



## APPENDIX 3.2 - GREEN INFRASTRUCTURE STRATEGY

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Not updated

# **A29 Green Infrastructure Strategy**

## Version 1

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**1.0**

Introduction

# 1.0 Introduction

## Introduction

This Green Infrastructure Strategy (the ‘Strategy’) has been prepared on behalf of West Sussex County Council (WSCC). The structure of this Strategy is as follows:

- Introduction.
- Planning and policy context.
- Baseline green infrastructure assets and opportunities:
  - » Baseline context.
  - » Existing assets and opportunities.
- Green Infrastructure Strategy.

The Strategy identifies the proposed realignment of the A29 (herein referred to as the Site) in its current Green Infrastructure (GI) context, opportunities for enhancement and outlines a proposed strategy for implementation of an enhanced GI-led corridor for Phase 1. It is acknowledged that this Strategy would also be applicable to Phase 2.

## Project Context

The proposed realignment of the A29 includes a 30 mph, 1.3 km single carriageway with a 3 m wide cycleway and footway, 2.5 m wide central islands, four uncontrolled crossings, three roundabouts, landscaping, potential noise barriers and other associated works. These works collectively are herein referred to as the Proposed Scheme, with the study area an approximate 1 km corridor around the Proposed Scheme.

The Proposed Scheme will be carried out in two phases. Phase 1 starts just to the south of Burnham Road, but sits largely to the north of Barnham Road connecting up to the far east of Eastergate Lane. Phase 2 will continue from just south of Barnham Road southwards, crossing the railway line and joining Lidsey Road just north of the village of Lidsey (see Figure 1 Location Plan).

The Proposed Scheme will cut through existing countryside between the settlements of Westergate, Eastergate and Barnham. The countryside forms a strategic area of open space and acts as a ‘strategic gap’ to define and separate the adjacent settlements and maintain their distinctiveness.

## Purpose of The Green Infrastructure Strategy

The purpose of this Strategy is to:

- Describe in outline the baseline GI of the Site and surrounding area, particularly in relation to landscape, biodiversity and arboricultural assets.
- Describe measures to enhance the value of such features in accordance with relevant national and local planning policies and supporting GI strategies.
- Outline the proposed GI approach to Phase 1 of the A29 corridor.

This Strategy is accompanied by GI baseline and strategy figures as well as illustrative cross sections.

This Strategy aims to complement existing published GI strategies, particularly at a regional and local level. It therefore concentrates on an analysis of existing GI within the Site and immediate surroundings to assess ways in which the Proposed Scheme can link with, or better link to, nearby assets, and create a multi-functional asset within the landscape.

It then outlines the vision, overarching objectives, functions and design opportunities to be fulfilled through the detailed design of the Proposed Scheme.

## What is Green Infrastructure?

The National Planning Policy Framework (NPPF)<sup>1</sup> defines GI as, ‘a network of multi-functional green space, urban and rural, which is capable of delivering a wide range of environmental and quality of life benefits for local communities.’

The Landscape Institute defines GI more specifically in their ‘Green Infrastructure: an integrated approach to land use’ report<sup>2</sup>, which identifies blue infrastructure (i.e. water) as part of the GI network: ‘the network of natural and semi-natural features, green spaces, rivers and lakes that intersperse and connect villages, towns and cities. Individually, these elements are GI assets, and the roles that these assets play are GI functions. When appropriately planned, designed and managed, the assets

and functions have the potential to deliver a wide range of benefits – from providing sustainable transport links to mitigating and adapting the effects of climate change’.

GI assets include publicly accessible open space, incidental green space, green ‘corridors’, the water environment including streams, ponds, canals and other water bodies (blue infrastructure), productive environments, trees, and green walls and green/brown roofs. Other GI assets could include:

- Parks & gardens.
- Natural & semi-natural open space.
- Amenity green space.
- Outdoor sports facilities.
- Play space & provision for children & young people.
- Cemeteries & churchyards.
- Allotments, community gardens & farms.
- References to GI in this document also apply to different types of blue infrastructure where appropriate.

GI’s multifunctional nature can bring environmental and wider benefits, at a range of scales, including benefits afforded to human health and enhanced well-being, landscape character, climate change adaptation, outdoor recreation and access, food and energy production, biodiversity, and the management of flood risk. In urban areas, benefits may also include urban cooling, open space, urban woodland, planted swales and productive landscapes also used for recreation. In the wider landscape, GI can identify strategic catchment scale flood alleviation schemes or long-distance sustainable transport or wildlife corridors.

## Vision and Overarching Objectives

This Strategy sets out a vision and series of overarching objectives to assist in the design of the Proposed Scheme reaching its potential and becoming a key green infrastructure corridor for the district.

The GI vision is to....

**‘Create a key GI corridor to link with or improve links to nearby assets. The GI corridor will be a multi-functional asset within the landscape, designed to maximise access and movement, biodiversity, sense of place, historic character, sustainable water resources and enhanced health and wellbeing.’**

The overarching objectives include:

- Objective 1 – To establish an off road, shared pedestrian and cycling route for the length of the route.
- Objective 2 – To maximise pedestrian and cycling connectivity to the existing PRoW network, surrounding communities (both existing and future), transport nodes and existing green infrastructure assets.
- Objective 3 – To create nodes of functional, useable and quality greenspace along the main corridor which connect with green space in any new developments.
- Objective 4 – To safeguard and expand sensitive habitats and species and enrich biodiversity.
- Objective 5 – To ensure SuDs are an integral part of the highways design and that above ground drainage features are designed to also improve biodiversity, create new habitats and provide usable public green space.
- Objective 6 – To put placemaking at the focus of the design and acknowledge the historic land use through the design.
- Objective 7 – To moderate pollution levels associated with air, noise and light.
- Objective 8 – To improve health and wellbeing through the retention and introduction of a range of landscape features connecting to surrounding countryside and GI assets.

The overarching objectives will be achieved by working collaboratively between all disciplines (including ecologists arboriculturalists, landscape architects and drainage engineers) to achieve the best possible multi-functional features.

## Methodology

The following work has been undertaken to inform this Strategy:

- Desk based review of relevant websites, documents, GI strategies and policy to help identify the context for the Site (including existing assets, designations, constraints and policy framework). Key features have been mapped to illustrate the key connections, assets, constraints and opportunities.
- Fieldwork to walk the length of the Proposed Scheme alignment (as far as practicable) and surrounding areas to understand the Site’s character, connectivity, materials, vegetation and accessibility.
- Consultation regarding the GI Strategy structure and content was discussed with representatives of WSCC in February 2019 and October 2019.

<sup>1</sup> Ministry of Housing, Communities and Local Government, 2019, National Planning Policy Framework

<sup>2</sup> Landscape Institute, 2013, Green Infrastructure, An integrated approach to land use

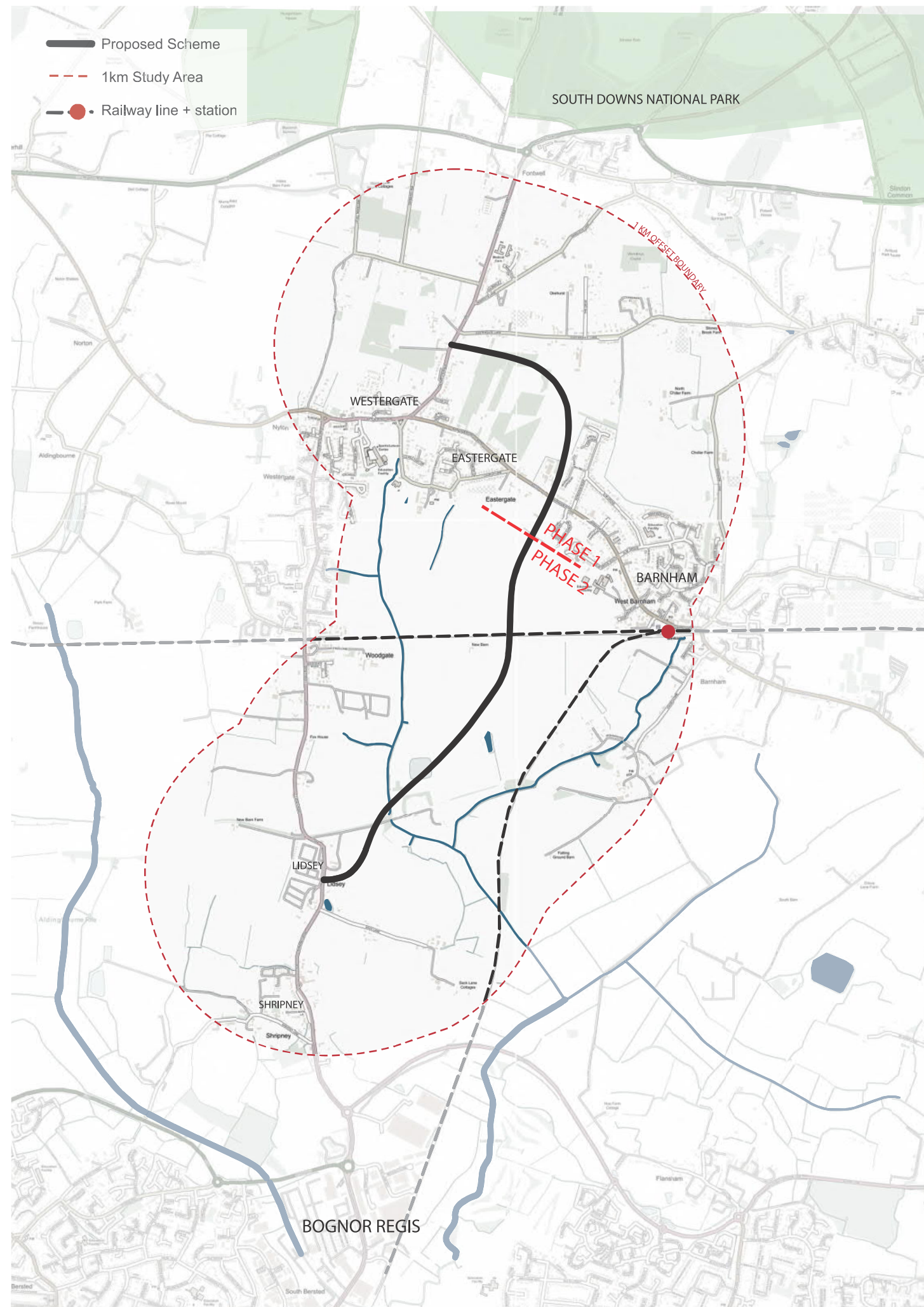


Figure 1. Location Plan

**2.0**

Legislation & Policy

# 2.0 Legislation & Policy

## Introduction

This Strategy has taken into account current legislation, policy and guidance relevant to GI. Given the wealth of national, regional and local policy and guidance relating to GI, particularly Government targets for Biodiversity Net Gain (BNG), improved air quality and public health and the declaration of a Climate Emergency, a more detailed summary is provided in Appendix A.

## Local Policy

The Proposed Scheme lies within Arun District Council's (ADC) administrative area; one of seven districts within WSCC.

### Arun Local Plan 2011 - 2031

Arun Local Plan 2011-2031<sup>3</sup> covers the southern half of the district whilst the northern half of the district falls within the South Downs National Park (SDNP); the responsibility of the SDNP Authority. The SDNP lies around one kilometre north of the Proposed Scheme.

ADC Local Plan seeks to conserve and enhance distinctive or important landscape, arboricultural and biodiversity features. Of particular interest to this Strategy is how the Proposed Scheme fits into the local landscape setting. Strategic objectives for Settlement Structure, GI and Landscape set out within the Local Plan include protecting and enhancing the district's 'outstanding landscape, countryside, coastline, historic, built and archaeological environment, as well as the setting for the South Downs National Park'.

The Local Plan identifies the importance of maintaining the distinctive settlement pattern of Arun District. The importance of retaining settlement structure is recognised along with the value of gaps between settlements, 'preventing the coalescence of individual settlements and for retaining the separate identity and amenity of settlements' and maintaining the districts multifunctional GI network.

The Plan, within Policy GI SP1 outlines the particular importance of green infrastructure in development. The policy is as follows:

*'The existing Green infrastructure network, as shown on the Green Network maps for each parish and town, must be considered at an early stage of the design process for all major development proposals.*

*All major development must be designed to protect and enhance existing Green Infrastructure assets, and the connections between them, in order to ensure a joined up Green Infrastructure Network. The Green Infrastructure network must be protected from light pollution to ensure that areas defined by their tranquility are protected from the negative effects of light in development.*

*Where compatible with nature conservation objectives, development proposals must identify opportunities to connect existing Green Infrastructure assets with the coast, the South Downs National Park or to the District's inland villages. Opportunities to enhance the network should take account of the multiple functions of Green Infrastructure assets and should be based upon those opportunities set out in the supporting text.'*

The Plan, within Policy SD SP3, seeks to protect strategic gaps between settlements to prevent coalescence and retain their separate identity. This includes the gaps between Bognor Regis/ Chichester/ Felpham and particularly Barnham to Walberton.

## Guidance and Existing Strategies

### Arun Green Infrastructure Study

The Arun Green Infrastructure Study (2012) provides a study of GI within the district. The study is a precursor to a sub-regional GI Strategy for the coastal West Sussex area. The study outlines the key characteristics of the Arun district including the environmental assets that form an integral part of the district's GI Network. The study carries forward the policies outlined in the South East Green Infrastructure Framework (2009) and develops a district level framework for GI in Arun.

The study identifies that Arun District has a marked split in coverage of GI assets. In the northern half of the district GI assets are plentiful and some are of considerable size, including Slindon Estate and Arundel Park. Connectivity is strong here with connections running to the north, and south towards the coastal plain. The southern part of the district is characterised as having small sized GI assets within the urban areas of Bognor Regis and Littlehampton, along with a few larger assets such as Pagham Harbour, a Site of Local Importance for Nature Conservation, and the strategic and local gaps. The study characterises the central area of the district, within which the Scheme lies, as having 'few GI assets all of which are very small in scale apart from the strategic and local gaps which provide the only large-scale GI assets in the central area of the District'.

The Study recognises the future growth of the district through the Proposed Growth Areas and, along with reference to previous work undertaken in understanding the landscape character and sensitivity of the district, provides a baseline of the development potential within each of the growth areas and likely impacts on the GI network and landscape character. One potential growth area identified is the Barnham-Eastergate-Westergate Growth Area.

The Barnham-Eastergate-Westergate Growth Area covers the Proposed Scheme and identifies the pressures on GI, key characteristics, and sensitivities of the area. It also provides landscape recommendations for the growth area including the following;

- Creation of a green space within the development site to keep a separation between the three villages.
- Encourage landscape enhancements around villages and on their approaches to conserve the setting of these settlements, particularly the Eastergate Conservation Area.
- Create a new, large scale tree and hedgerow framework which complements the open intensively farmed landscape, whilst maintaining significant views of Chichester Cathedral, the South Downs and local features.
- Maintain and enhance the landscape and biodiversity of watercourses and other existing habitats, enhancing their value as wildlife corridors. Re-profile banks and encourage more diverse flora by lengthening clearance cycles.
- Enhance the visual prominence of watercourses through the establishment of waterside vegetation features.
- Conserve ancient semi-natural woodland as an historical, landscape and wildlife feature and promote management of existing woodland, especially where under pressure from gravel working or urban fringe development.
- Ensure any new development is well integrated into the wider landscape. Use new woodland and hedgerow planting as appropriate. Particularly plant small tree groups on the eastern boundary of Binsted valley to screen glasshouses and traffic movement on its margins.

The Arun GI study established a framework for consideration of GI during planning and development within the district and informed the evidence base for the Arun Local Plan. The study established that GI assets in the district perform several primary functions including:

- Access links and access to recreation.
- Conserving and enhancing biodiversity.
- Sense of place.
- Historic character.
- Productive green environments.
- Sustainable water resources.



## Bognor Regis Green Infrastructure Framework

The Bognor Regis GI Framework provides a vision for GI between Bognor Regis and the SDNP, focussing on how the area can deliver resilience to the effects of climate change in the district. Key opportunities identified within the Framework include:

- Several existing open spaces that would benefit from enhancements to their quality and value especially around Barnham, Eastergate and Westergate.
- New provision for footpaths, cycle paths and enhancements to the existing network may be delivered alongside enhancements such as planting.
- Enhance and improve the wildlife value of the rife and ditch network, forming a high-quality wildlife corridor.
- Increase hedgerow and woodland connectivity through additional planting.
- Ensure existing and proposed recreational open spaces are multifunctional and provide wildlife habitat alongside other functions.
- Reinforce local character through the incorporation of appropriate planting and habitat creation.
- Help define the urban-rural fringe through planting and the use of appropriate materials for access infrastructure. Consider appropriate treatments for gateway areas.
- Lessen the landscape and visual impact of transport infrastructure through appropriate planting.
- Ensure landscape character is enhanced and reinforced through appropriate use of materials. This extends to path surfacing, way-marking and any waterways infrastructure. This is of particular importance nearby designated Areas of Character, Conservation Areas and Listed features.

In addition to the above Local Plan, studies and frameworks, the following items of Supplementary Planning Guidance or Guidance documents are relevant to the GI Strategy, all of which seek to promote health and wellbeing, access to nature and recreational open space; and management of water:

- Barnham and Eastergate Neighbourhood Plan 2014-2029<sup>4</sup>.
- West Sussex County Council: Breathing Better<sup>5</sup>.
- West Sussex County Council: Adoptable Highway Drainage and SuDS, Guidance Note for Developers<sup>6</sup>.
- West Sussex County Council: Pollinator Action Plan 2019-2022 (December 2018)<sup>7</sup>.
- ADC Open space sport and recreation study (PMP, March 2009)<sup>8</sup>.
- Water. People. Places. A guide for master planning sustainable drainage into developments<sup>9</sup>.

## Sustainable Drainage Systems, Maximising the Potential for People and Wildlife (RSPB, WWT)

This document highlights that surface water management can be designed to deliver benefits for the whole community through improvements to biodiversity, climate regulation, education, health, recreation and play. There is also a number of features which can be used to create a diverse landscape for people and wildlife. Rain gardens, planters, ponds and wetlands, all linked by carefully designed hard and soft conveyance features such as concrete rills and grass swales.

4 Barnham and Eastergate Parish Councils, 2013, Eastergate Parish Council/ Barnham Parish Council Barnham and Eastergate Neighbourhood Plan 2014-2029

5 West Sussex Inter-Authority Air Quality Group, 2020, Breathing Better: A partnership approach to improving air quality in West Sussex

6 West Sussex County Council, 2019, Adoptable Highway Drainage and SuDS, Guidance Note for Developers

7 West Sussex County Council, 2018, Pollinator Action Plan 2019-2022

8 Arun District Council and PMP, 2009, Open space sport and recreation study

9 Aecom, 2013, Water. People. Places. A guide for master planning sustainable drainage into developments

**3.0**

# Baseline Green Infrastructure Assets and Opportunities

## 3.0 Baseline Green Infrastructure Assets and Opportunities

### Baseline Context

This section sets out an overview of the existing GI context of the Site. The analysis explores GI assets in the study area, highlighting any key assets and design opportunities for enhancement or new provision, including those to tie into existing GI strategies. For the purposes of this report, the GI assets are grouped by their function as per the Bognor Regis GI Framework<sup>10</sup> and Arun District Green Infrastructure Study (June 2012)<sup>11</sup> but with the additional inclusion of Pollution, and Health and Wellbeing, given the potentially all-encompassing benefits of GI. For ease of reference, each function is colour coded throughout the document, as follows:

- Access links and access to recreation.
- Conserving and enhancing biodiversity.
- Sense of place.
- Historic character.
- Productive green environments.
- Sustainable water resources.
- Pollution.
- Health and Wellbeing.

### Access Links and Access to Recreation ●

#### Overview of Requirements and Aims

Access and access to recreation refers to the provision of sustainable transport and access routes, and access to a variety of recreational opportunities for the widest range of social, interest and age groups. This includes facilities for active travel such as walking and cycling tracks as well as bridleways. They should also consider requirements of wheelchair users, and people with low mobility or impaired sight. The promotion of active travel facilities can increase health and wellbeing as well as improve air quality, particularly where such routes connect to transport hubs, existing long-distance routes, and areas of interest/ nodes of activity such as schools. They should also target areas which are currently lacking in existing connections.

#### Baseline Assets: Access Links and Access to Recreation

In relation to the Site, there are several publicly accessible parks, amenity green spaces, play spaces, and natural & semi-natural open spaces within the study area, including Eastergate Sports Field, The Lidsey Rife, the Line of the Portsmouth and Arundel Canal, and St George's churchyard<sup>12</sup>. There are numerous Public Rights of Way (PRoW) within the study area with one PRoW crossing the proposed A29 route. PRoW (Eastergate 318-1) is a local walking route connecting Barnham Road with Eastergate Lane. It's orientation, running north to south, has the potential to act as part of a wider network connecting the SDNP with the coastal plain to the south. This footway is identified within the Bognor Regis GI Strategy as part of a GI corridor linking Bognor Regis with the SDNP.

A PRoW (Eastergate 321-1) cuts across the countryside south of the Proposed Scheme providing an East-West off road link between the outskirts of Eastergate and Barnham. Along with a number of other smaller PRoW and quiet rural roads, this route creates a significant East-West connection spanning approximately 3 km from Aldingbourne to Barnham.

There are several PRoW in the wider district including a North-South route running through Barnham (Barnham 158-3) and an extensive East-West pedestrian connection along the course of the disused Chichester to Arundel canal (Barnham 200/1-2). This forms part of the Long Distance Walkers Association (LDWA) long distance walking route entitled 'London's Lost Route to the Sea'<sup>13</sup> which weaves through Hampshire, Greater London, Portsmouth, Surrey and West Sussex. There are several cycle routes in the area that allow commuters to cycle to Barnham railway station using a combination of quiet roads and designated cycle paths. A cycle trail (part of the Barnham Link trail, connecting Barnham to Eastergate, Felpham and Bognor Regis) is located east of the Site running north to south see Figure 2 Access and access to recreation links.

<sup>10</sup> Arun District Council and LUC, 2019, Bognor Regis GI Framework: A Landscape & Green Infrastructure Framework Connecting Bognor Regis to the South Downs National Park

<sup>11</sup> Arun District Council, 2012, Arun District Green Infrastructure Study

<sup>12</sup> Eastergate Parish Council/ Barnham Parish Council, 2014, Barnham and Eastergate Neighbourhood Plan 2014-2029

<sup>13</sup> Long Distance Walkers Association, 2019, London's Lost Route to the Sea, Available at [https://www.ldwa.org.uk/ldp/members/show\\_path.php?menu\\_type=S&path\\_name=London%27s+Lost+Route+to+the+Sea](https://www.ldwa.org.uk/ldp/members/show_path.php?menu_type=S&path_name=London%27s+Lost+Route+to+the+Sea) [Accessed January 2020]

### Design Opportunities: Study Area

The Bognor and Arun GI studies identify numerous design opportunities within and around the Proposed Scheme. Key opportunities include:

- The Bognor and Arun GI studies identify numerous design opportunities within and around the Proposed Scheme. Key opportunities include:
  - New provision for footpaths, cycle paths, bridleways, and enhancements to the existing network may be delivered alongside enhancements such as planting.
  - Create and improve links & connections between existing GI assets.
  - Maximise pedestrian and cycling connectivity to the existing PRoW network and surrounding communities.
  - Provide sustainable links to transport nodes & facilities.
  - Create areas of greenspace which connect with green space in any future developments.
  - Facilitate east-west movement through green links.

### Specific Design Opportunities: A29 Phase 1

The Site is reasonably well connected with existing access assets but there are numerous opportunities for enhancement and improvement in relation to the Site itself and refining the more general opportunities identified above. Opportunities include:

- New provision for footpaths, cycle paths and bridleways by including a path alongside the whole A29 Phase 1 route alignment.
  - » Active Travel opportunities: new paths.
  - » Variation in visual amenity and character along the Proposed Scheme.
- Maximise pedestrian and cycling connectivity to the existing PRoW network, GI assets and surrounding communities.
  - » Ensure access routes, greenspaces and planting features are connected to existing features and future developments.
  - » Maximise pedestrian and cycling connectivity to existing PRoW network and surrounding communities.
  - » Provide sustainable links to key transport nodes.
  - » Create inclusive junctions along the A29 Phase 1 route that can accommodate pedestrians, cyclists and equestrians where appropriate.

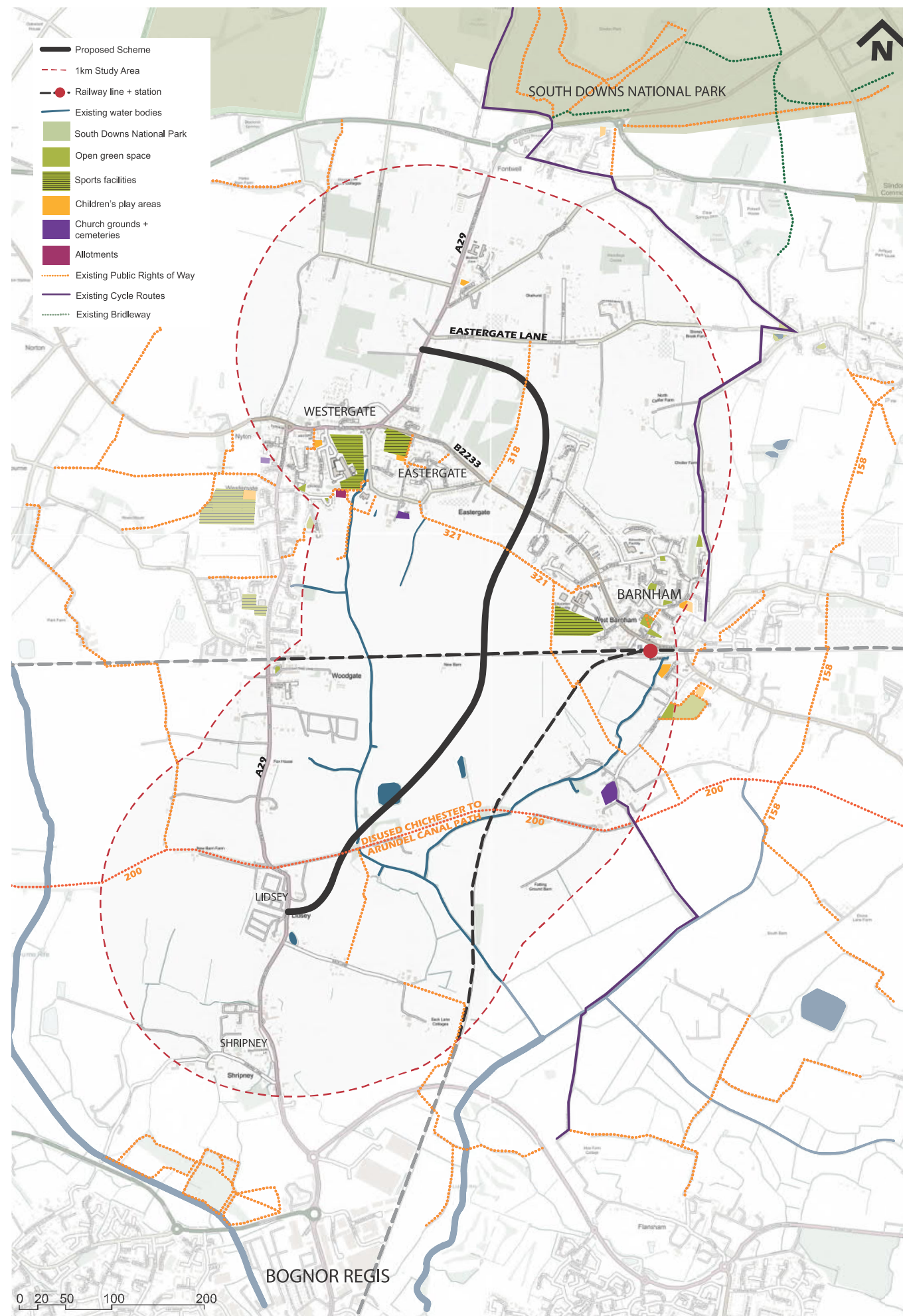


Figure 2. Access and access to recreation links

## Conserving and Enhancing Biodiversity ●

### Overview of Requirements and Aims

The betterment of biodiversity can be considered in the design of GI features and can support increased connectivity between existing habitats. Site design and layout should maximise benefits for biodiversity in new development by incorporating, connecting and enhancing habitats in the wider surrounding landscape; utilising a landscape scale approach. Opportunities can be identified to promote multifunctional use of existing open spaces within urban areas, such as playing fields, by incorporating habitat features, appropriate planting and flood storage.

Whilst Government's 25 Year Environmental Plan<sup>14</sup> and NPPF refers to Biodiversity Net Gain (BNG) and the need to improve biodiversity, National Policy Statements have yet to be updated and do not provide such a mandate.

ADC Local Plan Policy ENV DM5 Development and Biodiversity states that development should aim to achieve BNG whilst also protecting the existing habitats on Site. Development should be designed to facilitate the emergence of new habitats as well as the creation of links between habitat areas and open green spaces. Combined, these provide a vital network of green spaces which act to reconnect isolated sites and facilitate important species movement.

### Baseline Assets: Biodiversity

The baseline landscape features associated with the study area include a wide variety of planting and associated habitats, including Broadleaved woodland, Semi-natural, Native hedgerows, Native hedgerows with trees, Grassland / scrub, Mature trees, Traditional orchards, Arable farmland, Pasture, and Semi-improved grassland. There are no other landscape or ecological designations within the study area: see Figure 3 Biodiversity.

The study area has significant biodiversity value due to its rural setting. Species-rich hedgerows, with and without trees, are important for the range of species they support and their function as corridors and refuges. Although there are no areas of ancient woodland within the study area, there are small areas of broadleaved woodland cover scattered across it, as well as a large area of traditional orchard<sup>15</sup> to the north of the Proposed Scheme - particular features of the district.

Agricultural grassland, hedgerows and open spaces also attract badgers (there are several badger setts located throughout the study area) as well as bats, birds and reptiles.

### Design Opportunities: Study Area

The Bognor and Arun GI studies identify numerous opportunities within and around the Proposed Scheme.

Design opportunities include:

- Enhance and improve the wildlife value of the existing hedge and ditch network, forming high-quality wildlife corridors.
- Increase hedgerow and woodland connectivity through additional planting.
- Ensure existing and proposed recreational open spaces are multifunctional and provide wildlife habitat alongside other functions.
- Safeguard and expand existing valuable habitats, enriching their existing biodiversity.
- Maximises biodiversity & create a BNG through an appropriate soft landscaping palette which is in keeping with local native species & habitats.
- Ensure management and maintenance proposals benefit biodiversity.

### Specific Design Opportunities: A29 Phase 1

In relation to the Phase 1 Site, opportunities include:

- Design for connectivity and value of habitats: woodland, hedgerow and ecological corridors.
  - » Manage/maintain boundary hedgerows, including 'gapping up' where necessary with varied species.
  - » Incorporate new hedgerow planting along the Proposed Scheme to connect to adjacent/existing features.
- Design for multifunctional use.
  - » Width of the Proposed Scheme.
  - » Separation of uses.
  - » Screen planting.
- Design for celebrating and protecting existing features.
  - » Traditional orchards.
  - » Hornbeam hedge.
  - » Mature trees.
- Design for maximising Biodiversity and BNG.
  - » BNG principles.
  - » Use of water management features.
  - » Native species.
  - » Pollinator Species.
- Design for appropriate management.
  - » Mowing regimes.
  - » Plant selection.

<sup>14</sup> HM Government, 2018, A Green Future: Our 25 Year Plan to Improve the Environment

<sup>15</sup> Natural England Open Data, Traditional Orchards HAP (provisional) (England). Available at <https://naturalengland-defra.opendata.arcgis.com/datasets/traditional-orchards-hap-provisional-england?geometry=-0.696%2C50.838%2C-0.615%2C50.848> [Accessed January 2020]

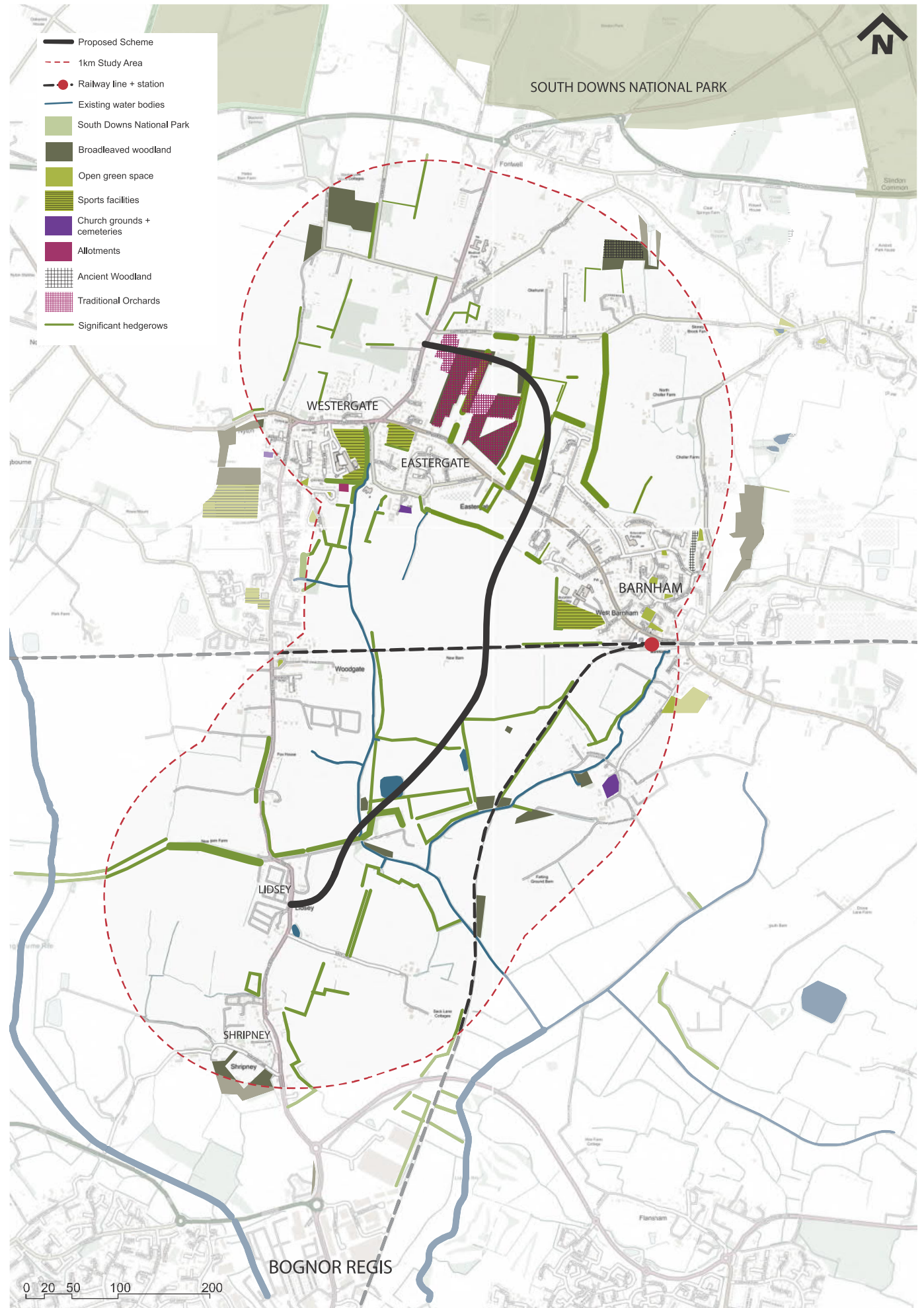


Figure 3. Biodiversity

# Sense of Place

## Overview of Requirements and Aims

GI can enhance sense of place by contributing to the wider setting for settlements and areas of development. A thorough understanding of existing local landscape character is required in planning for GI to ensure design and enhancements are appropriate and do not detract from the distinctiveness of a place. This applies to a range of GI functions such as habitat creation, planting, materials and wayfinding<sup>16</sup>.

## Baseline Assets: Sense of Place

The Site sits within National Character Area (NCA)<sup>17</sup> 126 South Coast Plain. The NCA profile describes the area as broadly divided into the coastal margins, heavily influenced by the sea; the expansive lower coastal plain which occupies most of the area; and the upper coastal plain which forms the transition between the lower plain and the chalk dip slopes of the South Downs and the South Hampshire Lowlands<sup>18</sup>. The Proposed Scheme sits within the latter.

Key characteristics of the north and east of the area, where the Proposed Scheme sits, are flat, regular patterns of large fields. It is a varied landscape, incorporating both open arable farmland and low-density settlements, with some wooded and semi-enclosed (somewhat suburban) character locally. Further north of the Site there is a network of small and medium-sized broadleaved woodlands, including ancient and semi-natural woodland, well linked by hedgerows and garden exotics providing an enclosed field framework.

It is a fertile area, due to superficial deposits & favourable climatic conditions, that supports intensive arable farming and horticulture, particularly soft fruit. This has given rise to the use of glasshouses and polytunnels in some areas. The underlying geology of flinty marine and valley gravels also gives rise to deep and well-drained, high quality soils.

The NCA profile sets out one of its Statements of Environmental Opportunities for this Character Area as “[P]lan for the creation of a strong landscape framework within and around major settlements and identified growth areas, while managing and enhancing existing greenspace and access, and balancing the needs of agriculture, communities and the natural environment.”<sup>19</sup>

The Proposed Scheme will cut through potential development areas between Eastergate and Barnham: see Figure 4 Sense of Place.

## Design Opportunities: Study Area

The Bognor and Arun GI studies identify numerous opportunities within and around the Proposed Scheme. Key opportunities include:

- Reinforce local character through the incorporation of appropriate planting and habitat creation. This may focus on restoring hedgerows, grassland and riparian habitats.
- Help define the urban-rural fringe through planting and the use of appropriate materials for access infrastructure.
- Lessen the landscape and visual impact of transport infrastructure through appropriate planting.
- Ensure landscape character is enhanced and reinforced through appropriate use of materials. This extends to path surfacing, wayfinding and any waterways infrastructure.

## Specific Design Opportunities: A29 Phase 1

In relation to the Phase 1 Site, opportunities include:

- Ensure water management solutions include riparian habitats (within, for example, swales, attenuation ponds or rain gardens).
- Ensure the planting palette reflects local species and character, including orchard trees.
- Ensure hard surfaces, structures and site furniture are in suitable materials and styles, including paths, lighting and acoustic barriers.
- Ensure suitable space is included for meaningful soft landscape planting and habitat creation.

<sup>16</sup> Arun District Council and LUC, 2019, Bognor Regis GI Framework: A Landscape & Green Infrastructure Framework Connecting Bognor Regis to the South Downs National Park.  
<sup>17</sup> NCAs divide England into 159 distinct natural areas. Each is defined by a unique combination of landscape, biodiversity, geodiversity, history, and cultural and economic activity. Their boundaries follow natural lines in the landscape rather than administrative boundaries.  
<sup>18</sup> Natural England, (2014). National Character Area Profiles - 126. South Coast Plain. [online]. Available at <http://publications.naturalengland.org.uk/category/587130> [Accessed January 2020].  
<sup>19</sup> Natural England, (2014). National Character Area profiles - 126. South Coast Plain. [online]. Available at <http://publications.naturalengland.org.uk/category/587130> [Accessed January 2020].

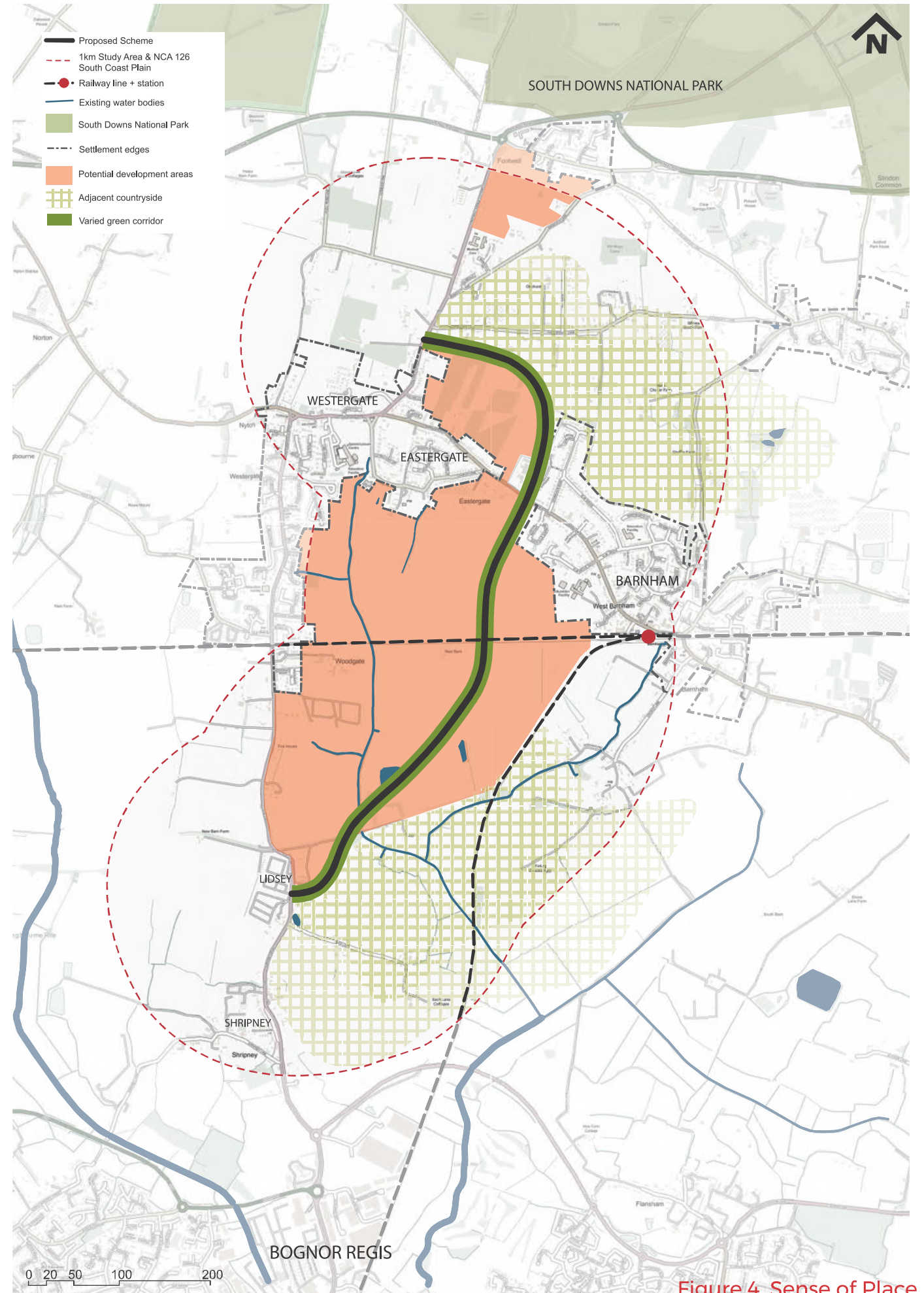


Figure 4. Sense of Place

# Historic Character

## Overview of Requirements and Aims

Cultural heritage and historic character may include both built features and evidence of previous land use. Identifying features of importance helps ensure new GI features enhance, rather than detract, from these assets. By identifying areas of focus and possible hubs of activity, areas may be prioritised for improving accessibility and providing opportunities for recreation<sup>20</sup>.

## Baseline Assets: Historic Character

Prior to the 18th century, the area around Eastergate and Barnham consisted mostly of Oak, Ash and Elm woodland, and open heathland on areas less fertile to the north. By the late 19th century, much of the land had been adopted for orchards or market gardens. Settlements remained consistently small from the Middle Ages through to the late 20th century, when a housing boom saw rapid settlement expansion and the rise of horsiculture on the fringes.

Four Listed Buildings are located at Manor Farm including the Barn and Cart Shed, Granary outbuilding, Manor Farmhouse, and St George's church. This cluster of buildings sit on the very outskirts of Eastergate, close to the Proposed Scheme and separated from the Scheme by farmland. There is evidence of Roman occupation with a Roman villa site near St. George's church and part of the church's chancel wall being made using Roman bricks. There are several other Listed Buildings in the wider area, clustered around the historic centres of Westergate and Eastergate, along Westergate Street, Nyton Road and Church Lane. Three Conservation Areas - Church Lane Barnham, Church Lane Eastergate and Eastergate Square lie within the study area, and Barham has an Area of Special Character; a mix of statutory and locally listed historical buildings and those with special character: see Figure 5 Historic Character.

## Design Opportunities: Study Area

The Bognor and Arun GI studies identify numerous opportunities within and around the Proposed Scheme. Key opportunities include:

- Open areas affording views from publicly accessible paths towards notable buildings and historic features should be protected and considered where tree planting is proposed.
- Utilise historic features as 'points of interest' along transport routes.
- Protect historic character through the appropriate use of materials.
- Conserve the character and cultural heritage of the local villages of Barnham, Westergate and Eastergate, including Eastgate Conservation Area surrounding Manor Farm.

## Specific Design Opportunities: A29 Phase 1

In relation to the Phase 1 Site, opportunities include:

- Although there are no direct views from the Proposed Scheme towards any heritage assets, there is the opportunity for interpretation panels along the route to celebrate local history or historic features ('points of interest'), such as the Traditional Orchards and impressive Hornbeam Hedge line.

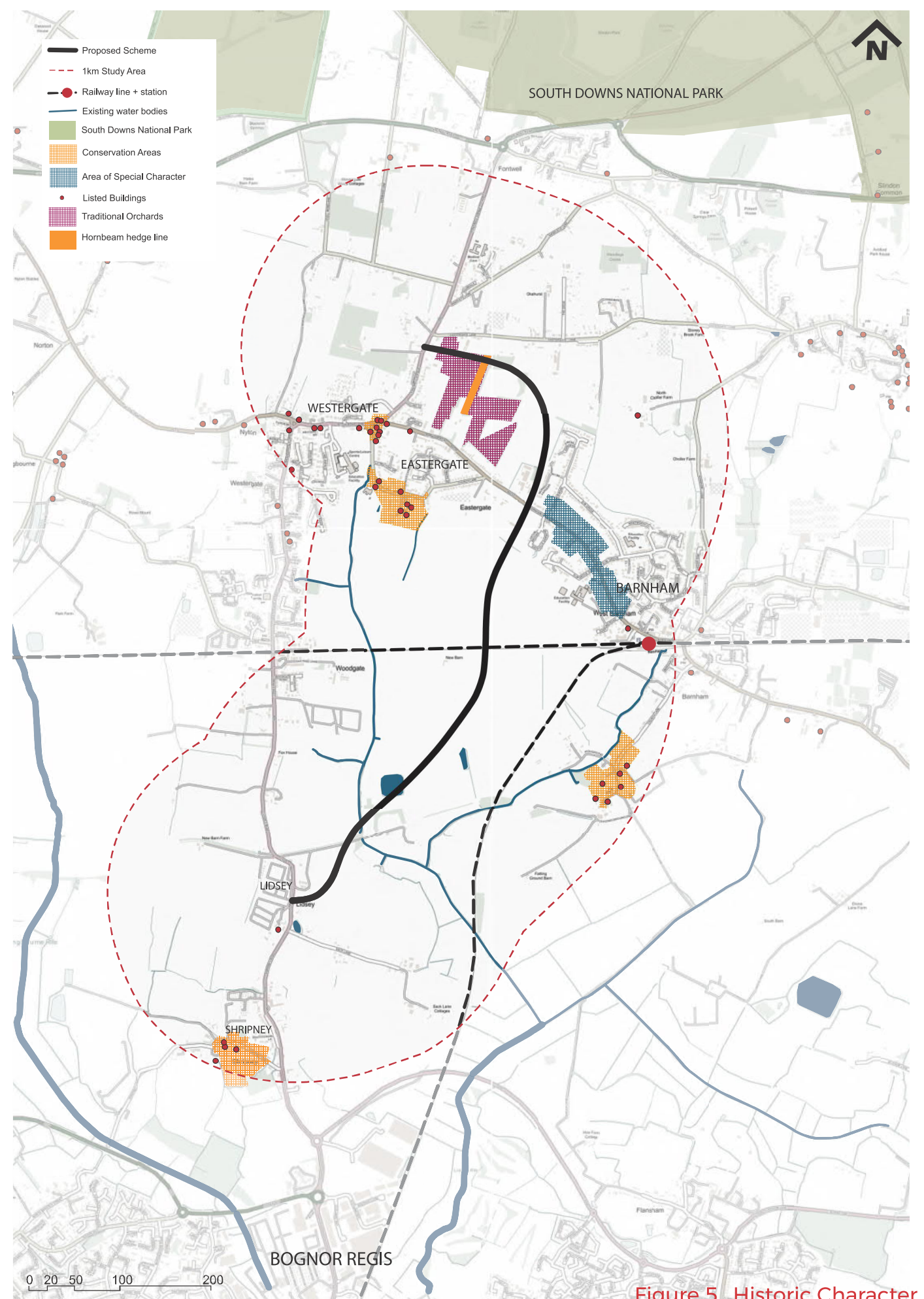


Figure 5. Historic Character

<sup>20</sup> Arun District Council and LUC, 2019, Bognor Regis GI Framework: A Landscape & Green Infrastructure Framework Connecting Bognor Regis to the South Downs National Park.



# Productive Green Environments

## Overview of Requirements and Aims

Productive environments are a key characteristic of the area with agricultural and horticultural uses near the study area. Productive green environments can be incorporated within and around urban areas and can help to improve people's quality of life, health and well-being. Areas for communal growing, whilst also providing opportunities for exercise and access to healthy food, can also foster improved social cohesion<sup>21</sup>.

## Baseline Assets: Productive Green Environments

A large proportion of the study area is currently under productive land uses including arable, horticulture and improved grassland. Agricultural land classification indicates land within the area ranges from excellent to moderate, with the moderate quality land generally most associated with flood zones. Traditional orchards are a particular feature of the area and cross the Proposed Scheme contributing to its productive and 'edible' landscape: see Figure 6 Productive green environments.

## Design Opportunities: Study Area

The Bognor and Arun GI studies identify numerous opportunities within and around the Proposed Scheme. Key opportunities include:

- Provide productive landscapes for community use as part of, or adjacent to, development proposals including local schools or other community hubs. This may comprise community garden, orchards or allotments.
- Provide areas for local sustainable food 'edible landscapes'.
- Community and school growing spaces included in new open spaces, adjacent to schools to encourage school use.
- Community orchard next to local schools as an educational and recreational resource.
- Use of fruit trees and shrubs in the public realm to encourage informal fruit picking.
- Planting schemes which support pollinators.

## Specific Design Opportunities: A29 Phase 1

In relation to the Phase 1 Site, opportunities include:

- Provide areas for local sustainable food as 'edible landscapes'.
- Retain/ enhance connections to productive landscapes.

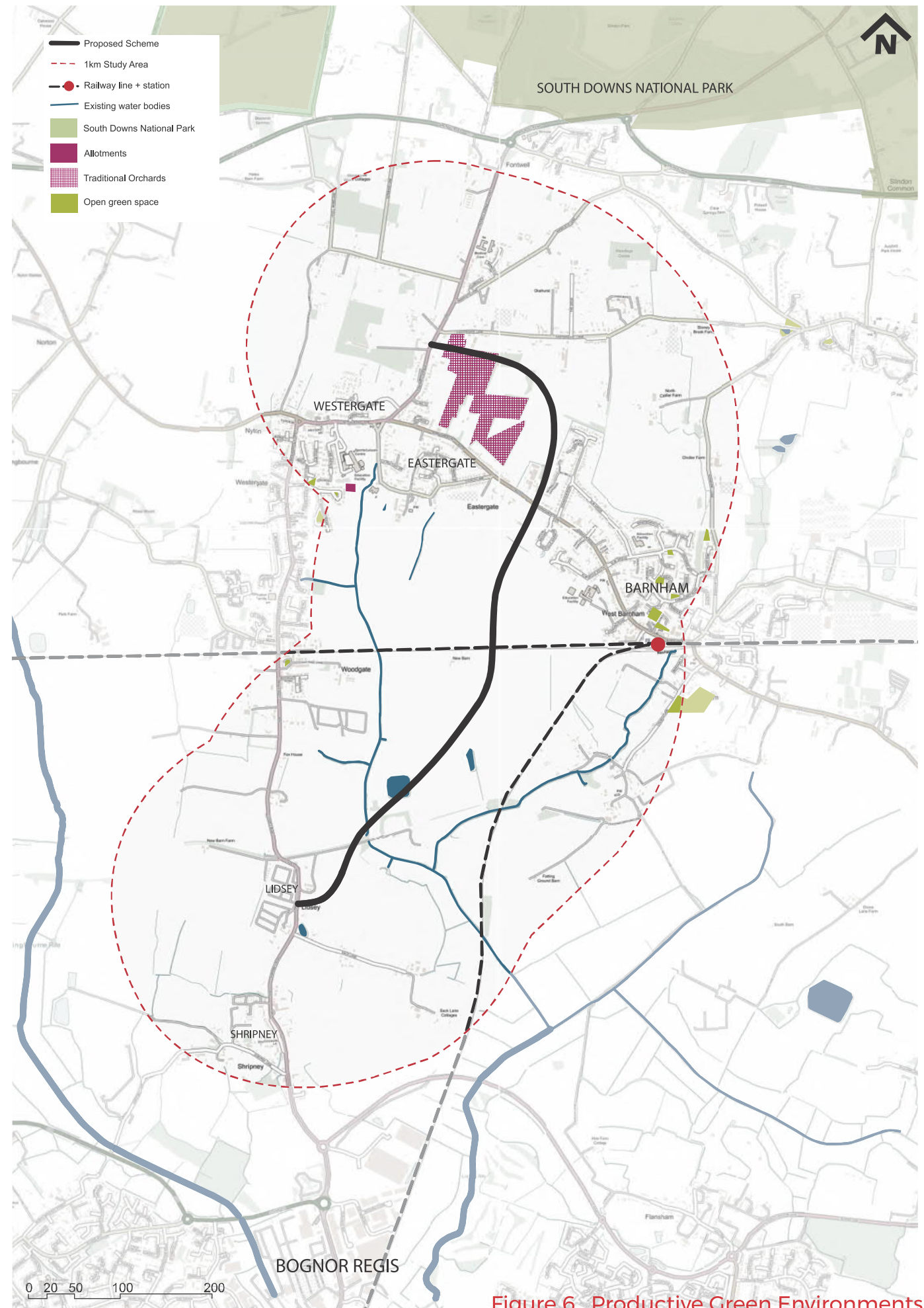


Figure 6. Productive Green Environments

21 Arun District Council and LUC, 2019, Bognor Regis GI Framework: A Landscape & Green Infrastructure Framework Connecting Bognor Regis to the South Downs National Park

# Sustainable Water Resources

## Overview of Requirements and Aims

The water environment is a key GI component in many landscapes, providing a wide range of benefits for recreation and biodiversity as well as conserving landscape character and sense of place. Consideration of local hydrology and issues relating to flooding or pollution is essential when planning for GI and offers the opportunity to mitigate against any predicted issues related to climate change. Linear features such as rivers and ditches also create opportunities to improve landscape connectivity both for biodiversity and access for recreation by providing a natural focus of 'routes' through the landscape for GI enhancements .

## Baseline Assets: Sustainable Water Resources

The majority of the Proposed Scheme sits within low lying ground and there is a network of streams and ditches throughout the study area, increasing in frequency towards the South, although there are no watercourses within the A29 Phase 1 Site. Watercourses in the wider area include Lidsey Rife, Ryebank Rife, and Aldingbourne Rife which flow south towards the coast, meeting at Bognor Regis before reaching the sea. Several smaller streams feed into these rifes, one of which starts at Church Lane, Eastergate and follows the boundary between Eastergate and Westergate villages. There are several smaller waterbodies in the area; of particular note is a small pond at the junction of Sack Lane with Lidsey Road and a duck pond where Eastergate Lane meets Barnham Road at Walberton village green: see Figure 7 Sustainable Water Resources<sup>22</sup>.

## Design Opportunities: Study Area

The Bognor and Arun GI studies identify numerous opportunities within and around the Proposed Scheme. Key opportunities include:

- Sustainable drainage features to reduce and help deal with the effects of climate change.
- SuDS features in the design.
- 'Space for water' for the community by designing SuDS features as usable public open space.
- A reduction in surface water runoff and burden in the watercourse network during heavy rainfall events through the incorporation of additional tree planting.
- Swales and small-scale attenuation where appropriate adjacent to new development and alongside pathways.

## Specific Design Opportunities: A29 Phase 1

In relation to the Phase 1 Site, opportunities include:

- Design sustainable, above ground drainage features based on SuDS principles.
  - » Soft landscape planting palette to include trees to aide storm water management.
- Design for biodiversity.
  - » Water features to be planted with suitable species to reflect likely rainfall inundation levels.
  - » Create varied above-ground features to aide habitat variation.
- Design for the Community.
  - » Provide 'space for water' for the community by designing SuDS features as usable public open space.
  - » Water features to be located adjacent to public paths, where possible, as visual (or physical) amenity features.
- Design for interaction.

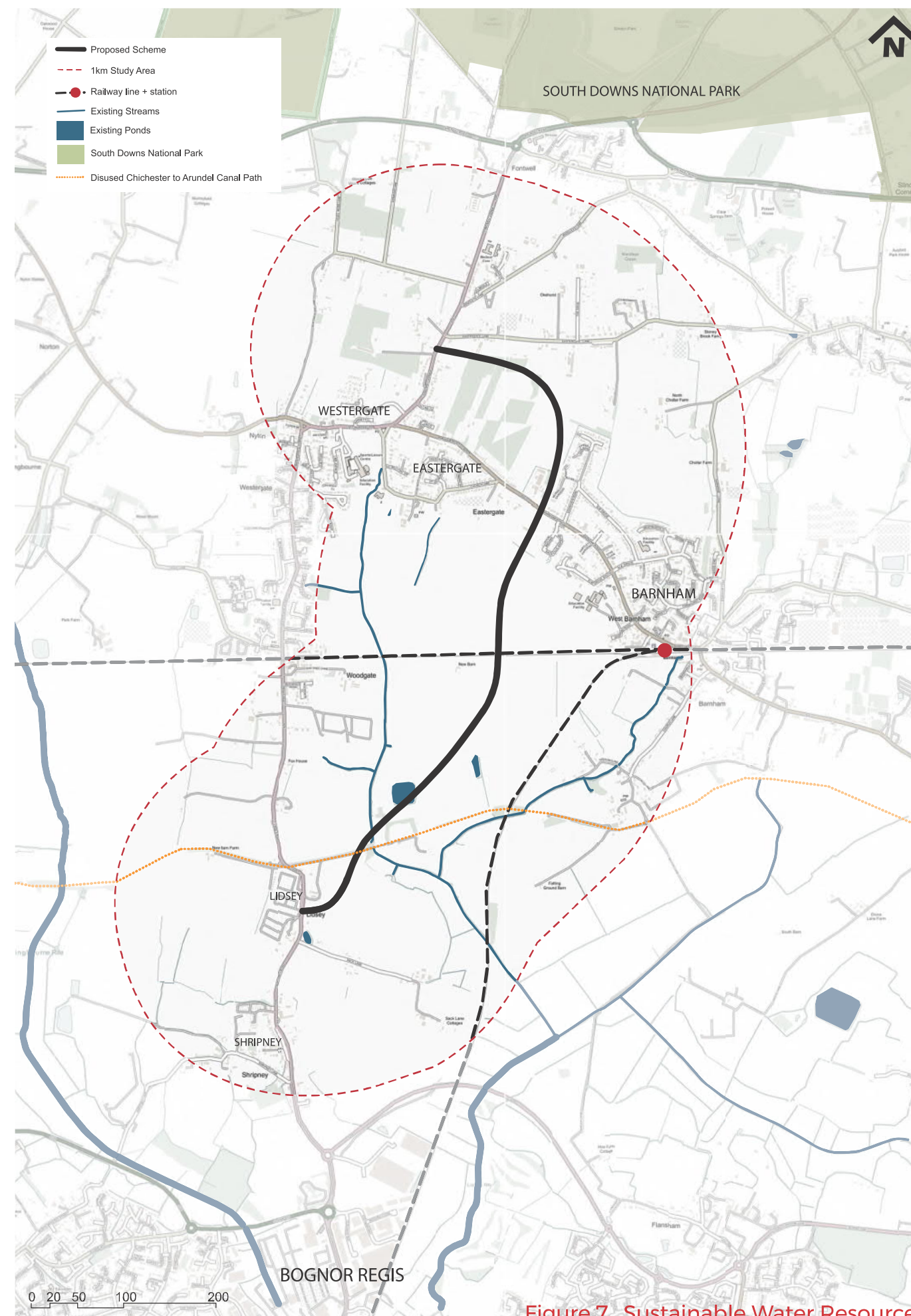


Figure 7. Sustainable Water Resources

22 Arun District Council and LUC, 2019, Bognor Regis GI Framework: A Landscape & Green Infrastructure Framework Connecting Bognor Regis to the South Downs National Park

## Pollution ●

### Overview of Requirements and Aims

Pollution comes in many forms, and the incorporation of green infrastructure can help to moderate most of them.

#### Air Pollution

A new study estimates that more than one in every 19 deaths in UK cities is related to air pollution<sup>23</sup>. Increasing levels of walking and cycling can help tackle poor air quality by reducing the number of vehicles on the road. Similarly, the importance of vegetation in improving air quality is widely acknowledged. As noted in their Breathing Better<sup>24</sup> report by WSCC, '*[T]rees and vegetation absorb carbon dioxide (the main greenhouse gas) and filter, absorb and reduce pollutant gasses including ozone, sulphur dioxide, carbon monoxide and nitrogen dioxide as well as producing oxygen.*'

Trees remove airborne pollutants at three times the rate of grassland<sup>25</sup> and particulate levels on tree-lined streets can be up to 60% lower than those streets without trees and for every 10% increase in a city tree canopy, ozone is reduced by between 3-7%<sup>26</sup>. A new study has also indicated that a hedgerow planted between a road and a playground could reduce particulate matter by over 50% on the playground side of the hedge, when in full leaf<sup>27</sup>.

#### Light Pollution

Artificial light provides valuable benefits to society, including through extending opportunities for sport and recreation, and can be essential to a new development. However, for maximum benefit, it is important to get the right light, in the right place and for it to be used at the right time.

White light, with more blue content or with ultraviolet content, is generally more disruptive to wildlife than warmer yellow/orange light. Similarly, for humans, light intrusion by white/blue light is more disruptive to sleep. Use of modern white light sources that filter out blue or ultraviolet light may mitigate these effects, as well as offering superior directional control<sup>28</sup>. However, whiter light aids people's vision and ability to perceive colour; it also facilitates CCTV use.

#### Noise Pollution

Noise pollution is unwanted or excessive sound that can have deleterious effects on human health and environmental quality<sup>29</sup>. Trees and vegetation in themselves are not effective at reducing noise levels, especially where there is limited space, but they can help with the perception of noise and can screen a solid noise barrier.

### Baseline Assets: Pollution

Light pollution across the district is at its lowest to the far north, in the vicinity of the National Park, & increases towards the built-up area of Bognor Regis and the coast. Air and noise pollution in the district are also low but there is a notable concentration of traffic around the existing A29 corridor which leads to higher levels of air and noise pollution at this location. However, the existing A29 is not lit except at junctions and in village centres.

Air, noise and light pollution are all at relatively low levels within the majority of the Proposed Scheme as it passes through existing countryside and villages of rural character. The existing site consists of fields edged predominantly with hedgerows and surrounded by further fields and hedgerows, resulting in low light, air and noise pollution due to lack of traffic or activity. Main sources of air, noise or light pollution into the existing site therefore currently come from surrounding streets, commercial areas and properties within the village of Eastergate.

The Proposed Scheme will redirect a proportion of existing traffic from the existing A29 corridor, easing traffic on the existing corridor and improving the conditions within the centres of Eastergate and Westergate. Conversely, new sources of noise, light and air pollution will be introduced into the Site, particularly concentrated where the route meets or crosses existing infrastructure: at the junctions of Fontwell Avenue and Barnham Road.

23 Kathrin Enenkel, Valentine Quinio, Paul Swinney, 27 January 2020 The Cities Outlook Study 2020 - Cities Outlook 2020 <https://www.centreforcities.org/reader/cities-outlook-2020/>

24 West Sussex County Council, January 2020, Breathing Better – A partnership approach to improving air quality in West Sussex.

25 Centre for Ecology and Hydrology – Lancaster University, Undated, Trees & Sustainable Urban Air Quality

26 Greenblue Urban, Edition 9 – The New Design Guide. Available at:

<https://architectprojects.co.uk/greenblue-urban-publish-edition-9-the-new-design-guide/>

27 Sustainable Cities & Society. Also in <https://www.scitecheuropa.eu/planting-hedges-road-pollution-exposure/91967/> (7th January 2019)

28 <https://www.gov.uk/guidance/light-pollution>

29 <https://www.britannica.com/science/noise-pollution>

### Design Opportunities: Study Area

Potential opportunities within and around the Proposed Scheme include:

- Planting as a means to improve air quality for users and residents in adjacent communities, particularly in the form of trees, hedgerows or evergreen shrubs.
- Retention of existing mature trees wherever possible, since mature trees absorb much more pollution than younger, newly planted trees.
- Directional, modern light fittings to minimise light spill and glare, and light only junctions/ sections necessary for health and safety.
- Where the walking and cycling route is adjacent to the highway, leave as large a gap as possible to incorporate planting.
- Consider the use of green acoustic barriers in space-limited locations.

### Specific Design Opportunities: A29 Phase 1

In relation to the Phase 1 Site, opportunities include:

- Planting of trees and hedgerows/low level shrubs including evergreens.
- Lighting to the carriageway should be restricted to purely around junctions and crossing points, as is the practice for the existing A29.
- Use of modern white light sources that filter out blue or ultraviolet light to be used for lighting columns in these locations.
- The off-road pedestrian and cycle path along the Proposed Scheme should have pedestrian scale lighting (such as bollard style lighting) to create a safe environment whilst keeping light pollution to a minimum.
- Consider the use of green acoustic barriers at the southern end of the Phase 1 Site where space is limited.

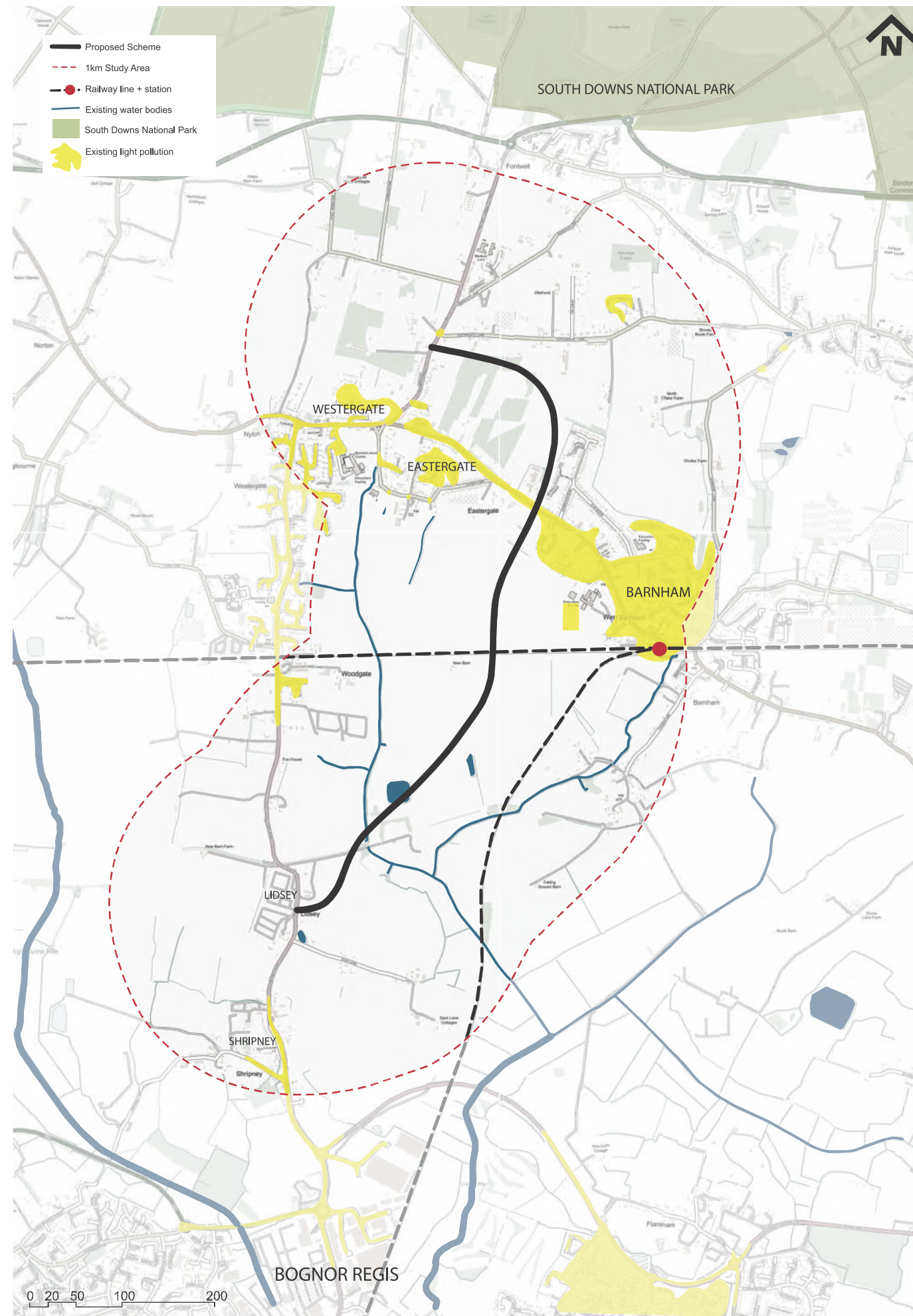


Figure 8. Pollution

## Health and Wellbeing

### Overview of Requirements and Aims

Trees can have a positive impact on health – a 10% increase in urban green space can postpone the onset of health problems by up to 5 years<sup>30</sup>. Conditions affected include asthma, skin cancer, and stress-related conditions. Trees can also aid concentration and enhance learning skills/social functioning in children. Roadside planting encourages careful driving and can help reduce incidences of speeding, as well as potentially reducing crime levels in urban areas<sup>31</sup>.

Good green infrastructure links to connect people to green space, facilities and workplaces can help to promote a healthy lifestyle and reduce stress levels, as can proximity to water. According to guidance by the RSPB<sup>32</sup>, drainage schemes have the potential to be a range of landscape features that are not only good for wildlife and water management, but also very good for people. Research has proven that being close to water, listening to the sound of water or watching wildlife on the water can all have a huge impact to health and well-being. It can reduce stress, lower heart rates & reduce blood pressure. Interacting with the water can be therapeutic and providing spaces for being still and quiet, surrounded by green space, can be just as important to health and well-being as space for physical activities and exercise.

### Baseline Assets: Pollution

As noted within the Bognor GI strategy, a lack of access and proximity to high quality green space can be associated with poor health and wellbeing outcomes for communities, linked both to poor physical health and mental health. Areas surrounding Barnham and Westergate have significant levels of poor health within the district. People of all ages, abilities and from all backgrounds should feel safe and comfortable on foot and cyclepaths, ideally through creation of a high-quality cycle lane separated from the main carriageway.

### Design Opportunities: Study Area

Potential opportunities within and around the Proposed Scheme include:

- Create & maintain links to allow the community to connect and enjoy the surrounding countryside and GI assets.
- Establish a consistent & safe off-road route as a mixed-use sustainable transport link for recreational use & commuters. Cycle parking and facilities should be included.
- Ensure new development or highways do not become a physical barrier between communities and the countryside. There is growing evidence that connecting people to a green environment can support better physical and mental health.
- Provide numerous crossing points along the route, such as to tie in with existing PRoWs as well as other key cross points identified for potential future off road links. Crossings should be suitable for pedestrians, cyclists and equestrians. It is important that all crossing points can accommodate all non-vehicular traffic to ensure that the Proposed Scheme does not become a physical barrier to some.
- It's important that pathways are welcoming and encourage people to use them. A green buffer between the pathway and the carriageway helps to create a safer and more enjoyable environment for pedestrians, cyclists and equestrians. The use of a variety of planting such as meadow grass, trees, shrubs, hedgerow and above ground drainage features can all be used to create a diverse and pleasant environment whilst separating people from traffic and helping to reduce air pollution.
- Peaceful green space with areas to sit and rest can be a facility for improving mental well-being. These rest spaces can also help those less physically able to get out and use the route to exercise. Placing seating at strategic locations along the route can assist those who can't walk long distances in one go.
- The width of pathways should be a minimum of 3m where they are multi-use, to accommodate pedestrians, cyclists and equestrians comfortably without one having a negative impact on another.
- Pathways should be locally widened to accommodate seating. Adding trees within the broadened hard landscaping / seating area would also allow people to sit beneath the trees.

### Specific Design Opportunities: A29 Phase 1

In relation to the Phase 1 Site, opportunities include:

- Ensure at-grade crossing points (for pedestrians, cyclists and equestrians) are located where existing PRoW are located, as well as ensuring connections into adjacent existing and proposed residential areas.
- Maximise the use of water in the landscape design.
- Create pocket green spaces with seating along the route for people to rest & enjoy their environment.
- Pathways should be kept clear of street furniture and clutter with lighting kept adjacent to the kerb.
- The safety of the route should also be considered through the use of pedestrian scale lighting for the entirety of the route and maintaining a visual connection with neighbouring proposed residential areas to increase natural surveillance.

30 Greenblue Urban, 2016, Benefits of Urban street Trees. Available at: <https://www.greenblue.com/wp-content/uploads/2016/05/Benefits-of-Urban-Trees.pdf>

31 Greenblue Urban, 2016, Benefits of Urban street Trees. Researchers have discovered reductions in both violent and petty crime, including domestic violence in locations with mature urban tree planting.

32 Graham, Day, Bray & Mackenzie, 2012, Sustainable drainage systems. Maximising the potential for people and wildlife (RSPB, WWT)