creation of new habitat as these areas are not in recreational use, less frequently mown and not formally landscaped. Yellow-rattle seed can help reduce grass growth and aid wildflowers establishment.

6.5 Surveying a potential site from March to October will help to understand site constraints and existing pollinator presence to ensure habitat creation is locally appropriate and targeted towards the needs of certain pollinators. The best place to create habitat for pollinators is often in a sheltered sunny spot.

1c. Strengthen connectivity through creation of corridor and stepping-stone habitat

6.6 Smaller patches of pollinator-friendly habitat, including hedges, road verges, ditches and banks help pollinators move across the landscape where there are few linear corridors. Maximising the function of smaller spaces in the urban realm is particularly important to increase the permeability for species movement. This may be by growing plants on a trellis or climbing frame, hanging basket or window boxes.

2. Increase diversity

2a. Choose native plants that are rich in nectar and pollen

6.7 Over the years pollinators have developed alongside native plants that are well adapted to the local growing season, climate, and soils. Many pollinators feed on specific plants because they prefer certain types of flowers.

6.8 Native plants can also reinforce local character and sense of place, for example the Tenby daffodil. In coastal towns, salt tolerant plants will be required. The Local Wildlife Trust or Meadows group may be able to provide seeds from a local source. The composition of the seed mix should be tailored to the soil type and location. For a large area, local green hay could be used as a seed source.

2b. Provide for more than just bees

6.9 There are a diverse range of pollinators that play an essential role in our ecosystems. As well as honeybees, bumble bees and solitary bees, pollinators include some wasps, butterflies, moths and hoverflies, and some beetles and flies. Providing the habitats and conditions required for a broader range of pollinators will create greater resilience in the provision of pollination services.

2c. Provide for pollinators throughout their lifecycle

6.10 Beyond pollen and nectar rich flowers available from March to late September, pollinators need habitats that help with other life stages, including places to shelter and raise their young. For example, dead seed heads and

stems can provide shelter in winter. Earth banks, bare soil, gaps in walls, piles of stones and logs can provide nesting and hibernation sites. Nest sites should be created near flowers, bearing in mind the foraging range of some pollinators is limited to a few metres.

2d. Avoid using pesticides wherever possible and never spray open flowers

6.11 Pesticides kill useful insects as well as pests. Use should be particularly avoided on flowering plants where pollinators are present or near nests. Many pests, weeds and diseases can be controlled without using pesticides, such as weeding by hand instead of spraying. Educating local community on pesticides and herbicides for use in their own gardens will benefit pollinators.

3. Deliver wider benefits for people and wildlife

3a. Provide food and shelter for other taxa

6.12 Creating a diverse range of habitat types and structures can also benefit other species. For example, allowing vegetation to grow long provides food and shelter for birds, other invertebrates and reptiles. Considering the needs of other taxa when designing pollinator habitat can help supporting overall thriving biodiversity.

3b. Integrate pollinator-friendly habitat into wider green infrastructure

6.13 Pollinator friendly habitat can be retrofitted into existing development and/or designed into new development either as standalone habitat or integrated into other green infrastructure assets. For example, if designed and

managed appropriately, grassland edges around SuDS can encourage pollinator-friendly species or water-tolerant wildflowers add to species diversity. Greater shrub planting in town centres can be combined with other measures such as barriers or traffic calming measures to pedestrianise streets and encourage active travel.

4. Raise awareness about the importance of pollinators

4a. Communicate perceived 'messiness'

6.14 Wildflower meadows, verges and deadwood can often be perceived as unmanaged or overgrown. Information signs can help explain that an area is being managed for pollinators. Teaming up with local wildlife and environment groups and displaying additional information on plant and pollinator species that might be seen nearby can help residents and visitors to learn about the local biodiversity and establish a connection to their natural surroundings.

6.15 National and local campaigns, such as Welsh Government's 'It's for Them' campaign [See reference 57] or EcoDewi's 'Mini Meadows' [See reference 58] project can increase recognition and understanding across Pembrokeshire.

4b. Consider 'Bee Friendly' accreditation

6.16 Bee Friendly accreditation provides access to advice and guidance from regional 'Bee Friendly Champions' and signposting to funding sources that could be used to implement pollinator-friendly actions and programmes.

6.17 Organisations and communities which are successful in their accreditation application will be able to use a Bee Friendly logo on their publicity to confirm

that they are part of the scheme. See 'Wider Initiatives' for more information about the scheme.

4c. Create accessible routes to promote nature exploration

6.18 In parks and open spaces, small paths and circular routes can be cut through wildflower meadows which reflect 'desire lines' of park users. Introducing seats, benches and logs to sit on and take in the sights and sounds can help people connect with nature. Clearly marking walked routes in meadows and woodland areas can help leave areas that are undisturbed for nature.

5. Ensure long term management

5a. Engage with schools and community groups

6.19 Good relationships with local people are vital for positive results and a sense of local ownership. Working with community groups and/or schools is a key way to engage with and involve local people in the design and delivery of protection and creation of pollinator habitat, and to widen participation.

5b. Work with large landowners to implement pollinator management

6.20 Over 70% of UK land is farmed in some way, therefore how it is managed has a huge impact on pollinators and biodiversity. The changes in our countryside over recent decades, including a 97% **[See reference 59]** loss of our wildflower meadows have meant that bees and other pollinators are

increasingly reliant on flowering crops and the wildflower mixes planted by farmers.

6.21 Encouraging and educating landowners on creation of pollinator friendly habitat features and the use of effective alternatives [See reference 60] to chemical pesticides and herbicides including encouraging natural predators and companion crops can all benefit pollinators.

5c. Carry out work at a suitable time in the year

6.22 Planting and management work needs to be carried out at suitable times of the year to ensure habitat establishment and to avoid disturbing or harming species. For example, bulbs and trees are best planted in the winter, whilst meadow seed is best sown in the autumn or spring. Hedge cutting should be avoided during the main breeding season for nesting birds, which usually runs throughout March to August each year. This can be weather dependent, and some birds may nest outside this period, so it is important to always check carefully for active nests prior to cutting.

5d. Cut and collect arisings

6.23 It is important to remove arisings from wildflower-rich grasslands to prevent soil enrichment, which favours coarse and competitive plants. This also keeps patches of bare ground accessible to ground-nesting bees. Where possible the arisings should be left in situ for a few days to allow seed to drop to the ground. Delaying cutting until the Autumn and removing vegetation until after the majority of plants have flowered helps extend the time food is available for pollinators. Alternatively, different areas could be cut from mid-July onwards changing which area is cut first each year.

5e. Control and remove invasive species

6.24 Invasive species create competition for space, light and resources to restore foraging and nesting habitats for pollinators. Due to their nature, invasive species are spread easily therefore removal of invasive species requires biosecurity measures to be put in place. It can be labour intensive and costly, although there is scope to include the community with removal. It is highly unlikely that many invasive species will be completely eradicated, often because it grows in inaccessible places, or where chemical and/or manual control is not an option.

6. Monitor progress

6a. Collect monitoring data and adjust management accordingly

6.25 Knowledge is key to people being able to take effective action to protect and sustain pollinator populations. A better understanding of population numbers and where actions are having an effect will enable improved design and implementation of conservation measures.

6b. Submit monitoring data to a national scheme

6.26 Contributing monitoring data to national schemes (such as those listed in 'Wider Initiatives') allows long-term changes in distributions to be tracked and helps support robust evidence-based policy and action. A study found **[See reference 61]** the costs of running nationwide monitoring schemes are more than 70 times lower than the value of pollination services to the UK economy.

Chapter 7

Pollinator Trails for 11 Settlements

7.1 The pollinator trails build on the overarching pollinator principles by outlining the key priorities for action in each settlement.

Fishguard and Goodwick Pollinator Trail

7.2 The Fishguard and Goodwick Pollinator Trail includes:

- Key existing pollinator assets
- Strategic pollinator corridors
- Key projects

7.3 These three aspects are informed by the baseline review, site visits and stakeholder consultation.

7.4 Reflecting Overarching Pollinator Principle [\[See reference 62\]](#) 1a 'Protect and enhance existing pollinator habitat', the key existing pollinator habitat is also provided for each settlement. While these may not be a focus of a key project, they are nonetheless invaluable as part of the pollinator trail and require safeguarding from damage or disturbance.

7.5 The key existing pollinator habitat includes statutory designations, local green space or where existing pollinator projects or initiatives are taking place. The areas included are not exhaustive and there will be other high-value land for pollinators, for example land in private landownership.

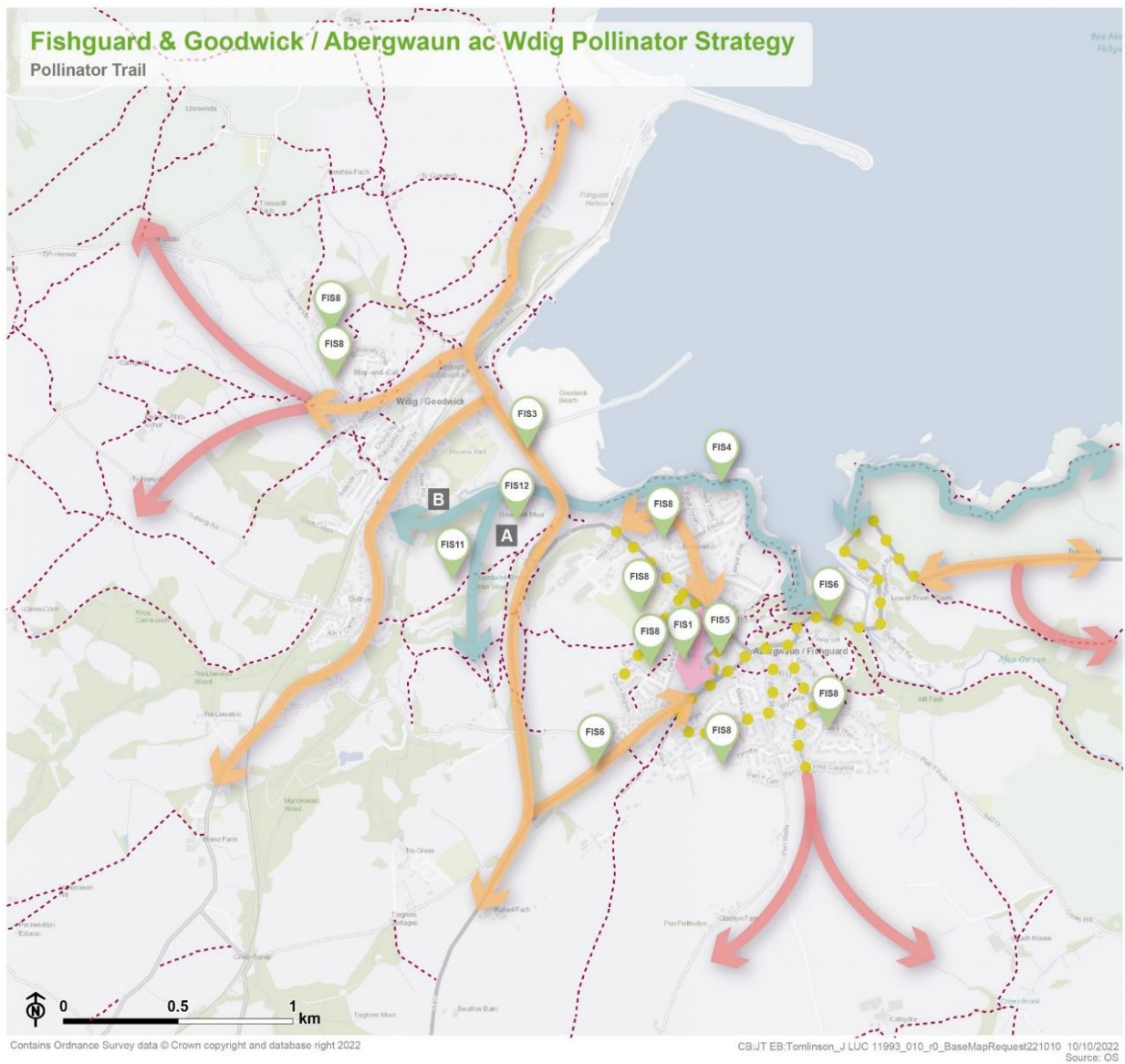
7.6 The different types of strategic pollinator corridors are described in 'Pollinator Trails for 11 Settlements' [\[See reference 63\]](#).

Chapter 7 Pollinator Trails for 11 Settlements

7.7 The Public Rights of Way Network is shown to encourage exploration of nature between the key pollinator assets and along the strategic corridors.

7.8 More information regarding the scope of each key project can be found in the Fishguard and GI Goodwick Management Plan [\[See reference 64\]](#).

Figure 7.1: Fishguard and Goodwick Pollinator Trail



- Key pollinator projects within the GI Management Plan:**
- FIS1** Enhance Lota Park
 - FIS3** Diversify road verges along The Parrog
 - FIS4** Create a pollinator trail at Marine Walk
 - FIS5** Enhance the greening of Chimneys Link Road (Ffordd yr Efail)
 - FIS6** Promote greening of the A487 corridor
 - FIS8** Enhance the biodiversity value of existing greenspaces and playing fields
 - FIS10** Promote community food growing in Goodwick
 - FIS11** Improve the biodiversity value of the playing field south of Goodwick Moors
 - FIS12** Enhance Goodwick Moor

- Key existing pollinator habitat:**
- A** Goodwick Moor Nature Reserve
 - B** Goodwick Community Garden



Haverfordwest Pollinator Trail

7.9 The Haverfordwest Pollinator Trail includes:

- Key existing pollinator assets
- Strategic pollinator corridors
- Key projects

7.10 These three aspects are informed by the baseline review, site visits and stakeholder consultation.

7.11 Reflecting Overarching Pollinator Principle [\[See reference 65\]](#) 1a 'Protect and enhance existing pollinator habitat', the key existing pollinator habitat is also provided for each settlement. While these may not be a focus of a key project, they are nonetheless invaluable as part of the pollinator trail and require safeguarding from damage or disturbance.

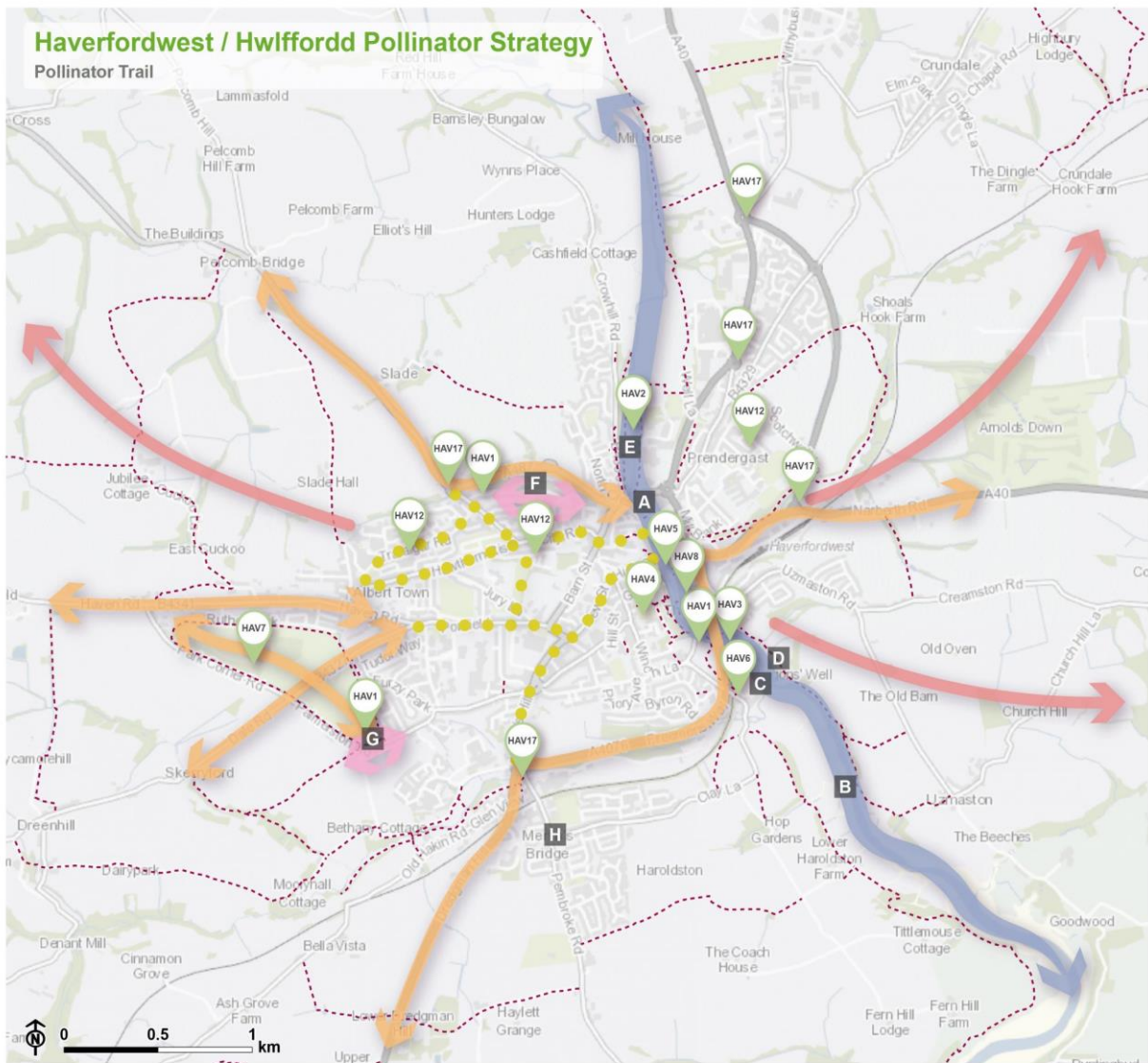
7.12 The key existing pollinator habitat includes statutory designations, local green space or where existing pollinator projects or initiatives are taking place. The areas included are not exhaustive and there will be other high-value land for pollinators, for example land in private landownership.

7.13 The different types of strategic pollinator corridors are described in 'Pollinator Trails for 11 Settlements' [\[See reference 66\]](#).

7.14 The Public Rights of Way Network is shown to encourage exploration of nature between the key pollinator assets and along the strategic corridors.

7.15 More information regarding the scope of each key project can be found in the Haverfordwest GI Management Plan [\[See reference 67\]](#).

Figure 7.2: Haverfordwest Pollinator Trail



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CB:JT EB:Tomlinson_J LUC 11993_010_0_BaseMapRequest221010 10/10/2022 Source: OS

- Key pollinator projects within the GI Management Plan:**
- HAV1** Maintain and enhance the network of orchards
 - HAV2** Extend and enhance Bridge Meadow riparian environment
 - HAV3** Establish a community growing area for people and wildlife
 - HAV4** Manage the medieval 'burgage' gardens as a wildlife haven
 - HAV5** Enhance County Hall
 - HAV6** Maintain and enhance Priory Saltings Meadow
 - HAV7** Establish a racecourse parkland tree trail and promote wildflower meadow establishment
 - HAV8** Introduce orchard and parkland trees adjacent to the skate park
 - HAV12** Promote the greening of Haverfordwest's residential areas
 - HAV17** Enhance green gateways

- Key existing pollinator habitat:**
- A** Western Cleddau River SSSI
 - B** Milford Haven Waterways SSSI
 - C** Priory Saltings Nature Reserve
 - D** Fortunes Frolic
 - E** Bridge Meadow
 - F** Fleming Crescent Orchard
 - G** Racecourse Orchard
 - H** Merlins Bridge Orchard

Edible Corridor	Grassland Corridor
Agricultural Corridor	Habitat Mosaic
Urban Stepping Stone	Public Rights of Way

Milford Haven Pollinator Trail

7.16 The Milford Haven Pollinator Trail includes:

- Key existing pollinator assets
- Strategic pollinator corridors
- Key projects

7.17 These three aspects are informed by the baseline review, site visits and stakeholder consultation.

7.18 Reflecting Overarching Pollinator Principle [\[See reference 68\]](#) 1c 'Protect and enhance existing pollinator habitat', the key existing pollinator habitat is also provided for each settlement. While these may not be a focus of a key project, they are nonetheless invaluable as part of the pollinator trail and require safeguarding from damage or disturbance.

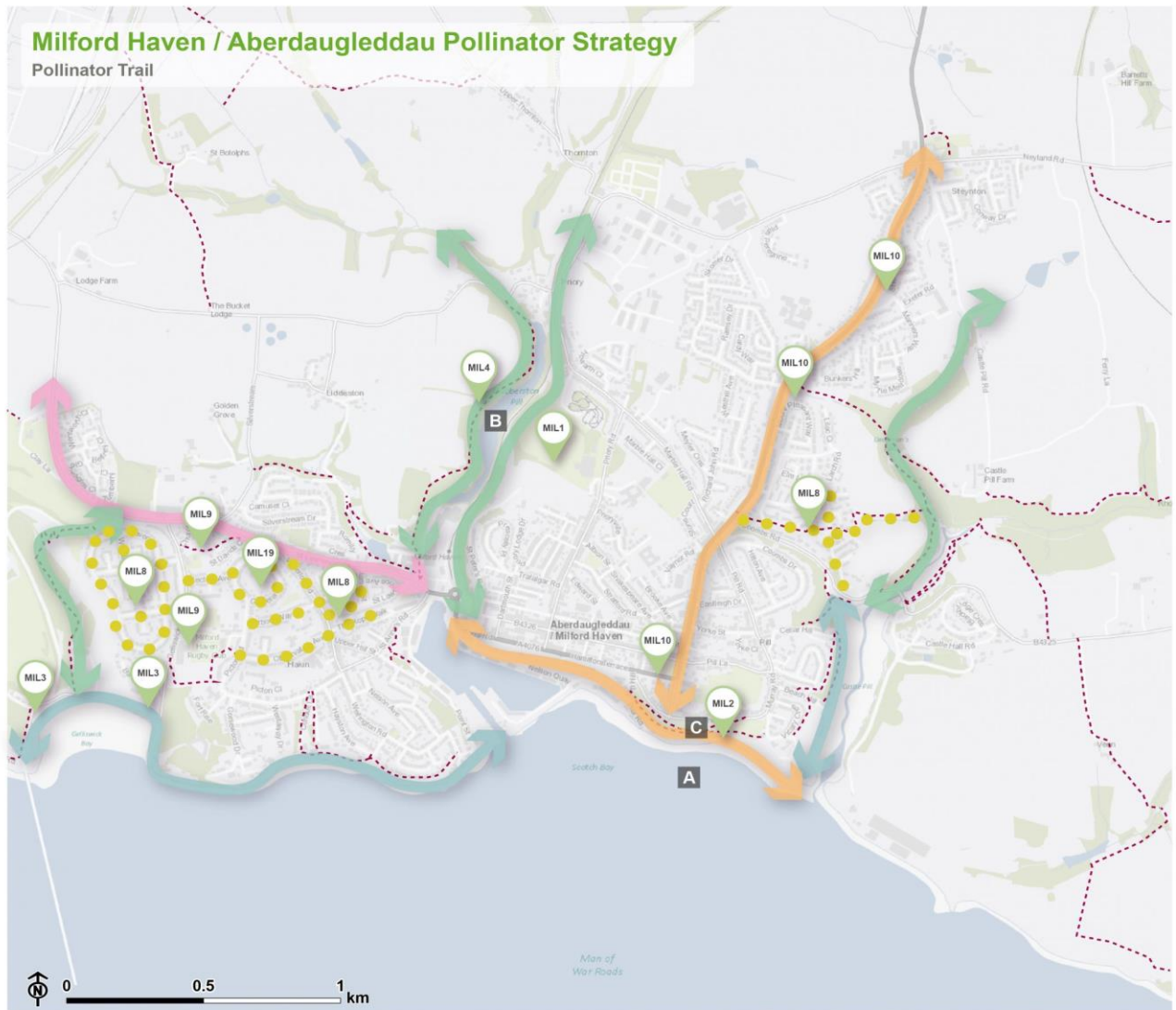
7.19 The key existing pollinator habitat includes statutory designations, local green space or where existing pollinator projects or initiatives are taking place. The areas included are not exhaustive and there will be other high-value land for pollinators, for example land in private landownership.

7.20 The different types of strategic pollinator corridors are described in 'Pollinator Trails for 11 Settlements' [\[See reference 69\]](#).

7.21 The Public Rights of Way Network is shown to encourage exploration of nature between the key pollinator assets and along the strategic corridors.

7.22 More information regarding the scope of each key project can be found in the Milford Haven GI Management Plan [\[See reference 70\]](#).

Figure 7.3: Milford Haven Pollinator Trail



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- MIL1 Key pollinator projects within the GI Management Plan:**
- MIL1** Transform the green space to the rear of Milford Haven Leisure Centre for biodiversity
 - MIL2** Expand the network of wildflower meadows on The Rath
 - MIL3** Enhance Gelliswick Bay greenspace and woodland
 - MIL4** Promote the enhanced management of Hubberston Pill Woods
 - MIL8** Promote the greening of housing estates
 - MIL9** Create a Hubberston to Hakin nature corridor
 - MIL10** Strengthen the A4076 as a green corridor
 - MIL19** Enhance the biodiversity and recreational value of Glebelands
 - MIL20** Promote community food growing in Milford Haven

Key existing pollinator habitat:

- A** Milford Waterways SSSI
- B** Hubberston Pill
- C** The Rath

Edible Corridor	Woodland Corridor
Wetland / Marine Corridor	Grassland Corridor
Urban Stepping Stone	Public Rights of Way

Narberth Pollinator Trail

7.23 The Narberth Pollinator Trail includes:

- Key existing pollinator assets
- Strategic pollinator corridors
- Key projects

7.24 These three aspects are informed by the baseline review, site visits and stakeholder consultation.

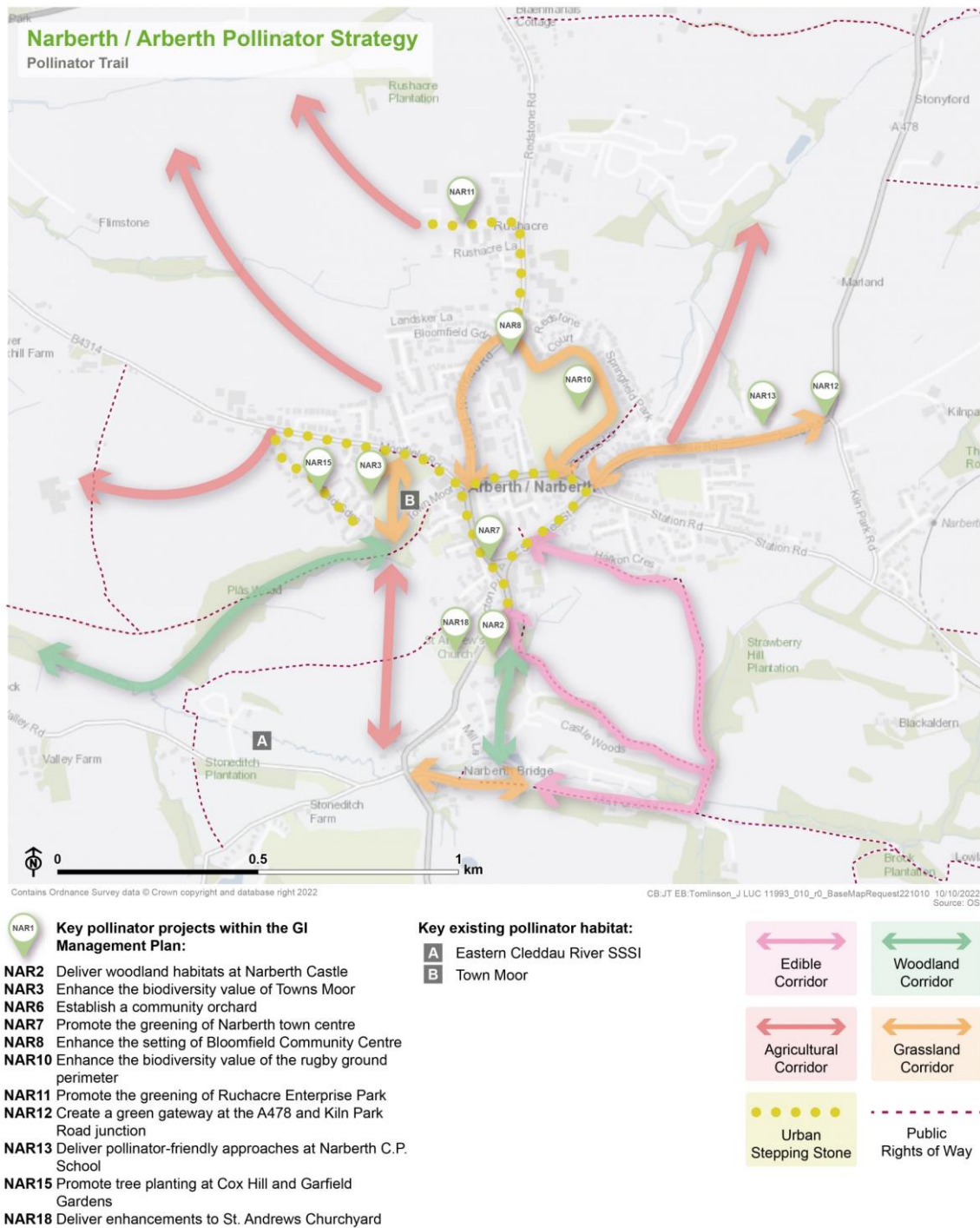
7.25 Reflecting Overarching Pollinator Principle **[See reference 71]** 1a 'Protect and enhance existing pollinator habitat', the key existing pollinator habitat is also provided for each settlement. While these may not be a focus of a key project, they are nonetheless invaluable as part of the pollinator trail and require safeguarding from damage or disturbance. The key existing pollinator habitat includes statutory designations, local green space or where existing pollinator projects or initiatives are taking place. The areas included are not exhaustive and there will be other high-value land for pollinators, for example land in private landownership.

7.26 The different types of strategic pollinator corridors are described in 'Pollinator Trails for 11 Settlements' **[See reference 72]**.

7.27 The Public Rights of Way Network is shown to encourage exploration of nature between the key pollinator assets and along the strategic corridors.

7.28 More information regarding the scope of each key project can be found in the Narberth GI Management Plan **[See reference 73]**.

Figure 7.4: Narberth Pollinator Trail



Newport Pollinator Trail

7.29 The Newport Pollinator Trail includes:

- Key existing pollinator assets
- Strategic pollinator corridors
- Key projects

7.30 These three aspects are informed by the baseline review, site visits and stakeholder consultation.

7.31 Reflecting Overarching Pollinator Principle [\[See reference 74\]](#) 1a 'Protect and enhance existing pollinator habitat', the key existing pollinator habitat is also provided for each settlement. While these may not be a focus of a key project, they are nonetheless invaluable as part of the pollinator trail and require safeguarding from damage or disturbance.

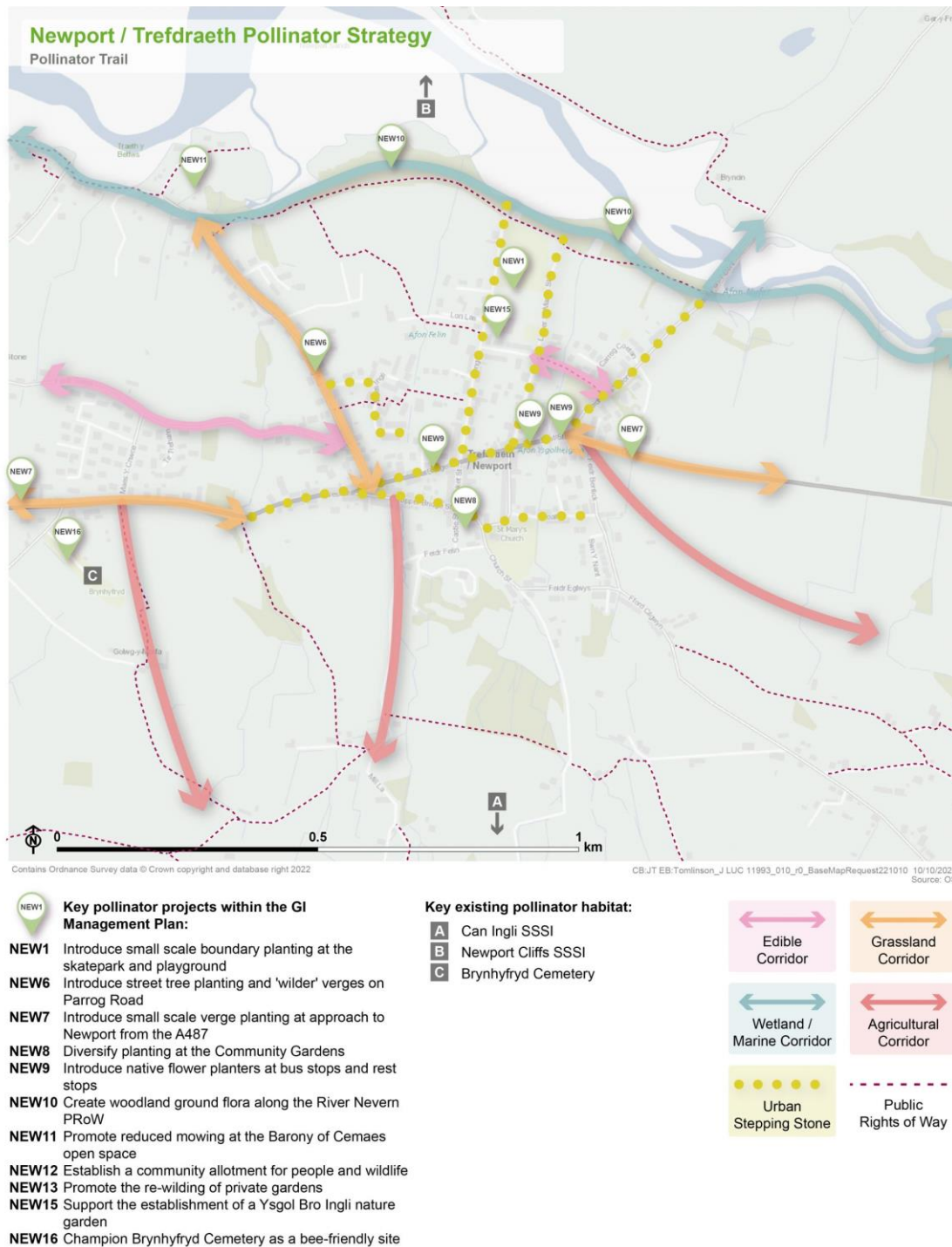
7.32 The key existing pollinator habitat includes statutory designations, local green space or where existing pollinator projects or initiatives are taking place. The areas included are not exhaustive and there will be other high-value land for pollinators, for example land in private landownership.

7.33 The different types of strategic pollinator corridors are described in 'Pollinator Trails for 11 Settlements' [\[See reference 75\]](#).

7.34 The Public Rights of Way Network is shown to encourage exploration of nature between the key pollinator assets and along the strategic corridors.

7.35 More information regarding the scope of each key project can be found in the Newport GI Management Plan.

Figure 7.5: Newport Pollinator Trail



Neyland Pollinator Trail

7.36 The Neyland Pollinator Trail includes:

- Key existing pollinator assets
- Strategic pollinator corridors
- Key projects

7.37 These three aspects are informed by the baseline review, site visits and stakeholder consultation.

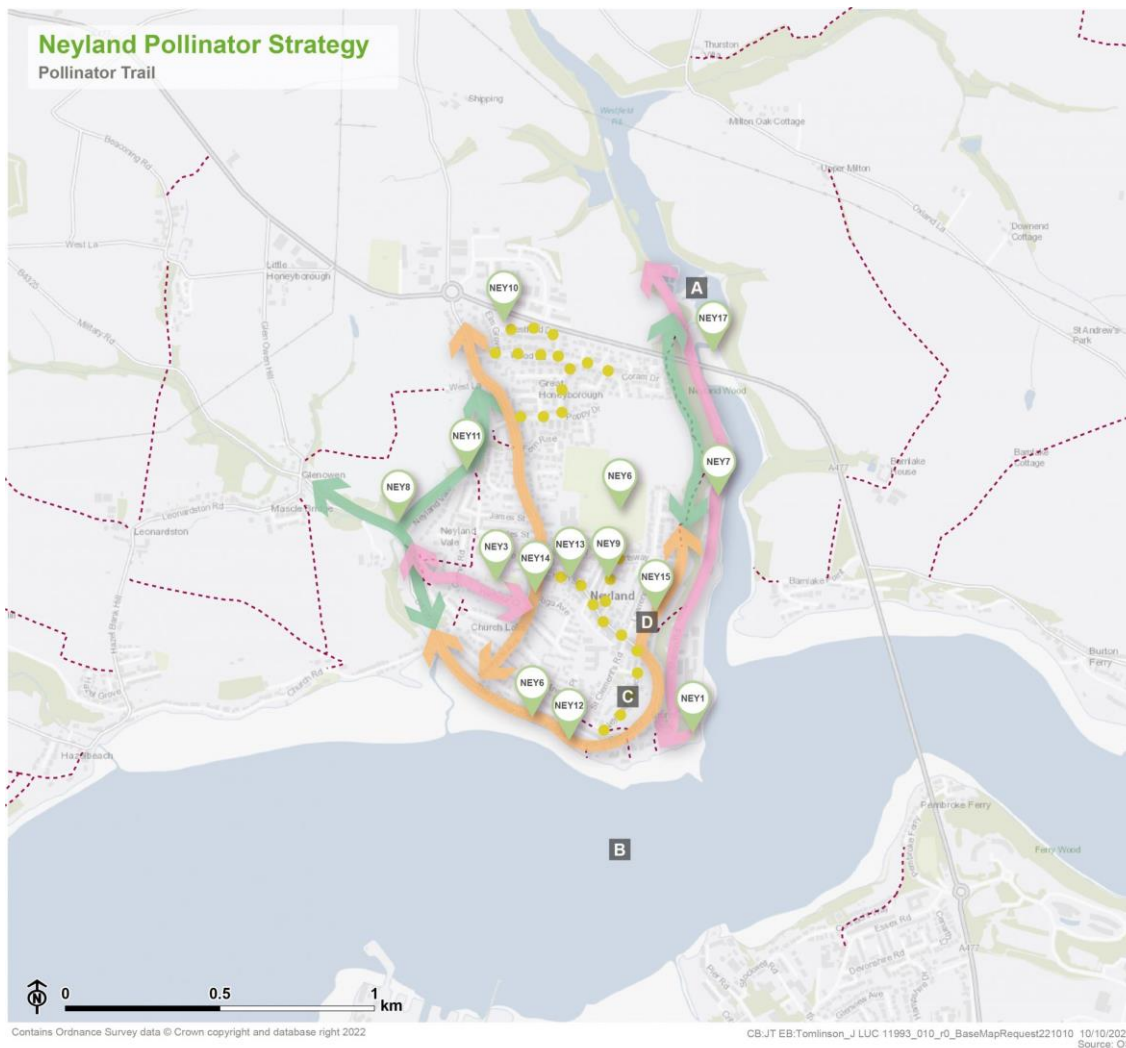
7.38 Reflecting Overarching Pollinator Principle [\[See reference 76\]](#) 1a 'Protect and enhance existing pollinator habitat', the key existing pollinator habitat is also provided for each settlement. While these may not be a focus of a key project, they are nonetheless invaluable as part of the pollinator trail and require safeguarding from damage or disturbance. The key existing pollinator habitat includes statutory designations, local green space or where existing pollinator projects or initiatives are taking place. The areas included are not exhaustive and there will be other high-value land for pollinators, for example land in private landownership.

7.39 The different types of strategic pollinator corridors are described in 'Pollinator Trails for 11 Settlements' [\[See reference 77\]](#).

7.40 The Public Rights of Way Network is shown to encourage exploration of nature between the key pollinator assets and along the strategic corridors.

7.41 More information regarding the scope of each key project can be found in the Neyland GI Management Plan [\[See reference 78\]](#).

Figure 7.6: Neyland Pollinator Trail



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- Key pollinator projects within the GI Management Plan:**
- NEY1** Enhance the greening of Brunel Quay
 - NEY3** Enhance Harbour Close Park
 - NEY6** Improve access to the council owned green space to the rear of the Athletic Ground
 - NEY7** Create a pollinator pathway along the Brunel Trail
 - NEY8** Enhance habitat and access at Neyland Vale Common
 - NEY9** Expand the number of native flowerbeds
 - NEY10** Enhance the biodiversity value of Westfield Drive green space
 - NEY11** Introduce wildflower meadows and trees at Honeyborough Green
 - NEY12** Create wildflower verges along The Promenade
 - NEY13** Enhance greening of the High Street
 - NEY14** Promote the greening of Riverside Avenue
 - NEY15** Provide access and biodiversity enhancements to the Cambrian Road green space
 - NEY17** Extend Westfield Pill Nature Reserve

- Key existing pollinator habitat:**
- A** Westfield Pill Nature Reserve
 - B** Milford Haven Waterways SSSI
 - C** Neyland Terrace flowerbeds
 - D** Railway Terrace flowerbeds

Edible Corridor	Woodland Corridor
Grassland Corridor	Urban Stepping Stone
Public Rights of Way	

Pembroke Pollinator Trail

7.42 The Pembroke Pollinator Trail includes:

- Key existing pollinator assets
- Strategic pollinator corridors
- Key projects

7.43 These three aspects are informed by the baseline review, site visits and stakeholder consultation.

7.44 Reflecting Overarching Pollinator Principle [\[See reference 79\]](#) 1a 'Protect and enhance existing pollinator habitat', the key existing pollinator habitat is also provided for each settlement. While these may not be a focus of a key project, they are nonetheless invaluable as part of the pollinator trail and require safeguarding from damage or disturbance.

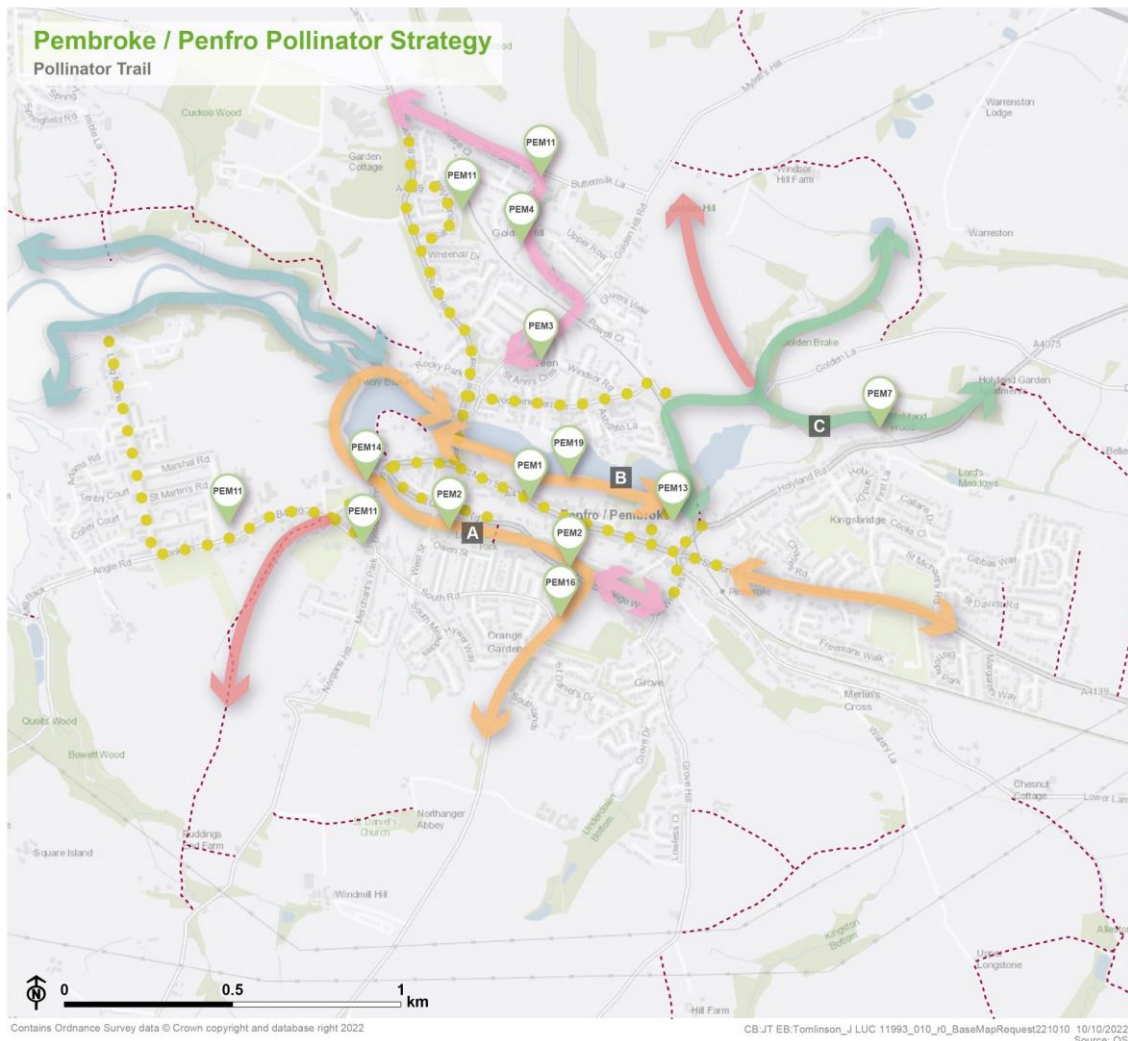
7.45 The key existing pollinator habitat includes statutory designations, local green space or where existing pollinator projects or initiatives are taking place. The areas included are not exhaustive and there will be other high-value land for pollinators, for example land in private landownership.

7.46 The different types of strategic pollinator corridors are described in 'Pollinator Trails for 11 Settlements' [\[See reference 80\]](#).

7.47 The Public Rights of Way Network is shown to encourage exploration of nature between the key pollinator assets and along the strategic corridors.

7.48 More information regarding the scope of each key project can be found in the Pembroke GI Management Plan.

Figure 7.7: Pembroke Pollinator Trail



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- Key pollinator projects within the GI Management Plan:**
- PEM1** Enhance the greening of Main Street and Pembroke's AQMA
 - PEM2** Enhance biodiversity and natural flood management at Pembroke Commons
 - PEM3** Enhance local biodiversity and landscape character of The Green
 - PEM4** Introduce a community orchard at Devon Drive
 - PEM7** Enhance habitat diversity at Holyland Wood
 - PEM11** Enhance the biodiversity potential and aesthetic interest of local amenity sites
 - PEM13** Enhance Barnard's Tower
 - PEM14** Create a wildlife garden and gallery
 - PEM16** Enhance biodiversity at South Road / St Daniel's Hill / A4139 junction
 - PEM19** Enhance the biodiversity value of Mill Pond Walk

- Key existing pollinator habitat:**
- A** Upper and Lower Common Park
 - B** Pembroke Mill Pond Local Nature Reserve
 - C** Holyland Wood

Edible Corridor	Woodland Corridor
Wetland / Marine Corridor	Grassland Corridor
Agricultural Corridor	Urban Stepping Stone
Public Rights of Way	

Pembroke Dock Pollinator Trail

7.49 The Pembroke Dock Pollinator Trail includes:

- Key existing pollinator assets
- Strategic pollinator corridors
- Key projects

7.50 These three aspects are informed by the baseline review, site visits and stakeholder consultation.

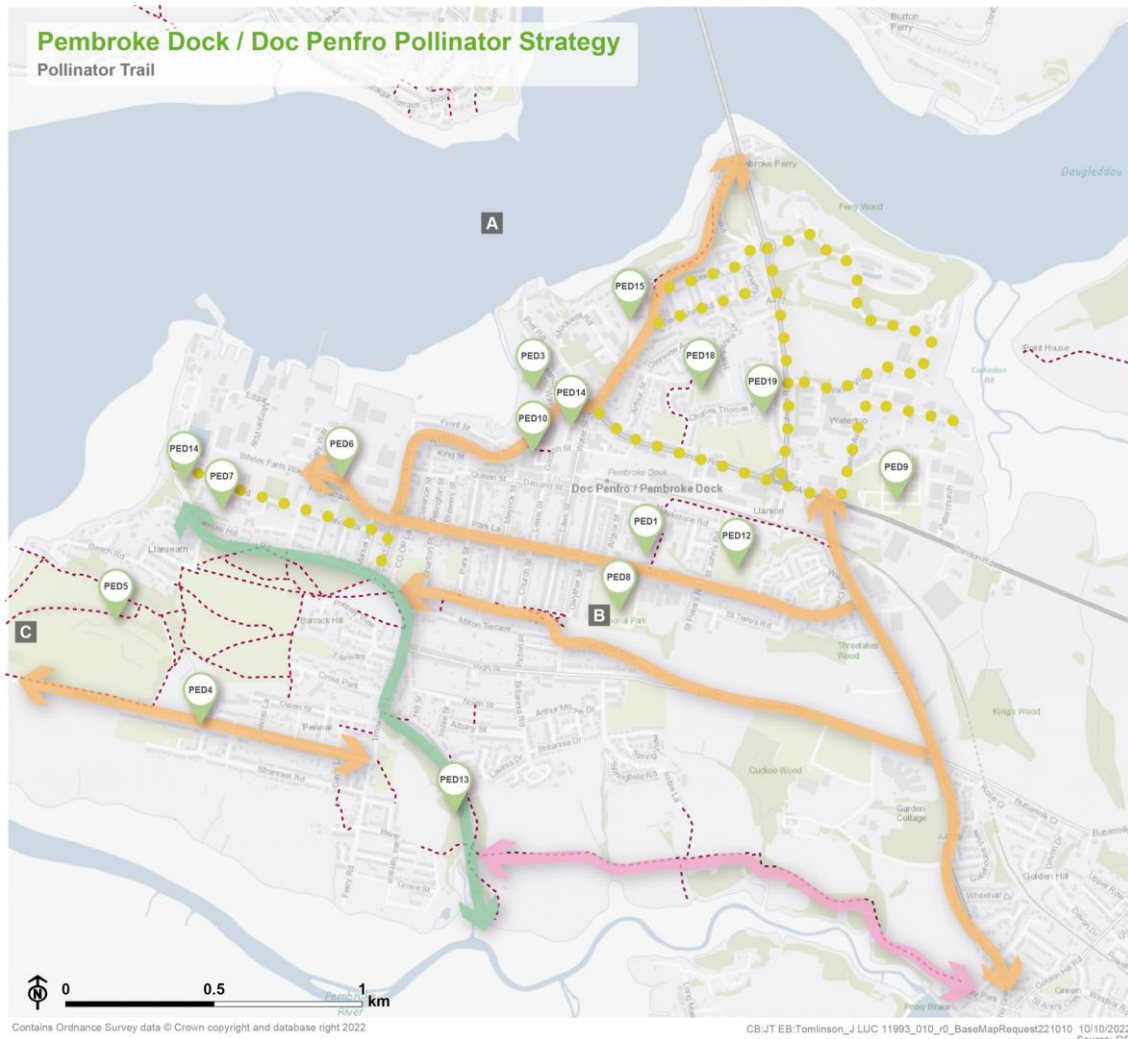
7.51 Reflecting Overarching Pollinator Principle [\[See reference 81\]](#) 1a 'Protect and enhance existing pollinator habitat', the key existing pollinator habitat is also provided for each settlement. While these may not be a focus of a key project, they are nonetheless invaluable as part of the pollinator trail and require safeguarding from damage or disturbance. The key existing pollinator habitat includes statutory designations, local green space or where existing pollinator projects or initiatives are taking place. The areas included are not exhaustive and there will be other high-value land for pollinators, for example land in private landownership.

7.52 The different types of strategic pollinator corridors are described in 'Pollinator Trails for 11 Settlements' [\[See reference 82\]](#).

7.53 The Public Rights of Way Network is shown to encourage exploration of nature between the key pollinator assets and along the strategic corridors.

7.54 More information regarding the scope of each key project can be found in the Pembroke Dock GI Management Plan [\[See reference 83\]](#).

Figure 7.8: Pembroke Dock Pollinator Trail



- Key pollinator projects within the GI Management Plan:**
- PED1** Rejuvenate Pembroke Dock Youth Club playground
 - PED3** Enhance Western Way Green for people and pollinators
 - PED4** Create a wildlife corridor along Military Road
 - PED5** Create wildlife stepping stones at the South Pembrokeshire Golf Course
 - PED6** Revive Carriage Drive
 - PED7** Create a wildlife garden at South Pembrokeshire Hospital
 - PED8** Enhance biodiversity at Memorial Park
 - PED9** Enhance the biodiversity of Pembroke Dock Cemetery
 - PED10** Enhance the greening of land to the rear of ASDA
 - PED12** Enhance the biodiversity value of Bush Street playing field
 - PED13** Promote increased biodiversity value of Sykemoor Valley
 - PED14** Enhance the greening of car parks
 - PED15** Create wildflower meadows at PCNPA HQ
 - PED18** Enhance the biodiversity value of Military Cemetery
 - PED19** Enhance the recreational and biodiversity value of public open space on Charles Thomas Avenue

- Key existing pollinator habitat:**
- A** Milford Haven Waterway SSSI
 - B** Memorial Park
 - C** Pennar Point



Saundersfoot Pollinator Trail

7.55 The Saundersfoot Pollinator Trail includes:

- Key existing pollinator assets
- Strategic pollinator corridors
- Key projects

7.56 These three aspects are informed by the baseline review, site visits and stakeholder consultation.

7.57 Reflecting Overarching Pollinator Principle [\[See reference 84\]](#) 1a 'Protect and enhance existing pollinator habitat', the key existing pollinator habitat is also provided for each settlement. While these may not be a focus of a key project, they are nonetheless invaluable as part of the pollinator trail and require safeguarding from damage or disturbance.

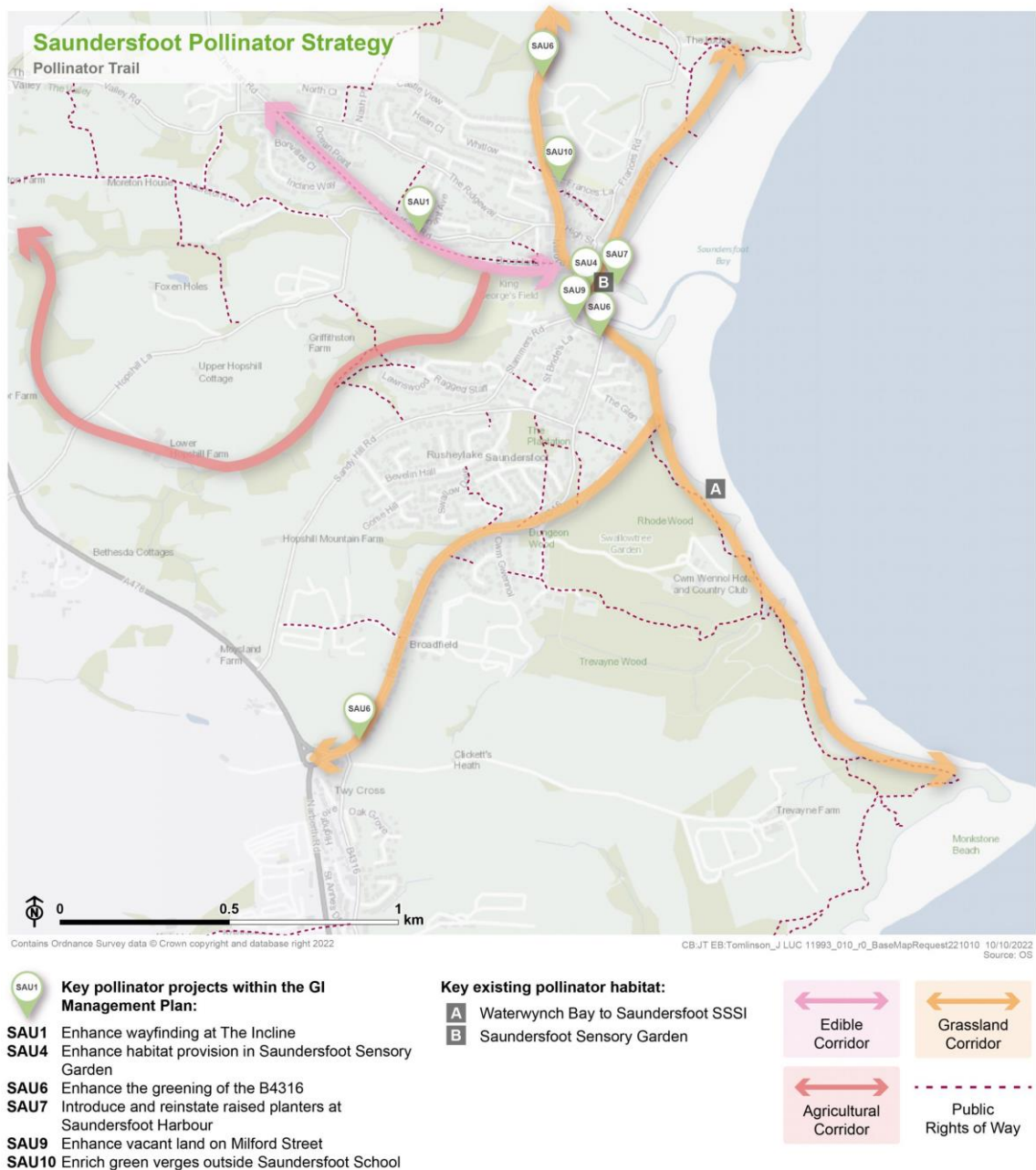
7.58 The key existing pollinator habitat includes statutory designations, local green space or where existing pollinator projects or initiatives are taking place. The areas included are not exhaustive and there will be other high-value land for pollinators, for example land in private landownership.

7.59 The different types of strategic pollinator corridors are described in 'Pollinator Trails for 11 Settlements' [\[See reference 85\]](#).

7.60 The Public Rights of Way Network is shown to encourage exploration of nature between the key pollinator assets and along the strategic corridors.

7.61 More information regarding the scope of each key project can be found in the Saundersfoot GI Management Plan [\[See reference 86\]](#).

Figure 7.9: Saundersfoot Pollinator Trail



St Davids Pollinator Trail

7.62 The St Davids Pollinator Trail includes:

- Key existing pollinator assets

- Strategic pollinator corridors
- Key projects

7.63 These three aspects are informed by the baseline review, site visits and stakeholder consultation.

7.64 Reflecting Overarching Pollinator Principle [\[See reference 87\]](#) 1a ‘Protect and enhance existing pollinator habitat’, the key existing pollinator habitat is also provided for each settlement. While these may not be a focus of a key project, they are nonetheless invaluable as part of the pollinator trail and require safeguarding from damage or disturbance.

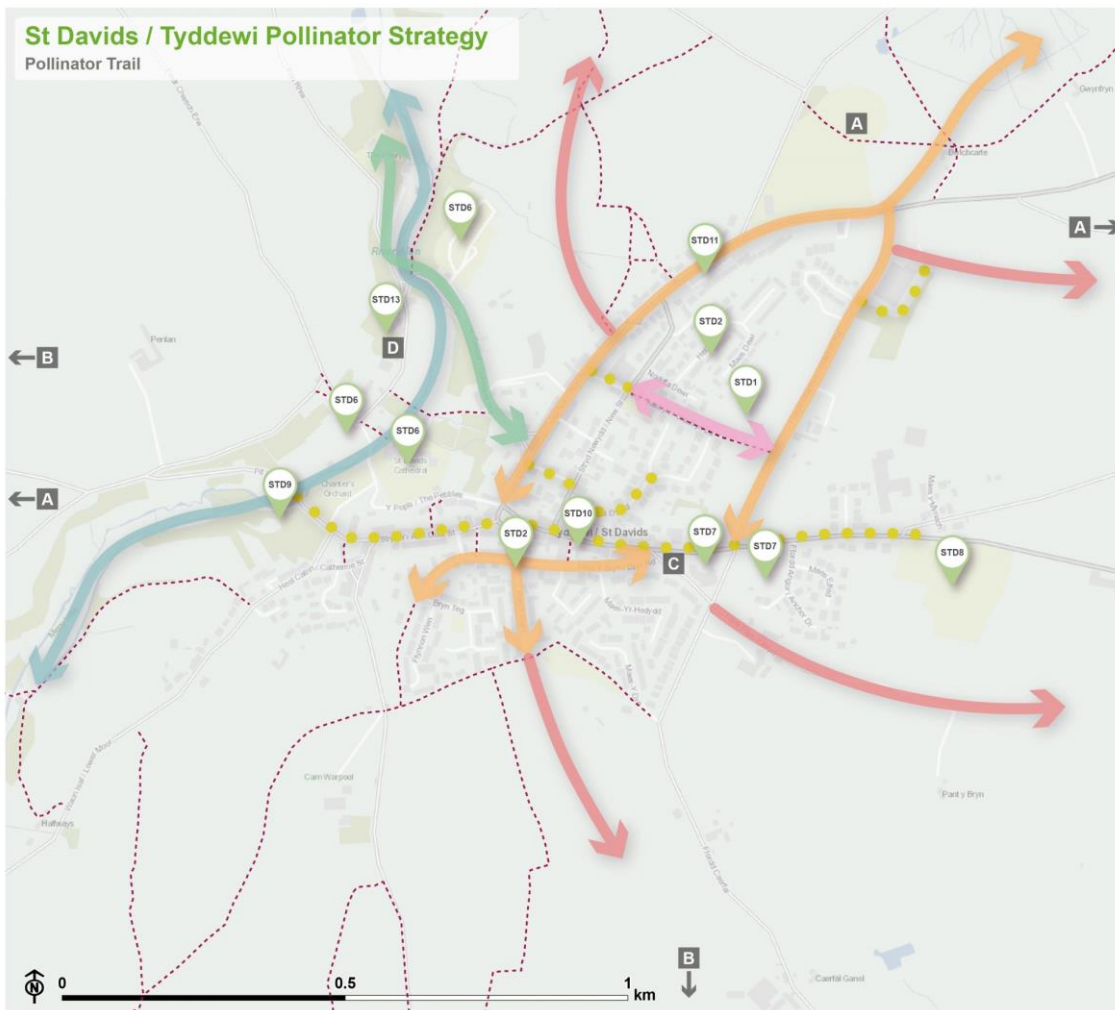
7.65 The key existing pollinator habitat includes statutory designations, local green space or where existing pollinator projects or initiatives are taking place. The areas included are not exhaustive and there will be other high-value land for pollinators, for example land in private landownership.

7.66 The different types of strategic pollinator corridors are described in ‘Pollinator Trails for 11 Settlements’ [\[See reference 88\]](#).

7.67 The Public Rights of Way Network is shown to encourage exploration of nature between the key pollinator assets and along the strategic corridors.

7.68 More information regarding the scope of each key project can be found in the St David GI Management Plan [\[See reference 89\]](#).

Figure 7.10: St Davids Pollinator Trail



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CB:JT EB:Tomlinson_J LUC 11993_010_r0_BaseMapRequest221010 10/10/2022 Source: OS

- Key pollinator projects within the GI Management Plan:**
- STD1** Deliver a new community growing space / allotments on Glasfryn Road
 - STD2** Introduce urban greening within existing residential areas
 - STD6** Enhance the setting of St Davids Cathedral, the Bishop's Palace, and the Cemetery for pollinators
 - STD7** Develop pollinator provision at Oriol y Parc Gallery and Visitor Centre
 - STD8** Enhance the habitat potential of sports pitches at Ysgol Penrhyn Dewi
 - STD9** Enrich existing habitat at Merivale Car Park / Bishop's Palace
 - STD10** Address gaps in St Davids Pollinator Trail
 - STD11** Enhance the greening of Nun Street
 - STD13** Locally promote community food growing opportunities

- Key existing pollinator habitat:**
- A** North Pembrokeshire Commons SAC
 - B** St Davids SAC
 - C** Bee Friendly St Davids Pollinator Trail
 - D** Dewi's Acre, St Davids Community Garden

	Edible Corridor		Woodland Corridor
	Wetland / Marine Corridor		Grassland Corridor
	Agricultural Corridor		Urban Stepping Stone
Public Rights of Way			

Tenby Pollinator Trail

7.69 The Tenby Pollinator Trail includes:

- Key existing pollinator assets
- Strategic pollinator corridors
- Key projects

7.70 These three aspects are informed by the baseline review, site visits and stakeholder consultation.

7.71 Reflecting Overarching Pollinator Principle [\[See reference 90\]](#) 1a 'Protect and enhance existing pollinator habitat', the key existing pollinator habitat is also provided for each settlement. While these may not be a focus of a key project, they are nonetheless invaluable as part of the pollinator trail and require safeguarding from damage or disturbance.

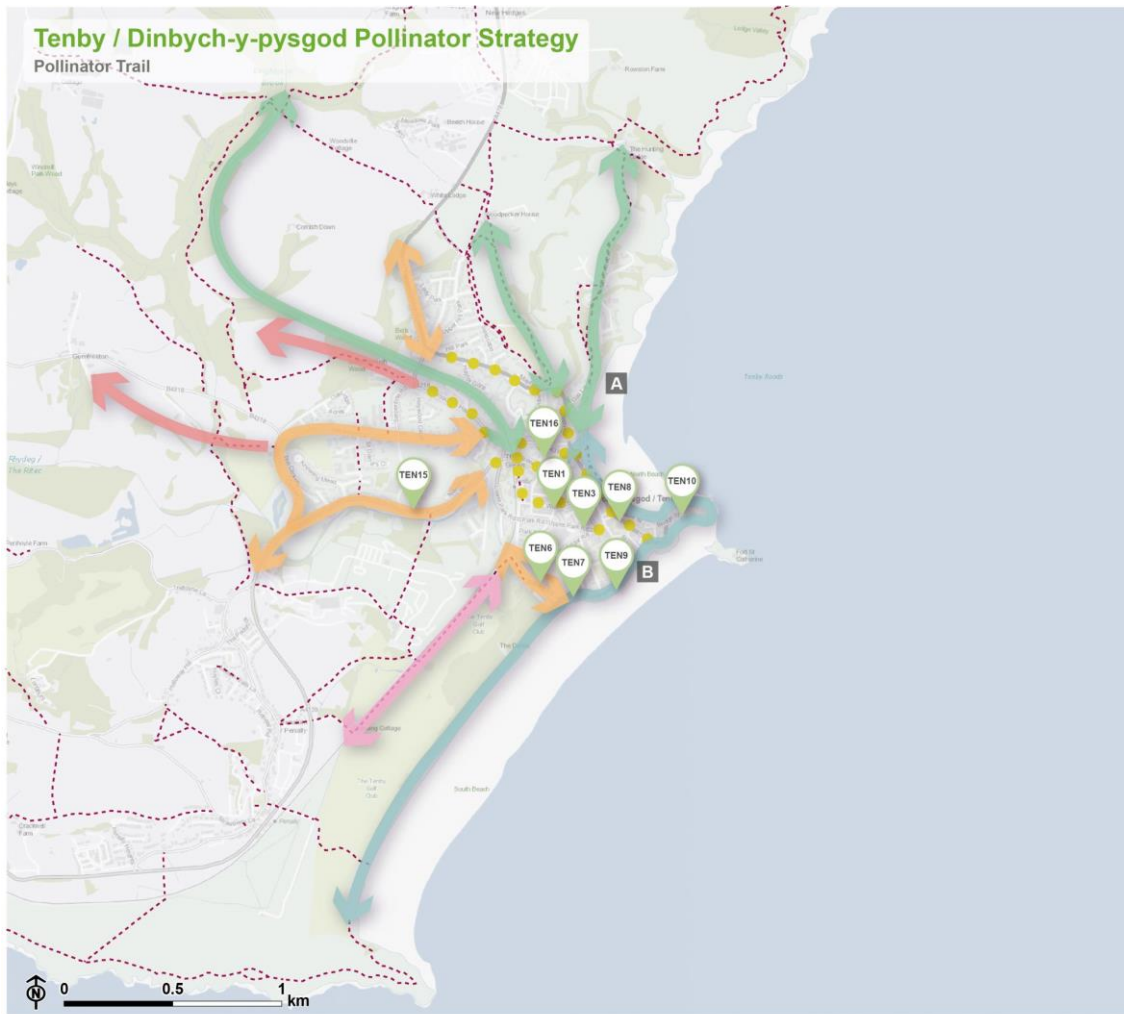
7.72 The key existing pollinator habitat includes statutory designations, local green space or where existing pollinator projects or initiatives are taking place. The areas included are not exhaustive and there will be other high-value land for pollinators, for example land in private landownership.

7.73 The different types of strategic pollinator corridors are described in 'Pollinator Trails for 11 Settlements' [\[See reference 91\]](#).

7.74 The Public Rights of Way Network is shown to encourage exploration of nature between the key pollinator assets and along the strategic corridors.

7.75 More information regarding the scope of each key project can be found in the Tenby GI Management Plan [\[See reference 92\]](#).

Figure 7.11: Tenby Pollinator Trail



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- Key pollinator projects within the GI Management Plan:**
- TEN1 Promote greening of the Transport Hub
 - TEN3 Deliver greening interventions at the Town Wall
 - TEN6 Enhance the Battery Gardens for pollinators
 - TEN7 Encourage the establishment of pollinator-friendly flowering plants at Jubilee Gardens
 - TEN8 Increase biodiversity at St Mary's Church
 - TEN9 Introduce native planting along the Esplanade
 - TEN10 Provide a pollinator haven at Tenby Castle
 - TEN15 Create a pollinator bank at Ysgol Greenhill School
 - TEN16 Deliver a growing space at St Telios Primary School
 - TEN22 Promote community food growing in Tenby

- Key existing pollinator habitat:**
- A Tenby Cliffs & St Catherine's Island SSSI
 - B Lydstep Head to Tenby Burrows SSSI

Edible Corridor	Woodland Corridor
Wetland / Marine Corridor	Grassland Corridor
Agricultural Corridor	Urban Stepping Stone
Public Rights of Way	

Strategic pollinator corridors

7.76 For each of the 11 settlements, strategic pollinator corridors have been identified. These corridors are a key component of wider ecological networks, connecting core pollinator areas and stepping stone habitats. They enable species to move, disperse, migrate and reproduce and become more resilient to threats such as climate change and loss of habitat.

7.77 These corridors also reflect focus opportunity areas for improving connectivity for pollinators, for example a wide continuous grass verge that is currently closely mown but has potential for enhancement. These have been identified using pollinator habitat suitability modelling and B-Lines data sets, as well as site visits and aerial imagery.

7.78 Generic actions to strengthen the function and continuity of these corridors are outlined below.

7.79 Areas outside of the strategic corridors may still have potential importance for pollinators and should still be considered as part of proposals for creating, enhancing and connecting pollinator habitat.

Woodland corridors

7.80 Floral resources for pollinators are often in short supply early in the year before the main flowering period of herbaceous plants in road verges, field margins and meadows. At this time of year, flowering shrubs and trees in woods, as well as woodland ground flora such as bluebells, wood anemones, violets can provide valuable sources of nectar and pollen.

7.81 Creating a few metres of uncultivated or unmown habitat along woodland edges where hogweed, cow parsley, thistles, knapweeds ragwort and some bramble can grow will benefit pollinators. Rides and clearings can extend this open habitat supporting the warm and sunny conditions that pollinators prefer.

Creation of coppiced areas, dead wood, exposed root plates, varied topography and wet woodland can also provide habitat for pollinators at various stages of their life cycle.

Edible corridors

7.82 Community gardens and edible corridors can provide excellent pollinator habitat but also serve the local community for foraging opportunities and recreational usage. It can reduce the impact of food poverty in low-income areas and allow residents greater access to nutritious food.

7.83 Planting of fruit trees, flowering vegetables and herbs, replacing ornamental hedgerows or filling gaps in hedgerows with native species that fruit berries or nuts will provide for people and pollinators. National Botanic Garden of Wales has produced the top 50 [\[See reference 93\]](#) edible plants for pollinators. This provides a selection of fruit trees, to grow for food whilst attracting pollinators. Species which could be planted include apple, pear, bramble, elder, plum and hazelnut.

Wetland or marine corridors

7.84 Wet features such as canals and balancing pools with marginal swamp, along with ditches support wetland flowers such as Marsh marigold, Marsh woundwort, Meadowsweet and Great willowherb, all of which are good sources of pollen and nectar.

7.85 Many hoverflies require 'hoverfly lagoons' for their aquatic larval life stage. Ponds or wet habitat can support the larvae of pollinators such as drone flies and can also provide flowering features if the right plants are used e.g. water mint, purple loosestrife, angelica and marsh woundwort which benefit other pollinators too.

7.86 Marine corridors are most commonly those atop cliff faces or on the seashore where plants will be more highly exposed to salt spray in the air and salt accumulation in the soil. Salt tolerant native plants should be planted to ensure successful establishment. As many of the settlements are coastal salt tolerance will also be a factor to consider for some identified grassland corridors.

Grassland corridors

7.87 Wildflower-rich grasslands are essential for many pollinating insects. Grasslands on less fertile soils can be incredibly flower-rich, with species such as bird's-foot trefoils, Cowslip, Oxeye daisy, bedstraws and orchids.

7.88 One of the easiest way to promote a pollination corridor is by changing mowing regimes. Road verges, embankments, slopes and perimeters or corners of open spaces can all be cut less frequently to allow plants to flower. Cutting regimes should aim to find a balance between safety, amenity and the needs of pollinators/wildlife.

7.89 Marshy grasslands, such as the Molinia meadows found at North West Pembrokeshire Commons SAC are also extremely valuable to pollinators. Maintaining appropriate grazing regime will be required to achieve a species-rich sward community that supports a diverse number of pollinator.

Agricultural corridors

7.90 The edges of arable fields are ideal locations for increasing pollinator habitat and connectivity into the wider countryside. They are often less fertile, less productive or inaccessible to modern farm machinery, and so considered less valuable for crop production. Establishing a mix of legumes and native wildflowers in plots or strips in or around arable fields can provide pollinating insects with good sources of pollen and nectar from March through to October.

7.91 The margins will work best in combination with sensitive hedgerow management to provide early sources of pollen and nectar from flowering hawthorn and blackthorn. Hedges provide flowers, shelter from wind, food plants for pollinator larvae and overwintering sites in the hedge bottoms.

7.92 Most agricultural land will have potential for restoration or enhancement of pollinator habitat features. This will often require engagement with private landowners. These corridors are intended to indicate general permeability into the agricultural matrix rather than a specifically spatially defined corridor.

Habitat mosaic corridors

7.93 In some cases, natural corridors through the landscape e.g. river corridors, will take in many different types of habitats, such as mosaics of wetland, wet grassland, species-rich grassland, tall-herb communities, scrub, heathland and scattered pockets of woodland. A variety of features supporting pollinators can be enhanced and created, such as dead wood, bare earth, habitat piles, varied grass swards, leaf litter, open bracken and scrub.

Urban stepping stones

7.94 Where space is limited, adding more diverse planters, flowerbeds and hanging baskets to the public realm and housing estates can provide good sources of pollen and nectar from spring to autumn, safe places to breed and overwinter and safe flyways. Walls and bridges can support native flowering climbers such as Ivy and Honeysuckle. Old brickwork and stonework also has its own flowery habitat with Oxford ragwort, Red valerian, Ivy-leaved toadflax and Elder.

7.95 They can also provide a range of other benefits, including improving air quality by filtering pollutants and improving mental and physical health by bringing people closer to nature through creating inviting green spaces. It can also increase economic benefits as the addition of plants, flowers and shrubs

Chapter 7 Pollinator Trails for 11 Settlements

help cultivate a positive environment attracting more customers to towns and potentially increase property values.

Chapter 8

Delivery- Pollinator Strategies

8.1 The Settlement Pollinator Trails [\[See reference 94\]](#) include a variety of actions to create, restore, enhance and connect pollinator habitat. Maintenance and management considerations are provided for the following types of habitats and pollinator interventions:

- Wildflower meadows and verges;
- Planters and hanging baskets;
- Private gardens;
- Community gardens and orchards;
- Flowering and fruiting species rich hedgerows;
- Bee and butterfly banks;
- Hoverfly lagoons;
- Woodland ground flora; and
- Arable margins.

8.2 Delivery of the key projects highlighted within the pollinator trails should also align with overarching pollinator principle 5 [\[See reference 95\]](#): ‘Ensure long-term management’.

Management and maintenance considerations

Wildflower meadows and verges

8.3 Wildflower meadows can transform built up environments and tired greenspaces of any shape or size. These habitats are suitable for: gardens; parks; community spaces; fields; or bases of hedgerows and stone walls. The colour and diversity of wildflowers add visual interest from spring through to summer.

8.4 How to create a wildflower meadow depends on whether an existing flower-rich area is being enhanced or the area is species poor. Either way planting or sowing a variety of wildflowers with differing flowering times, we can help pollinators to have a more diverse range of pollen and nectar to feed on throughout the year.

8.5 Managing meadows is key to having a spring-flowering or summer-flowering meadow. Having both will provide additional opportunities for pollinators to feed for longer. Although wildflower meadows are managed habitats, they require minimal maintenance. Dorset County Council saves around £93,000 a year [\[See reference 96\]](#) by only cutting rural road verges when needed and Burnley Borough Council estimates that it saves £58,000 a year from meadow management [\[See reference 97\]](#). Monmouthshire County Council estimates that the savings made from a reduction in highway verge mowing is approximately £35,000 each year [\[See reference 98\]](#) and Rotherham report they save £25,000 a year [\[See reference 99\]](#) in reduced mowing fees.

8.6 When developing a wildflower area, the best guidance is always to remove all cuttings. This helps to keep soil fertility at a minimum which encourages wildflower growth. Leaving arisings adds fertility to the soil and encourages the

growth of vigorous grasses which outcompete the wildflowers in the seed bank. Effective management requires one-off purchase of a cut and collect mower.

8.7 There can be a perception that wildflower meadows are overgrown or messy. Signage is important to let people know what is being done and why. For larger meadows, it's often a good idea to mow meandering paths through them. These paths should take into account desired lines and points of interest along the way. Such paths can help encourage people to explore and enjoy the wildlife contained within.

Further guidance

- Buglife – [\[See reference 100\]](#)
- Buglife – [\[See reference 101\]](#)
- Magnificent Meadows – [\[See reference 102\]](#)
- Plantlife – [\[See reference 103\]](#)
- Dorset Council – [\[See reference 104\]](#)

Planters and hanging baskets

8.8 Many areas in the public realm are already planted with ornamental species. Selecting more diverse native or climate resilient plants instead does not provide any additional management upkeep but greatly increases the biodiversity value. Purchasing planters or hanging baskets or creating flower beds may provide an upfront cost but this will be balanced by more attractive places – encouraging longer visits, better experiences, and enhanced spending.

8.9 When planting hedgerows, trees and shrubs it's important to choose native species, ideally flowering species of benefit to pollinators.

8.10 Maintenance of baskets and planters can add to the cost, although these can often be sponsored and cared for by businesses and community groups in partnership with the council. They require regular watering directly into the soil rather than over the plants/flowers themselves, even if it rains, roughly once a week, this will be increased in summer months. In some case using plant feed will be required.

8.11 There are many flowers that can be planted which are self-cleansing and will not require dead-heading, this is the best option to save on extra maintenance costs.

Further guidance

- Swansea County Council – [\[See reference 105\]](#)

Private gardens

8.12 Starting a pollinator garden doesn't require a lot of space. A couple of acres or just a balcony garden, can provide important stepping stone habitat for pollinators and other insects. A part of the garden should be left less intensively cultivated and more informal, to provide suitable nesting sites.

8.13 Most bedding plants (i.e. as sold in polystyrene strips in garden centres and DIY stores), 'double' flowered plants [\[See reference 106\]](#), and other highly-hybridized horticultural novelties are less suitable for pollinators and should be replaced by native flowers (see 'Species selection').

8.14 Pesticides, herbicides or insecticides of any kind shouldn't be used in or around the pollinator garden.

Further guidance

- Buglife – [\[See reference 107\]](#)

- Botanic Garden Wales – [\[See reference 108\]](#)
- Friends of the Earth – [\[See reference 109\]](#)

Community gardens and orchards

8.15 Community gardens can provide excellent pollinator habitat but also serve the local community for foraging opportunities and recreational usage, for example, orchards. It is beneficial to the environment, and to the health and wellbeing [\[See reference 110\]](#) of the community members. It can reduce the impact of food poverty in low-income areas and allow residents greater access to nutritious food.

8.16 National Botanic Garden of Wales has produced the top 50 [\[See reference 111\]](#) edible plants for pollinators. This provides a selection of fruit trees, flowering vegetables and herbs to grow for food whilst attracting pollinators. Species which could be planted include apple, pear, bramble, blackcurrant, cherry and plum.

8.17 Community gardens and edible corridors require intensive management to avoid becoming derelict and unloved. Self-organisation between community members contributes to a good long term management plan. Volunteer involvement and ensuring continuity are key elements in ensuring the success of the garden.

8.18 The community garden can offer opportunities for training volunteers and community groups in horticulture and providing them with the confidence they need to continue. There are benefits in creating a steering group of community members and local council members to facilitate regular communication in relation to the garden or corridor. Research from 12 community garden projects in Northern Ireland has provided information on how to sustain your community garden [\[See reference 112\]](#).

8.19 As community gardens are usually managed by the local community and volunteers, this eases pressure on the local council to spend money on additional maintenance. Developing and maintaining garden space is less expensive than parkland area, in part because gardens require little land and 80% of their cost in labour [\[See reference 113\]](#). Local councils can provide land holdings for the community and provide them with the tools they need to create a successful community garden.

Further guidance and case studies

- UK Government – [\[See reference 114\]](#)
- CLAS Wales – [\[See reference 115\]](#)
- The Orchard Project - [\[See reference 116\]](#)
- St Dogmaels – [\[See reference 117\]](#)
- Incredible Edible Porthmadog – [\[See reference 118\]](#)
- St Davids - [\[See reference 119\]](#) Community Garden

Flowering and fruiting species rich hedgerows

8.20 Hedgerows are one of the most important habitats for wildlife in the UK [\[See reference 120\]](#) and with correct management will support a range of pollinators. Blossoming hedge trees such as wild cherry, willows or outgrown field maples or crab apples can provide valuable pollinator habitat. Hedge trees can also provide an important larval habitat for pollinators. The foliage can be a food source for herbivorous butterflies and moths. Heart rot and aerial rot holes are the breeding sites for various hoverflies, and any dead limbs or dead trunks in the sun can be a breeding site for a variety of solitary bees and wasps, including the red mason bee – a pollinator of fruit trees.

8.21 Further crucial hedge habitat include hedge banks, ditches and margins. By managing hedgerows to provide these features and species we can support the habitat network across Pembrokeshire for pollinators. There is a plethora of

guidance on habitat management available. This includes checking the current stock of species and adding more if needed, cutting hedges on three to four year rotations and allowing flowery hedge margins to develop.

Further guidance

- Farm Wildlife – [\[See reference 121\]](#)
- People’s Trust for Endangered Species – [\[See reference 122\]](#)
- Hedgelink – [\[See reference 123\]](#)

Bee and butterfly banks

8.22 In order to create a Bee and Butterfly Bank space, upfront labour and materials are required. Therefore this would suit a community project best, such as schools or local volunteers, but with support from local wildlife trusts or local councils. Once established, maintenance inputs are low and focus on ensuring vegetation doesn’t become established on it, or shades out created areas.

8.23 Management should clear back half of the bank each year in February to minimise disturbance and create varying habitats, or on a rotational basis if there are multiple banks. Planting around the edge of this habitat or adding deadwood features can also provide additional nesting habitat for other species of pollinators.

Further guidance

- National Biodiversity Data Centre Ireland – How-to-Guide: [\[See reference 124\]](#)
- Buglife - [\[See reference 125\]](#)

Hoverfly lagoons

8.24 Hoverfly lagoons are a quick and easy way to add wildlife habitat to parks or gardens. They can provide a great activity for school and community groups by simply creating a lagoon in a tree stump or from plastic containers and leaf litter. These may be best placed in shaded areas where evaporation is lower. A number of hoverfly larvae live in rotting wood, with wet decaying stumps being favoured. Introducing deadwood habitats surrounding ponds will provide sanctuaries for hoverflies.

8.25 In general habitats should be managed to maintain structural and species diversity to provide for both generalist and specialist pollinators throughout their lifecycle.

Further guidance

- The Buzz Club - [\[See reference 126\]](#)
- Royal Horticultural Society - [\[See reference 127\]](#)

Woodland ground flora

8.26 East and south-facing edges which get the sun and warm up first in the morning are useful to the many pollinators that forage early in the day, they tend to also provide better shelter from prevailing winds. Although shady north facing edges can be useful to pollinators during droughts or hot periods. Careful management of ride clearings can create clearings that catch the sun from morning until evening.

8.27 When managing woodlands its important to consider tree diseases [\[See reference 128\]](#), in particular in larch (*Phytophthora ramorum*) and ash (Ash dieback) which have been affecting sites in the UK and beyond. Early detection

and removal of infected young trees can slow down the loss of ash trees and woodland. Management of woodland should follow biosecurity measures.

8.28 Managing woodland in this way is in line with the Pembrokeshire Coast National Parks Management Plan [\[See reference 129\]](#) (2020-2024) which has policies on conserving and enhancing National Park landscapes and seascapes, including semi-natural woodlands.

Further guidance

- Buglife - [\[See reference 130\]](#)
- Defra - [\[See reference 131\]](#)
- Bumblebee Conservation Trust - [\[See reference 132\]](#)

Arable margins

8.29 Arable margins provide connectivity of a variety of habitats across the UK making them key areas for pollinators. Grass margins which are wildflower rich can attract nectar-feeding pollinators like bumblebees and hoverflies.

8.30 Pembrokeshire boasts a high proportion of rare arable plants as a result of the range of substrate, with arable plants being one of the most threatened groups of plants in Wales. Many of these notable arable plant species provide highly valuable sources of nectar and pollen for a number of pollinator species for example, bugloss, common poppy and cornflower.

8.31 Cereal field margins [\[See reference 133\]](#) can be created which are strips of land lying between cereal crops and the field boundary, deliberately managed to create conditions which benefit pollinators, and other wildlife. This involves creating a 6m wide 'wildlife strip' adjacent to a cereal crop, together with a 1m 'sterile strip' between the wildlife strip and the crop. The sterile strip aims to prevent the spread of arable weeds and reduce inputs from pesticides.

8.32 Providing a range of habitats will attract more insects and pollinators, habitats can include ancient hedgerows, grassy banks, woodlands or other semi-natural habitat. In addition, arable margins can provide opportunities [\[See reference 134\]](#) to create beetle banks, conservation headlands, encourage diverse, flower rich vegetation and maintain early successional habitat etc.

Further guidance

- RSPB - [\[See reference 135\]](#)
- Buglife - [\[See reference 136\]](#)

Species selection

8.33 Overarching pollinator principle [\[See reference 137\]](#) 2a stresses the importance of choosing native plants. Swapping out less useful ornamental bedding plants for more pollinator friendly native species is an easy way to increase pollinator habitat. An example list of plants recommended by the Bumblebee Conservation Trust [\[See reference 138\]](#) and the National Botanic Garden of Wales [\[See reference 139\]](#) can be found below along with details on flowering times and species they attract.

8.34 Where possible species of local provenance should be planted in order to support the landscape and townscape character. The Bee Friendly Initiative has put together a list of species [\[See reference 140\]](#) native to or naturalised in Wales that provide benefit for butterflies, moths, wild bees and other pollinators. Further information on species selection for trees can be found in the Urban Tree Planting Strategy [\[See reference 141\]](#).

8.35 Pembrokeshire County Council are looking for stakeholders to have their say in Growing Urban Greenspaces (2022-2023) [\[See reference 142\]](#). PCC promotes bulb planting and wildflower areas, including the planting of native bulbs, to maximise benefits for nature e.g. Tenby daffodil, bluebells, snowdrops, fritillary and spring squill.

References

- 1 chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.gov.wales/sites/default/files/publications/2018-03/woodlands-for-wales-action-plan.pdf
- 2 Schwaab et al. (2021) The role of urban trees in reducing land surface temperatures in European cities. *Nature Communications*, 12, 6763
- 3 Wolf et al. (2020) Urban Trees and Human Health: A scoping Review. *International Journal of Environmental Research and Public Health* 2020, 17, 4371
- 4 Green Blue Urban. (2015) A guide to the benefits of urban trees. Available at: www.greenblue.com/wp-content/uploads/2016/05/Book-1-A-Guide-to-the-Benefits-of-Urban-Trees.pdf
- 5 Coder, KD. (1996) Identified Benefits of Community Trees and Forests, University of Georgia Cooperative Extension Service – Forest Resources Publication FOR96-39
- 6 Smets, V. et al. (2019) The importance of city trees for reducing net rainfall: comparing measurements and simulations. *Hydrology and Earth System Sciences*, 23, 3865-3884
- 7 Kuo, FE and Sullivan, WC, (2001(a)), Environment and Crime in the Inner City. Does Vegetation Reduce Crime Environment and Behaviour 33(3), pp 343 – 367
- 8 Green Blue Urban. (2015) A guide to the benefits of urban trees. Available at: www.greenblue.com/wp-content/uploads/2016/05/Book-1-A-Guide-to-the-Benefits-of-Urban-Trees.pdf
- 9 Wolf et al. (2020) Urban Trees and Human Health: A scoping Review. *International Journal of Environmental Research and Public Health* 2020, 17, 4371
- 10 Holtan, M.T., Dieterlen, S.L., Sullivan, W.C. (2015) Social life under cover: Tree canopy and social capital in Baltimore, Maryland. *Environmental Behaviour* 47, 502-525

References

- 11 Parliamentary Office of Science & Technology (2016) Green Space and Health
- 12 Wolf, K, (2000) Community Image – Roadside Settings and Public Perceptions, University of Washington College of Forest Resources, Factsheet #32
- 13 Wolf, K, (2003) Public Response to the Urban Forest in Inner-City Business Districts, Journal of Arboriculture 29(3) pp 117 – 126
- 14 <https://www.pembrokeshirecoast.wales/trees-and-woodland-draft-supplementary-planning-guidance-oct-2022/>
- 15 <https://www.pembrokeshirecoast.wales/trees-and-woodland-draft-supplementary-planning-guidance-oct-2022/>
- 16 <http://supplementary%20planning%20guidance%20consultations%20-%20pembrokeshire%20coast%20national%20park/>
- 17 <http://supplementary%20planning%20guidance%20consultations%20-%20pembrokeshire%20coast%20national%20park/>
- 18 <https://www.pembrokeshire.gov.uk/biodiversity/pembrokeshire-nature-partnership-plans-and-guidance>
- 19 <https://naturalresources.wales/guidance-and-advice/environmental-topics/woodlands-and-forests/tree-health-in-wales/?lang=en>
- 20 <https://www.pembrokeshirecoast.wales/trees-and-woodland-draft-supplementary-planning-guidance-oct-2022/>
- 21 <https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/pollinators/love-pollinators/?lang=en#:~:text=Pollinators%20are%20good%20for%20our,is%20worth%20%C2%A330%20billion.>
- 22 <https://www.gov.wales/sites/default/files/publications/2019-04/action-plan-for-pollinators.pdf>
- 23 <https://www.gov.wales/well-being-of-future-generations-wales>
- 24 <https://www.legislation.gov.uk/anaw/2016/3/contents/enacted>
- 25 <https://naturalresources.wales/sonarr2020?lang=en>

References

- 26 <https://www.gov.wales/sites/default/files/publications/2019-06/natural-resources-policy.pdf>
- 27 <https://naturalresources.wales/about-us/area-statements/?lang=en>
- 28 <https://www.gov.wales/sites/default/files/publications/2019-05/nature-recovery-action-plan-2015.pdf#:~:text=The%20Nature%20Recovery%20Plan%20for%20Wales%20sets%20out,National%20Biodiversity%20Strategy%20and%20Action%20Plan%20for%20Wales.>
- 29 <https://www.gov.wales/sites/default/files/publications/2019-04/action-plan-for-pollinators.pdf>
- 30 <https://naturalresources.wales/about-us/area-statements/south-west-wales-area-statement/?lang=en>
- 31 <https://www.pembrokeshire.gov.uk/biodiversity/pembrokeshire-nature-partnership-plans-and-guidance>
- 32 https://cdn.buglife.org.uk/2019/11/Wales-Threatened-Bee-report_FINAL.pdf
- 33 <https://www.plantlife.org.uk/wales/about-plantlife-cymru/news-press/magnificent-meadows-#:~:text=Wales%20has%20lost%2097%20percent,fortunes%20of%20our%20vanishing%20meadows.>
- 34 <https://www.wtwales.org/news/uk-government-puts-bees-risk>
- 35 <https://www.bristol.ac.uk/biology/news/2020/what-are-the-effects-of-climate-change-on-pollinators-and-human-health.html#:~:text=Climate%20change%20is%20predicted%20to,their%20pollinators%20is%20being%20disrupted.>
- 36 <https://storymaps.arcgis.com/stories/1bd0035fd7a64db3a2e2e53ceeb4f83c>
- 37 https://cdn.buglife.org.uk/2019/11/Wales-Threatened-Bee-report_FINAL.pdf

References

- 38 <https://butterfly-conservation.org/sites/default/files/soukb-2015.pdf>
- 39 <https://ukbms.org/>
- 40 <https://www.biodiversitywales.org.uk/Butterflies-and-Moths>
- 41 [https://royalsocietypublishing.org/doi/10.1098/rspb.2020.0508#:~:text=Un like%20bees%2C%20which%20rarely%20forage,migratory%20%5B60%2C61%5D](https://royalsocietypublishing.org/doi/10.1098/rspb.2020.0508#:~:text=Un%20like%20bees%2C%20which%20rarely%20forage,migratory%20%5B60%2C61%5D).
- 42 <https://www.biodiversitywales.org.uk/Bee-Friendly>
- 43 <https://ukpoms.org.uk/>
- 44 <https://ukbms.org/>
- 45 <https://www.bumblebeeconservation.org/surveys/>
- 46 <https://www.buglife.org.uk/campaigns/get-britain-buzzing-2/>
- 47 <https://www.buglife.org.uk/our-work/pollinator-projects/urban-buzz/>
- 48 <https://www.buglife.org.uk/our-work/pollinator-projects/urban-buzz/>
- 49 <https://bigbutterflycount.butterfly-conservation.org/>
- 50 <https://www.mothnight.info/>
- 51 <https://observation.org/apps/obsidentify/>
- 52 https://www.inaturalist.org/pages/seek_app
- 53 <https://irecord.org.uk/>
- 54 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/overarching-principles/
- 55 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/pollinator-trails-for-11-settlements/
- 56 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/management-and-maintenance/
- 57 <https://www.gov.wales/its-them-campaign-stakeholder-toolkit>
- 58 <https://ecodewi.org.uk/mini-meadows/>

References

- 59 <https://friendsoftheearth.uk/nature/farming-bees>
- 60 <https://friendsoftheearth.uk/nature/farming-bees>
- 61 <https://www.ceh.ac.uk/news-and-media/news/pollinator-monitoring-more-pays-itself>
- 62 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/overarching-principles/
- 63 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/pollinator-trails-for-11-settlements/
- 64 https://lucmaps.co.uk/Pembrokeshire_GI/fishguard-and-goodwick/
- 65 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/overarching-principles/
- 66 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/pollinator-trails-for-11-settlements/
- 67 https://lucmaps.co.uk/Pembrokeshire_GI/haverfordwest/
- 68 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/overarching-principles/
- 69 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/pollinator-trails-for-11-settlements/
- 70 https://lucmaps.co.uk/Pembrokeshire_GI/milford-haven/
- 71 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/overarching-principles/
- 72 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/pollinator-trails-for-11-settlements/
- 73 https://lucmaps.co.uk/Pembrokeshire_GI/narberth/
- 74 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/overarching-principles/
- 75 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/pollinator-trails-for-11-settlements/

References

- 76 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/overarching-principles/
- 77 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/pollinator-trails-for-11-settlements/
- 78 https://lucmaps.co.uk/Pembrokeshire_GI/neyland/
- 79 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/overarching-principles/
- 80 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/pollinator-trails-for-11-settlements/
- 81 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/overarching-principles/
- 82 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/pollinator-trails-for-11-settlements/
- 83 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/pollinator-trails-for-11-settlements/pembroke-dock-pollinator-trail/
- 84 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/overarching-principles/
- 85 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/pollinator-trails-for-11-settlements/
- 86 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/pollinator-trails-for-11-settlements/saundersfoot-pollinator-trail/
- 87 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/overarching-principles/
- 88 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/pollinator-trails-for-11-settlements/
- 89 https://lucmaps.co.uk/Pembrokeshire_GI/st-davids/
- 90 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/overarching-principles/

References

- 91 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/pollinator-trails-for-11-settlements/
- 92 https://lucmaps.co.uk/Pembrokeshire_GI/tenby/
- 93 <https://botanicgarden.wales/wp-content/uploads/2021/08/Top-50-Edible-Plants-for-Pollinators.pdf>
- 94 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/pollinator-trails-for-11-settlements/
- 95 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/overarching-principles/
- 96 <https://news.dorsetcouncil.gov.uk/2019/06/17/our-roadside-verges-a-fine-balance-to-strike/>
- 97 <https://www.buglife.org.uk/news/huge-public-backing-for-councils-to-reduce-grass-cutting-to-help-save-our-bees/>
- 98 <https://outco.co.uk/#:~:text=Dorset%20County%20Council%20saves%20around%20%C2%A393%2C000%20a%20year,highway%20verge%20mowing%20is%20approximately%20%C2%A335%2C000%20each%20year.>
- 99 <https://www.examinerlive.co.uk/news/local-news/how-rotherhams-beautiful-wildflower-verges-18651477>
- 100 <https://cdn.buglife.org.uk/2019/07/2.BuglifeCommunityMeadowspackHOTOCREATEACOMMUNITYMEADOWweb.pdf>
- 101 https://cdn.buglife.org.uk/2019/07/Transport-Corridors-Pollinator-Sheet-Final_1.pdf
- 102 <https://www.biodiversitywales.org.uk/Content/Upload/How%20to%20make%20a%20meadow%20poster.pdf>
- 103 <https://meadows.plantlife.org.uk/>
- 104 <https://www.dorsetcouncil.gov.uk/countryside-coast-parks/countryside-management/verge-cutting/verge-cutting-information-dorset>

References

- 105 <https://www.swansea.gov.uk/hangingbasketcare?lang=en>
- 106 <https://www.gardeningknowhow.com/ornamental/flowers/fgen/what-are-double-blooms.htm>
- 107 <https://cdn.buglife.org.uk/2020/07/B-Friendly-in-your-Garden.pdf>
- 108 <https://botanicgarden.wales/wp-content/uploads/2020/05/Garddio-ar-gyfer-Peillwyr-Gardening-for-Pollinators.pdf>
- 109 <https://friendsoftheearth.uk/nature/gardening-bees>
- 110 <https://www.farmgarden.org.uk/sites/farmgarden.org.uk/files/benefits-community-growing-research-and-evidence.pdf>
- 111 <https://botanicgarden.wales/wp-content/uploads/2021/08/Top-50-Edible-Plants-for-Pollinators.pdf>
- 112 https://www.farmgarden.org.uk/system/files/sustaining_your_garden.pdf
- 113 https://www.lamar.edu/sustainability/ files/documents/Multiple%20Benefits_2012.pdf
- 114 <https://www.gov.uk/guidance/garden-communities>
- 115 https://www.farmgarden.org.uk/system/files/fcfcg_cgr_pack_inners_wales-eng_web.pdf
- 116 https://www.theorchardproject.org.uk/guides_and_advice/links-and-further-resources/
- 117 <http://www.stdogmaelsabbey.org.uk/peoplesorchard>
- 118 <https://renewwales.org.uk/bwyd-bendigedig-port-incredible-edible-porthmadog/>
- 119 <https://ecodewi.org.uk/st-davids-garden-project/>
- 120 <https://farmwildlife.info/2021/06/04/managing-hedges-for-pollinators/#:~:text=Blossoming%20hedge%20trees%20such%20as,for%20herbivorous%20butterflies%20and%20moths.>
- 121 <https://farmwildlife.info/2021/06/04/managing-hedges-for-pollinators/#:~:text=Blossoming%20hedge%20trees%20such%20as,for%20herbivorous%20butterflies%20and%20moths.>

References

- 122 <https://ptes.org/hedgerow/managing-hedgerows-top-tips/>
- 123 <https://hedgelink.org.uk/guidance/hedgerow-management-advice/>
- 124 <https://pollinators.ie/wordpress/wp-content/uploads/2018/04/How-to-guide-Nesting-2018-WEB.pdf>
- 125 <https://cdn.buglife.org.uk/2020/04/Bee-bank-booklet-2.pdf>
- 126 <https://www.thebuzzclub.uk/hoverfly-lagoons>
- 127 <https://www.rhs.org.uk/biodiversity/hoverflies>
- 128 <https://www.pembrokeshirecoast.wales/conservation/woodland-management/>
- 129 <https://www.pembrokeshirecoast.wales/wp-content/uploads/2020/01/National-Park-Management-Plan-2020-2024-Eng.pdf>
- 130 https://cdn.buglife.org.uk/2019/07/Woodland-Pollinator-Sheet-Final_0.pdf
- 131 https://www.bumblebeeconservation.org/wp-content/uploads/2018/03/6192_defra_info_sheet_woodlands_final.pdf
- 132 <https://www.bumblebeeconservation.org/wp-content/uploads/2021/04/BBCT171-Taddington-Valley-Wood-Land-management-options-for-bumblebees-and-pollinators-in-an-urban-fringe-ancient-woodland-03.21.pdf>
- 133 <https://www.buglife.org.uk/resources/habitat-management/cereal-field-margins/>
- 134 <https://www.buglife.org.uk/resources/habitat-management/cereal-field-margins/>
- 135 <https://www.rspb.org.uk/our-work/conservation/conservation-and-sustainability/farming/advice/managing-habitats/arable-field-margins/>
- 136 <https://www.buglife.org.uk/resources/farming-hub/>
- 137 https://lucmaps.co.uk/Pembrokeshire_GI/pollinator-strategies/overarching-principles/

References

- 138 <https://www.bumblebeeconservation.org/beethechange/wp-content/uploads/2022/07/Community-Planting-Guide.pdf>
- 139 <https://botanicgarden.wales/wp-content/uploads/2015/10/Pollinating-Plants-Booklet-final-copy.pdf>
- 140 <https://www.biodiversitywales.org.uk/Content/Upload/Bee-friendly-plant-list-ENG.pdf>
- 141 https://lucmaps.co.uk/Pembrokeshire_GI/delivery/
- 142 <https://haveyoursay.pembrokeshire.gov.uk/urban-trees>

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