Eden Project International

EDEN PROJECT NORTH, MORECAMBE

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1

INTRODUCTION

1. INTRODUCTION

1.1. BACKGROUND

1.1.1. Eden Project International Limited (herein referred to as 'EPIL') is seeking full planning permission for a major mixed-use leisure-led development (herein referred to as the 'proposed development') at the former Bubbles Complex, Morecambe. The location is identified in **Figure 1.1: Site Location Plan of Volume 4** and described further in **Chapter 2: The Existing Site**.

1.1.2. This Environmental Statement (ES) supports a full planning application seeking permission for:

"Demolition of existing buildings and proposed construction of major mixed leisure development in association with Eden Project (including use classes E, F1 and F2), outdoor arena (including live music performances), public realm, landscaping works, cycle parking, energy pods, and associated infrastructure and engineering operations"

1.1.3. The site extends to circa 4.58 hectares and comprises land situated to the north and west of Morecambe Town Centre. The main development site bound by the promenade to the north and east, Marine Road Central to the south and the Grade II* listed Midland Hotel to the west.

1.1.4. Further details on the proposed development are presented in **Chapter 3: Description of the proposed development**.

1.1.5. The Environmental Statement (ES) is the written output of the Environmental Impact Assessment (EIA) process which has been undertaken in accordance with the [Town and Country Planning (Environmental Impact Assessment) Regulations 2017 and the Town and Country Planning (Development Management Procedure, Listed Buildings and Environmental Impact Assessment) (England) (Coronavirus) (Amendment) Regulations 2020 (Ref. 1.1) (referred to as the 'EIA Regulations 2017'). The ES Report is one of the supporting documents submitted to the determining planning authority, in this case Lancaster City Council, in support of the planning application.

1.1.6. This chapter outlines the legal framework and structure of the ES report and supporting documents. A breakdown of the information required by the EIA Regulations 2017 is provided in **Table 1-1** alongside guidance on the location of this information within this report.

1.1.7. WSP has been commissioned by the Applicant to carry out, with input from external consultants, the EIA in support of the full planning application. This has incorporated technical input from a number of consultants, as outlined in **Table 1-2**.

1.2. DEFINITION OF ENVIRONMENTAL IMPACT ASSESSMENT

1.2.1. The term 'environmental impact assessment' describes a procedure that must be followed for certain types of projects before they can be given planning consent. The procedure is a means of drawing together, in a systematic way, an assessment of a project's likely significant environmental effects. This helps to ensure that the importance of the predicted effects and the scope for reducing them are properly understood by the public and the relevant competent authority before it makes its decision. The aim of EIA is to:

"protect the environment by ensuring that a local planning authority when deciding whether to grant planning permission for a project, which is likely to have significant effects on the environment, does so in the full knowledge of the likely significant effects, and takes this into account in the decision making process" and "ensure that the public are given early and 2effective opportunities to participate in the decision making procedures." (Ref. 1.2)

1.3. LEGAL FRAMEWORK FOR THE ENVIRONMENTAL STATEMENT

1.3.1. The EIA Regulations 2017 implement the requirements of EU Directive 2014/52/EU and require that prior to consent being granted, for certain types of development, an EIA must be undertaken. The EIA Regulations 2017 set out the types of development which must always be subject to an EIA (Schedule 1 development) and other developments which may require an assessment if they give rise to likely significant environmental effects (Schedule 2 development).

SCREENING (REGULATIONS 5, 6 AND 7)

1.3.2. The proposed development falls under Schedule 3 of the EIA Regulations 2017 and is therefore subject to statutory EIA.

1.3.3. Under Schedule 2, it is a matter for the Local Planning Authority to determine the need for an EIA through the evaluation of the sensitivity of the Site and surrounding area and whether the proposed development has the potential to result in likely significant environmental effects by virtue of its characteristics, location and nature of the effects (in accordance with Regulation 5 of the EIA Regulations 2017).

1.3.4. The applicant considers that an EIA is required to support the planning application and did not submit a request for an EIA Screening Opinion.

SCOPING (REGULATION 15)

1.3.5. An EIA Scoping Report was submitted to Lancaster City Council on 14 June 2019 (as presented in **Appendix 1.1**, together with a formal request for an EIA Scoping Opinion, in accordance with Regulation 15(1) of the EIA Regulations 2017. A formal Scoping Opinion was subsequently received from the Council on 30 August 2019 as included in **Appendix 1.2**. The full set out consultation responses to the Scoping request are contained at **Appendix 1.3.**

1.3.6. A Scoping Addendum was submitted to LCC on 30 July 2021, a copy of which is contained at **Appendix 1.4**. Whilst the proposed development remains predominantly in line with the parameters set out in the 2019 Scoping Report, there have been refinements to certain elements of the scheme that are the result of an extensive design feasibility and alignment exercise that has taken place since LCC issued its Scoping Opinion on 30 August 2019. Copies of the consultation responses received to the latest ES Scoping exercise are contained at **Appendix 1.5**. Further details of these scheme refinements are set out in Chapter 5.

1.3.7. Further details on the Scoping Opinions and how they have informed this ES are provided in **Chapter 5: Approach to EIA**.

ENVIRONMENTAL STATEMENT

1.3.8. The findings of the EIA are presented in this ES which has been prepared in accordance with the EIA Regulations 2017 as well as planning practice guidance (Ref. 1.3). The ES is provided in four parts:

- Volume 1: Non-Technical Summary;
- Volume 2: Main Text and Figures;
- Volume 3: Technical Appendices; and
- Volume 4: Figures and Illustrations.

1.3.9. Schedule 4 of the EIA Regulations 2017 provides details of the information required for inclusion in an ES. **Table 1-1** summarises the requirements and where the information is located in this ES.

Table 1-1 - Location of Required Information within the ES

	Required Information	Location within this ES
1	Description of the development, including in particular:	
	(a) a description of the location of the development	Chapter 2: The Existing Site
	(b) a description of the physical characteristics of the whole development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases	Chapter 3: Description of the proposed development
	(c) a description of the main characteristics of the operational phase of the development (any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used	Chapter 3: Description of the proposed development
	(d) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced during the construction and operation phases.	Chapter 5: Approach to EIA and technical chapters 6 to 16
2	A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.	Chapter 4: Reasonable Alternatives Considered
3	A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge	Chapter 2: The Existing Site, Chapter 5: Approach to EIA and technical chapters 6 to 16
4	A description of the factors specified in regulation 4(2) likely to be significantly affected by the development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.	Technical chapters 6 to 16
5	A description of the likely significant effects of the development on the environment resulting from, inter alia:	
	the construction and existence of the development, including, where relevant, demolition works;	Technical chapters 6 to 16
	the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;	Technical chapters 8, 9 and 10
	the emission of pollutants, noise, vibration and the creation of nuisances	Technical chapters 12 and 13
	the risks to human health, cultural heritage or the environment	Technical chapters 6 to 16
	the cumulation of effects with other existing and/or approved projects, considering any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;	Technical chapters 6 to 16

	Required Information	Location within this ES
	the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change;	Chapter 3: Description of the proposed development and technical chapters 6 to 16
	the technologies and the substances used.	
6	A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.	Technical chapters 6 to 16
7	A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.	Technical chapters 6 to 16
8	A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to EU legislation such as Directive 2012/18/EU(3) of the European Parliament and of the Council or Council Directive 2009/71/Euratom(4) or UK environmental assessments may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.	Chapter 3: Description of the proposed development
9	A non-technical summary of the information provided under paragraphs 1 to 8	Non-Technical Summary (Volume 1)
10	A reference list detailing the sources used for the descriptions and assessments included in the environmental statement.	All chapters

1.4. THE PROJECT TEAM

1.4.1. In line with Regulation 18(5)(a) – (b) of the EIA Regulations 2017, the ES and technical assessments which inform it have been undertaken by a suitably qualified project team. **Table 1-2** presents the Project Team for the ES, their associated roles and expertise. The Project Team stated are responsible for the scope, content and assessment of likely significant environmental effects of their respective technical chapters (where relevant).

1.4.2. WSP is responsible for the coordination, compilation and procedural review of the ES. WSP is registered under the EIA Quality Mark operated by the Institute of Environmental Management and Assessment (IEMA) which recognises our commitment to excellence in EIA activities. WSP was one of the original eight pilot organisations in the UK that trialled the process in 2011 and developed the EIA Quality Mark scheme from the former Corporate Registered Assessor process.

1.4.3. We have continued to maintain our EIA Quality Mark registration, following annual examination by IEMA in relation to our ongoing products, staff, innovation and promotion of EIA within the industry. WSP has and continues to support and lead nationally recognised guidance for EIA in the UK.

1.4.4. WSP has developed and applies an in-house set of processes, procedures and guidance for EIA based on sound project management principles.

Table 1-2 - The Project Team

Element	Competent Expert Evidence
EIA Coordination, overarching technical authority for the ES Chapter 1: Introduction Chapter 2: The Existing Site Chapter 3: Description of the proposed development Chapter 4: Reasonable Alternatives Considered Chapter 5: Approach to the EIA Non-Technical Summary	Daniel Jackson (WSP), BA(Hons) MPlan MRTPI - EIA Project Director, Planning Consultancy James Warrington (WSP) BA(Hons) MSc MRTPI – EIA Project Manager, Planning Consultancy
Chapter 6: Townscape, Seascape and Visual Impact Assessment	Lindsey Huxley (TEP) - Principal Landscape Architect
Chapter 7: Cultural Heritage	Nick Corbett (WSP), BA Hons Bpl MA (Urb Des) MRTPI IHBC - Associate Director, Heritage Planning & Placemaking Ben Lawless (WSP), MRTPI – Principal Planner – Heritage Planning & Placemaking
Chapter 8: Nature Conservation and Biodiversity	Francis Hesketh (TEP), MCIEEM - Director Mike Walker (TEP), MCIEEM – Principal Ecologist
Chapter 9: Ground Conditions and Geology	Dr Catriona Woods (WSP), PhD, MSc, BSc (Hons) – Director, Ground & Water Paula Gallagher (WSP), BSc, MSc, CSci, MIEnvSc – Associate, Ground & Water
Chapter 10: Hydrology, Drainage and Flood Risk	Matthew Quinnell (WSP), BSc (Hons), MCIWEM - Associate, Water Risk Management and Engineering Jasmine Hope (WSP), BSc (Hons), MCIWEM – Engineer, Water Risk Management and Engineering
Chapter 11: Traffic, Transport and Access	Kevin Riley (WSP), MCIHT - Director Jim Outterside (WSP), MCIHT – Associate Director Alberto Poltz-Faggiani (WSP), MCIHT – Transport Planner
Chapter 12: Noise and Vibration	Simon Faircloth (WSP), PG DIP MIOA – Principal Acoustic Engineer
Chapter 13: Air Quality	Amber Sunderland (WSP) – Principal Consultant – Air Quality, Environment
Chapter 14: Wind, Daylight/Sunlight and Microclimate	Joseph Berthoud (Hilson Moran) – Principal Sustainability Consultant
Chapter 15: Socio-economics	George Burgess (WSP), BA (Hons) MSc MRTPI – Principal Planner, Planning Consultancy

1.5. PLANNING APPLICATION DOCUMENTS

1.5.1. The ES is part of a suite of documents which will support the planning application for the proposed development. The planning application submission comprises the following documents:

- Application Fee and Covering Letter;
- Planning Submission Documents:
  - Application Forms, Certificates and Notices;
  - Architectural and Landscaping Planning Drawings.
  - Design and Access Statement;
  - Planning Statement;
  - Statement of Community Engagement;
  - Lighting Strategy;
  - Drainage Strategy;
  - Sustainability and Energy Strategy;
  - Waste Management Strategy; and
  - Utilities Strategy.
- Environmental Statement: Volumes 1-4

1.6. REFERENCES

- **Reference 1.1**: Town and Country Planning (Environmental Impact Assessment) Regulations 2017. Statutory Instrument 2017 No. 571;
- **Reference 1.2**: Planning Practice Guidance (PPG) Online Tool, Paragraphs 032 and 033. Reference ID: 4-002-20140306. [Online] accessed via https://www.gov.uk/guidance/environmental-impact-assessment; and
- **Reference 1.3**: Planning Practice Guidance (PPG) Online Tool. [Online] accessed via https://www.gov.uk/guidance/environmental-impact-assessment.

2

THE EXISTING SITE

2. THE EXISTING SITE

2.1. INTRODUCTION

2.1.1. This chapter provides an overview of both the context and environmental characteristics of the Site and the surrounding area. Key spatial boundaries are illustrated on **Figure 1.1: Site Location Plan** and planning and environmental designations are summarised below. Further technical data is provided within the technical chapters 6 to 16.

THE SITE

2.1.2. The site extends to circa 4.58 hectares and comprises land situated to the north and west of Morecambe Town Centre. The main development site bound by the promenade to the north and east, Marine Road Central to the south and the Grade II* listed Midland Hotel to the west.

2.1.3. The main development site is identified by Lancaster City Council as a Development Opportunity Site. The site is known as the Seafront Headland, Central Promenade and also the site of the former Bubbles leisure complex.

2.1.4. The site falls within the Morecambe Conservation Area and close to a number of designated heritage assets.

2.1.5. The main development site is bound to the north, east and west by the promenade which extends east-west along the Bay of Morecambe. A Royal National Lifeboat Institution (RNLI) station lies immediately north of the site adjoining the promenade. The stone jetty extends out from the promenade to the north west of the site.

2.1.6. There are no adopted highways nor Public Rights of Way within the proposed development red line boundary.

2.1.7. Vehicular movements within the site are currently only allowed for emergency vehicles, RNLI access, the Stone Jetty (servicing) and the Bay Arena Car Park.

2.1.8. The existing site comprises five distinct areas:

- The Harbour Band area in the north-western corner of the site which is laid out as public open space following the demolition of the former bandstand;
- The redundant Bubbles site comprising the former swimming pool complex temporarily used by fair rides and attractions;
- The dome theatre southeast of the Bubbles complex built in 1979 and presently disused;
- The Bay Arena Car Park to the east; and
- The Promenade Gardens in the south-western corner of the site.

2.1.9. The site is located at the heart of the Morecambe promenade, a well-pedestrianised traffic free corridor connecting Heysham and Hest Bank. The traffic free environment of the site also includes cycling, a key activity along the Promenade. Sustrans Route 69 (Way of the Roses) and 700 permeate part of the site. These routes connect Morecambe with Lancaster via a segregated traffic free route along the River Lune.

2.1.10. Immediately to the south west lies the Grade II* listed Midland Hotel and the Bay of Morecambe.

2.1.11. The site is bound to the south by Marine Road Central beyond which lies the Grade II* listed Winter Gardens, amusement arcades, shops, public realm and car parks serving Morecambe Town Centre.

2.1.12. Other designated heritage assets in close proximity to the site boundary include the Grade II listed station building and lighthouse at the northern tip of the stone jetty, the Grade II listed wall and entrance piers enclosing the car park and the Grade II listed war memorial in the main site.

Figure 1-1 - Site Location Plan



SURROUNDING AREA

2.1.13. The site is situated immediately to the north and west of Morecambe town centre. Morecambe Train Station is located approximately 300 metres to the south east.

2.1.14. In terms of strategic infrastructure, the site is located in close proximity to the M6 and other key roads such as the A683.

2.1.15. Morecambe Railway Station is located just 300 metres to the south of the proposed development. It provides regular services to Lancaster and Leeds. Wider regional services are available from Lancaster.

2.1.16. Both Morecambe and Lancaster Railway Stations provide key walking and cycling connectivity with the proposed development site with traffic free and segregated walking and cycling routes.

2.1.17. Morecambe Bus Station is located on Central Drive next to the railway station, effectively forming a transport hub in the town centre. Local services connect Morecambe with Kendal, Lancaster, Preston and multiple local and regional destinations.

2.1.18. Furthermore, a series of bus stops for local services are located across Marine Road Central, all of which provide sheltered waiting facilities.

2.1.19. Further details on current land use within the Site and surrounding area are provided within the technical chapters at chapter 6 to 16.

2.2. ENVIRONMENTAL CHARACTERISTICS

2.2.1. Key environmental features are summarised below, with further detail available in technical chapters 6 to 16.

Ecology and biodiversity

2.2.2. There are six statutory designated sites within 5km of the site, as follows:

- Morecambe Bay Special Area of Conservation;
- Morecambe Bay and Duddon Estuary Special Protection Area (SPA);
- Morecambe Bay Ramsar;
- Morecambe Bay SSSI;
- Heysham Moss SSSI; and
- Lune Estuary SSSI.

2.2.3. There is also one non-statutory designated site within 2km of the site – Oxcliffe Road Lake Biological Heritage Site (BHS).

2.2.4. The site is within the Morecambe Bay Limestones and Wetlands Nature Improvement Area, one of the primary purposes of the Nature Improvement Area is to improve and connect the area's special wetland, limestone grassland and woodland habitats.

Landscape and visual

2.2.5. The site is not located within any international, national or local landscape designations. There are, however, a number of designations in proximity to the site, as follows:

- Heysham Head Local Landscape Designation – 480m to the southwest;
- Torrishome Barrow Key Urban Landscape – 2.8km to the east;
- Arnside and Silverdale Area of Outstanding Natural Beauty (AONB) – 5.6km to the north;
- Williamson Park Key Urban Landscape – 6.5km to the southeast; and
- Forest of Bowland Area of Outstanding Natural Beauty (AONB) – 8km to the east.

Cultural heritage and archaeology

2.2.6. The application site is entirely within the Morecambe Conservation Area. There are no heritage assets within the scheme boundary, however the Grade II listed War Memorial (NHLE 1292855) is located directly adjacent to the site's southern boundary and Grade II* listed Midland Hotel (NHLE 1208988) is located directly adjacent to the site's western boundary. The Winter Gardens (NHLE 1025280), a Grade II* listed theatre, is located on the southern side of Marine Road Central a short distance from the site's southern boundary. In addition to the Conservation Area and three buildings detailed above, the following relevant Grade II listed buildings have been identified within 500m of the site boundary:

- Former Station Building and Lighthouse (NHLE 1207223)
- The Clock Tower (NHLE 1279837)
- Morecambe Railway Station Main Building (NHLE 1207224);
- 217, 219 and 221 Marine Road Central (NHLE 1207218); and
- Wall and 2 pairs of entrance piers enclosing south-east side of car park of Midland Hotel (NHLE 1292883).

2.2.7. There are two non-designated heritage assets within 500m of the site boundary:

- Former Woolworths Building, now occupied by B&M; and
- Former Littlewoods Building, now occupied by CB Warehouse.

2.2.8. There are no known archaeological interests beneath the site.

Hydrology and flood risk

2.2.9. The site lies adjacent to Morecambe Bay.

2.2.10. The Environment Agency's Flood Map for Planning shows the Site lies in Flood Zone 1, 2 and 3 and so the chance of flooding in any year ranges from a 0.1% to 3% probability.

Air quality

2.2.11. The site is not located within or adjacent to an Air Quality Management Area (AQMA). The nearest AQMA to the site is the City of Lancaster AQMA, which lies approximately 4.77km east/southeast of the site.

Noise

2.2.12. A desktop review of the site has identified the existing key noise sources around the site and the closest sensitive receptors.

2.2.13. Existing noise sources include are predominantly associated with road traffic noise from Marine Road Central to the south.

2.2.14. The closest sensitive receptors to noise impacts are considered to be:

- Residential properties, hotels and B&Bs immediately to the south and south east along Marine Road Central;
- The Midland Hotel immediately west of the site; and
- Ecological receptors within Morecambe Bay.

2.2.15. No clearly identifiable vibration sources have been identified by our desktop review.

2.2.16. Further details of the environmental characteristics and designations within the Site and surrounding area are provided and assessed in accordance with relevant policy, legislation and guidance in technical chapters 6-16.

2.3. SENSITIVE RECEPTORS

2.3.1. There are a number of sensitive receptors that have been identified as relevant to the proposed development. As the extent of sensitive receptors differs between different ES topic areas, sensitive receptors relevant to each ES topic area are detailed and have been taken into consideration within the assessments presented in technical chapters 6 to 16.

3

DESCRIPTION OF THE PROPOSED DEVELOPMENT

3. DESCRIPTION OF THE PROPOSED DEVELOPMENT

3.1. INTRODUCTION

3.1.1. This chapter provides a description of the proposed development, including a description of how Eden Project North would be constructed, alongside the assumptions used for the basis of assessment where this information is subject to confirmation. This description aligns with what planning consent is sought for, and, together with the supporting plans (as identified in Section 3.6 below), is what the technical assessments are based upon (technical chapters 6 to 16).

3.2. SCHEME OVERVIEW AND DEVELOPMENT PARAMETERS

3.2.1. The planning application will seek full planning permission for the following development:

"Demolition of existing buildings and proposed construction of major mixed leisure development in association with Eden Project (including use classes E, F1 and F2), outdoor arena (including live music performances), public realm, landscaping works, cycle parking, energy pods, and associated infrastructure and engineering operations"

3.2.2. The following maximum development parameters were set for the development within the ES Scoping Report (scoping ref: 21/00988/EIO, submitted to LCC on 30 July 2021) and the Environmental Impact Assessment (EIA) will has been prepared on this basis:

- Maximum building height of 37.3m AOD;
- Maximum building footprint of 18,000sqm (GEA);
- Maximum visitor numbers of 1 million per annum with an estimated average of 760,000 per annum. There will be timed ticketing to control visitor flows. The proposed development has been designed to accommodate a maximum of 4,000 visitors per day. Feasibility studies indicate an estimated average of 100 days per annum of up to 3,750 visitors; 200 days per annum of up to 2,500 visitors; and 60 days per annum of up to 1,250 visitors. There will be a maximum of 750 visitors per hour accessing the site.
- Maximum core hours of operation (main site):
  - Daily: 09:00 – 21:00
- Maximum hours of operation (main site – summer time):
  - Daily: 09:00 – 00:00
- Maximum 6,000-person capacity outdoor arena to host up to 8 late evening events per calendar year (summer months only) during the following hours:
  - 18:00 – 00:00 (music finishing at 23:00)
- A canopy-like structure primarily to provide weather protection for visitors plus flexible spaces that can potentially accommodate Class E food and beverage and retail outlets, house renewable energy technologies and/or provide sheltered cycle parking.

3.2.3. Within these maximum parameters, the proposed development will comprise development within the following land and building use categories ('Use Classes'), as defined by the Town and Country Planning (Use Classes) Order 1987 (as amended):

- Use Class E (commercial, business and service use);
- Use Class F1 (learning and non-residential institutions);
- Use Class F2 (local community uses); and
- *Sui Generis* use (ie the outdoor arena including use for live music performances, that does not fall within any defined Use Class category).

3.2.4. The proposed layout of the development accords with the aforementioned proposed parameters of development. The latest Site Layout Plan has been included at **Figure 3.1** with details as to how the layout demonstrates compliance set out in section 3.4.

3.2.5. No development will take place outside of the site's red line boundary as part of these proposals, however, EPIL will work with the City Council to secure future enhancements as part of the wider transformation of the local area.

3.2.6. An indicative opening year for the development has been given as spring 2024. The site is anticipated to be built over a 2-year period.

3.3. PLANS AND DESIGN ASSUMPTIONS

3.3.1. The proposed development is illustrated by a series of plans. The plans to be used for the purpose of the EIA, and which are presented in the ES and therefore submitted in support of the planning application, are summarised in **Table 3.1** below:

Drawing/ Document Reference	Drawing/Document Title	Scale	Revision
Architectural drawing pack			
A01 1001	Site Location Plan	1:1250 @A1	3
A01 1002	Existing Site Plan	1:500 @A1	1
A01 1003	Proposed Demolition Plan	1:500 @A1	2
A01 1004	Existing Site Levels Section	1:500 @A1	2
A01 1005	Existing Topographic Survey	1:500 @A1	0
A01 1006	Proposed Site Levels Section	1:500 @A1	0
A02 1002	Proposed Site Plan	1:500 @A1	4
A02 1003	Proposed Site Layout Plan	1:500 @A1	4
A02 1004	Proposed Site Access Plan	1:500 @A1	3
A03 1001	Lower Ground Level (+3.5m/+4.5m) Plan	1:250 @A1	4
A03 1002	Ground Level (+7.72/+8.5m) Plan	1:250 @A1	5
A03 1003	First Floor Level (+11.72/+12.72) Plan	1:250 @A1	4
A03 1004	Roof Plan	1:250 @A1	3
A06 1001	Proposed North and South Building Elevations	1:250 @A1	3
A06 1002	Proposed East and West Building Elevations	1:250 @A1	3
A06 1003	Proposed Elevations in Context	1:500 @A1	3
Landscape drawing pack			
EDNN-TEP-ZZ-Z1-DR-LA-004	Landscape – Northern Coastal Edge	1:250@A1	P01
EDNN-TEP-ZZ-Z2-DR-LA-005	Landscape – Rhythm Garden and Seasonal Support Space	1:250@A1	P01
EDNN-TEP-ZZ-Z3-DR-LA-006	Landscape – Energy Field	1:250@A1	P01
EDNN-TEP-ZZ-Z4-DR-LA-007	Landscape – Tide Garden and Western Space	1:250@A1	P01
EDNN-TEP-ZZ-ZZ-DR-LA-001	Landscape – General Arrangement	1:750@A1	P01
EDNN-TEP-ZZ-ZZ-DR-LA-008	Landscape Surfacing Proposals	1:750@A1	P01

Drawing/ Document Reference	Drawing/Document Title	Scale	Revision
EDNN-TEP-ZZ-ZZ-DR-L-009	Boundary Treatments	1:750@A1	P01
EDNN-TEP-ZZ-ZZ-DR-LA-012	Sections – Tide Garden and Energy Field	As shown @A1	P01
EDNN-TEP-ZZ-ZZ-DR-LA-013	Sections – Area and Northern Edge	As shown @A1	P01

3.3.2. These plans should be read alongside the Design & Access Statement which sets out a series of overarching design principles that have influenced scheme design. These design principles are outlined below alongside any necessary assumptions for the purposes of the EIA.

PLANNING APPLICATION BOUNDARY

3.3.3. The planning application boundary is illustrated in **Figure 1.1: Site Location Plan**.

3.3.4. The EIA is based upon this planning application boundary which totals approximately 4.58 ha.

3.4. DESIGN & ACCESS OVERVIEW

QUANTUM

3.4.1. The total floorspace assessed for the purposes of this ES is 18,000sqm (GEA). However, the submitted plans in support of the application demonstrate a total internal floor area of 17,186sqm (GIA). Given this is below the maximum floorspace parameter assessed in this ES and technical chapters, the total floorspace proposed is clearly within the acceptable limits.

3.4.2. **Table 3.2** below provides a summary of the schedule of accommodation, the split of internal and external floorspace/areas and the floor level(s) each use / area designation is located. Further details are contained within the Design & Access Statement.

Zone / Area Designation	Floorspace Internal Areas (sqm)	Floorspace External Areas (sqm)	Level
Public Realm (approaches)	-	1,333	Ground Floor
Visitor Centre	1,265	-	Ground Floor
Bay Hall	890	-	Ground Floor
Bay Glade	2,800	-	Ground / First Floor
Rhythm Machine	5,192	-	Basement / Ground / First Floor
Natural Observatory (including Bay Restaurant)	1,514	-	First Floor
Seasonal Programming (exhibition space)	872	-	Basement
Outdoor Arena	53	5,040	Ground / First Floor
Basking Deck	-	500	First Floor
Centralised Venue Operations	1,810	1,205	Basement / Ground Floor
Other Ancillary Uses/Spaces	2,790	1,612	Basement / Ground / First Floor
Total	**17,186**	**8,485**	**-**

3.4.3. Accordance with other parameters set out at ES Scoping stage are highlighted where relevant in the following sub-sections.

LAYOUT

3.4.4. The overall approach to site layout has been designed to provide visitors with an immersive experience, whilst integrating well with the local setting and surroundings.

3.4.5. The layout seeks to work with the opportunities and constraints of the site, working effectively with existing levels to ensure that the shell structures respond to the topography, views and neighbouring uses.

3.4.6. The Site Layout Plan identifies the various components of the scheme, which can be broadly categorised into the following elements:

- Four shell-shaped buildings:
  - Rhythm Machine;
  - Natural Observatory;
  - Bay Glade (including Glade Café at first floor level);
  - Bay Hall;
- Four Seasons Garden;
- Tide Garden;
- Rhythm Gardens (including arena stage);
- Visitor Centre (including Eden Retail);
- Bay Restaurant with outdoor terrace (at first floor level);
- An 'Energy Field' in part of the southern landscaped area comprising Air Source Heat Pump (ASHP) energy pods;
- A canopy-like structure within part of the southern landscaped area, primarily to provide weather protection for visitors plus flexible spaces that will have the potential to accommodate food and beverage and retail outlets, house renewable energy technologies and/or provide sheltered cycle parking;
- Landscaped gardens to the south and far west of the site.

3.4.7. Eden Project North will comprise a cluster of four shell-shaped buildings with an outdoor garden (Four Seasons Garden) providing a centrepiece to this cluster.

3.4.8. The Visitor Centre and main entrance to the venue will be located within an adjoining building immediately to the south of the shell-like cluster. This building, as will adjoining link buildings to the shell-like structures and external areas, will take the form of a 'dunescape' with the shell-like structures rising above to create a striking and location-specific design.

3.4.9. The shell-like structures, the Four Seasons Garden and Visitor Centre will be flanked by the Tide Garden to the west and the Rhythm Gardens to the east. A substantial landscaped area in the southern portion of the site will be enhanced to create an attractive frontage and approach to the venue, as well as providing the main pedestrian and cyclist thoroughfare from Marine Road Central to the venue. Furthermore, an area of landscaping will be enhanced to the west of the Tide Garden and north of the Midland Hotel.

3.4.10. The Rhythm Gardens will function as both an outdoor landscaped feature and, on occasion, as an outdoor arena hosting live music events. A stage will be located to the south of the Gardens to facilitate this occasional use and the stage has been deliberately orientated to project noise out towards the Bay and away from the town and neighbouring uses. The seasonality of the live music events, which will be held during the summer months, will also ensure any impacts on wintering birds are mitigated. Further details are set out in Chapter 8.

3.4.11. The promenade along northern boundary of the site will be retained. Soft landscaping proposals are being explored within this northern part of the site, within the flood defence easement, subject to LLFA and City Council agreement.

3.4.12. Air Source Heat Pumps (ASHP) / Energy Pods are proposed within The Energy Field landscape area, on the approach to the main entrance of new built-form, have been designed as part of the surrounding landscape proposals, and their form and lattice timber structure is organic and of a quality in keeping with the rest of the proposed development. The Energy Pods also have potential to demonstrate both solar and wind harvesting, as well as integrating covered cycle parking and seating for visitors. The Energy Pods support a 'sea foam' shelter that extends southeast towards Marine Road Central, offering a sheltered route for visitors arriving from the park and ride and coach drop-off.

SCALE AND MASSING

3.4.13. The scale and massing of the proposal respond to existing levels within the site and wider context.

3.4.14. The shell-like structures feature a range of heights in order to break up the built form. Heights vary from 25 to 37 metres AOD, therefore in accordance with the maximum height parameter of 37m AOD, with the largest and tallest structures being positioned at the farthest point into the site to utilise the lowest areas of the site effectively and mitigate impacts on the Midland Hotel. The massing of the largest structure will be broken up by smaller structures in the foreground.

3.4.15. The massing of the proposals responds to neighbouring sensitive receptors such as nearby heritage assets, ensuring that the largest structures are well contained within the site. Sufficient separation distances ensure that there is a positive relationship between the shell-like structures and heritage assets.

3.4.16. Existing site levels have been used to form the outdoor arena area, with the stage being located at one of the lowest points of the site and orientated to project acoustics out into the bay rather than towards the town. Levels gradually rise to the north to create an amphitheatre style seating area.

APPEARANCE

3.4.17. Inspired by the unique coastal setting of the bay, the architecture is informed by the efficiency in which natural organisms like mussels structure their thin shells, where each layer of the structure performs a specialised function that allows the organism within to thrive.

3.4.18. An engineered colony of lightweight shell structures, designed with sustainable materials, will create spaces for unique experiences as well as make Eden North's architecture an inspiring landmark and an exemplar of sustainability.

Figure 3-2 – Indicative visualisation of interior of one of the shells (source: Grimshaw)



3.4.19. The cladding strategy for the built form is a key element of the design. Materials will be carefully chosen in order to respond to the following factors:

- Natural environment
  - Durability due to harsh marine environment;
  - Breathability to respond to wind conditions;
  - Naturally daylight spaces with solar control.
- Structural requirements
  - Lightweight and flexible materials for the shell-like structures in order to achieve structural optimisation
- Experiential requirements
  - Lighting control
- Sustainability
  - Use of responsible materials sourced locally (within average of 100 miles);
  - Proportion of materials used from Living Building Challenge 'red list';
  - Materials with environmental certification credentials suitable to the type of material;
  - Building embodied carbon footprint;
  - Construction waste diverted from landfill (utilised on-site);

3.4.20. Influenced by the above factors, the emerging materials strategy is as follows:

- Superstructure (the shell-like structures) – Timber Gridshell with a flexible membrane cladding;
- Dunescape roof – Timber structure with landscaped roof;
- Primary structural elements and external walls – Timber framing with slabs and timber wall framing;
- Other external walls (non-shell structures) – Combination of solid masonry/stone cladding and glazed facades;
- Landscape structures – Utilise vegetated retaining walls where required.

ACCESS

3.4.21. Eden Project North will be primarily accessed on foot with car parking provided offsite. On-site cycle storage and ancillary facilities for staff and visitors will further contribute to the use of a variety of sustainable transport options.

3.4.22. The existing pedestrian and cycle route that passes laterally through the centre of the site will be retained.

3.4.23. Accessibility to all has underpinned the design process ensuring that all aspects of design including experiential, exhibitions, catering, retail and toilets are fully accessible.

3.4.24. Eden Project North will appoint an Accessibility Champion with the appropriate authority to ensure that targets are considered at each stage of the design and construction process and that they are used to guide the project development and ensure that accessibility remains at the forefront of thinking during the operational phase of the project. The accessibility champion will engage with local groups on all aspects of design

3.4.25. In terms of site circulation, as shown on the Site Circulation Plan (ref: A02 1004 Rev 0) contained **Figure 3.2 of Volume 4**, the layout will accommodate the following access and circulation routes:

- Proposed pedestrian crossing (to be explored via S278 Agreement) to provide safe passage of pedestrians and cyclists across from the Goods Yard car park to the south of Marine Road Central and the main thoroughfare into and out of the site;

- The Park & Ride shuttle will utilise a stop to be provided on the north side of Marine Road Central, adjacent to the main thoroughfare into and out of the site;
- Coaches will be able to pick-up and drop-off from the south side of Marine Road Central opposite the War Memorial;
- The primary visitor entrance and exit points will be via the Visitor Centre to the south of the cluster of buildings;
- Secondary access points will be provided to the Tide Garden, Rhythm Gardens and landscaped areas proposed to the northern-most part of the development, where it interfaces with the promenade;
- The RNLI will continue to utilise the existing route off Marine Road Central passing between the Midland Hotel and area of public realm to reach the RNLI lifeboat station.

3.4.26. In addition, the Site Access Plan contained at **Figure 3.3 of Volume 4** illustrates areas of the site where ticketed access applies as well as areas of the site with permissive access throughout the year (such as the landscaped areas to the south and west of the site and promenade) and also areas with permissive access at certain times of the year (such as the Rhythm Gardens).

3.4.27. All promenades surrounding the site will remain open to the public.

3.4.28. Finally, in terms of servicing, deliveries for the retail and café uses and servicing of the arena will utilise the existing route from Marine Road Central which forks off from the promenade and behind the War Memorial. However, the primary servicing point will be in the north east of the site utilising the promenade before turning into the development itself (between the Natural Observatory and Bay Glade). The Bay Restaurant will also be serviced via the promenade.

OPERATIONAL EMPLOYMENT

3.4.29. The proposed development will directly employ circa 390 full time equivalent employees. It is expected that the maximum number of employees on site at any given time would be circa 280.

3.4.1. In addition to the creation of temporary construction employment and an estimated 389 FTE jobs once operational, EPIL are committed to building a similar volunteer network in Morecambe to that at Eden Cornwall, which currently has 120+ full time volunteers who have access to the same benefits as paid Eden employees. Volunteering for Eden Project North will be an ideal way to become involved in the day-to-day work of Eden Project North helping EPIL achieve its mission by becoming a link between the visiting public and the project. EPIL are already being approached by many local people wishing to volunteer, evidencing a strong community buy in.

3.4.2. Further details on employment generation are set out in **Chapter 15: Socio-economics**.

3.5. PROPOSED STRATEGIES

3.5.1. A number of overarching strategies have been implemented since the outset of the project to underpin the scheme design, construction and operation, as discussed in the paragraphs below.

CLIMATE CHANGE ADAPTATION, ENERGY AND SUSTAINABILITY STRATEGY

3.5.2. Eden Project North will be a leading example of regenerative sustainability. The project aims to not only keep its environmental impact to an absolute minimum but deliver environmental benefits and drive sustainable change beyond the boundaries of the project itself.

3.5.3. To support this approach a regenerative sustainability framework has been developed responding to key drivers, such as policy and best practice, from the international through to the local level.

3.5.4. This regenerative sustainability framework translates these key drivers into a vision and set of objectives, 'key results' and targets, which then inform design and operational strategies for the project (see diagram below). The regenerative sustainability framework is based upon the Five Capitals model of sustainability addressing areas of natural capital (e.g. biodiversity, energy, water, waste, materials, etc.) as well as wider issues encompassed within the Human, Social, Manufactured and Financial capitals. This approach drives the project to not only focus on areas of environmental performance but also consider themes of community, health and wellbeing, education and research, transport, employment and economic growth.

3.5.5. In support of the UK's Net Zero commitment by 2050, the project is working towards being a Net Zero Carbon building as defined by the UK Green Building Council addressing both the carbon emissions associated with its construction as well as its operational energy demands. Once operational the project is also committed to addressing its wider carbon footprint (known as scope 3 emissions) and will work to address emissions areas such as its supply chain and visitor journeys as far as possible.

ARCHITECTURAL DESIGN STRATEGY

3.5.6. Eden Project North will be in a prominent location on Morecambe Bay. The existing site is an important interface between the town and views towards the bay and beyond.

3.5.7. The impact of Eden Project North on the site and its surroundings will be transformational and in turn will positively re-define and enhance and the character of the existing townscape, landscape and seascape.

3.5.8. The design evolution has been informed by the site's location within the Morecambe Conservation Area and the proximity of heritage assets, alongside the surrounding landscape, seascape and key views across the bay.

3.5.9. EPIL recognises that the surrounding ecosystem is of great significance and as such will ensure that the qualities of Morecambe Bay will be promoted, enhanced and celebrated.

3.5.10. The Eden Project North experience will reconnect people to each other and the natural world. The overall experiential approach derives from the idea of rhythms to underpin the visitor experience.

3.5.11. Accordingly, the following design principles have been set to ensure that the design:

- Will be a unique landmark attraction;
- Is relevant to its context;
- Responds to the natural rhythms experienced by the site (cultural, tidal, lunar, seasonal rhythms);
- Efficient and regenerative;
- Functional; and
- Affordable and flexible.

3.5.12. The concept of rhythms falls into three types of rhythm experience:

Real Time Rhythms

3.5.13. Where the focus is on Morecambe Bay as a physical place grounded in rhythms as they happen 'in the real world'.

Rhythm Machines

3.5.14. Where the key natural rhythms of the Bay – of Sun and Moon – are amplified, making them hyper-real. Here the seasons and cycle move faster, with phenomena becoming larger than life in tightly controlled theatrical worlds that play with all the senses.

3.5.15. Where rhythms are slowed down to appear almost unchanging; as a portal to explore biological rhythms and health and wellbeing. This will be experienced within the Bay Glade, which is the primary planted space within Eden Project North.

3.5.16. The proposal will fuse all mediums to create educational experiences and journeys that emotionally immerse people in the rhythms that underpin all walks of life - and in doing so reveal the dangers when these rhythms are ignored or under threat.

LANDSCAPE STRATEGY

Landscape Vision

3.5.17. The vision for the surrounding landscape is to create an appropriate, attractive and contemporary setting for Eden Project North that fits with the fabric of the town and is an asset for residents and visitors.

Landscape Design Principles

- Create an interesting and varied landscape around the building to define the Eden Project North boundary, but also create new ways for people to interact with the adjacent open spaces;
- Provide easy and comfortable arrival and departure experience for visitors to Eden Project North;
- Retain the public promenade on the north, bay-facing side and to the south, town-facing side;
- Respect the character and access needs of our neighbours; and
- Develop a regenerative landscape that enhances biodiversity and supports the sustainability of Eden Project North.

Landscape Design Concept

3.5.18. The principal landscape design concept is based on the creation of a ‘bayscape’ surrounding and enveloping Eden Project North’s cluster of shell-like buildings. The bayscape comprises a series of spaces spanning both the public realm and visitor attraction, which take reference from the distinctive and varied landscapes found within the Morecambe Bay area. This concept creates a wealth of potential for storytelling within the landscape, as well as providing a means of sign posting to other visitor destinations that are within easy reach.

3.5.19. The bayscape concept will result in a new and contemporary landscape, but one which references natural forms and planting found in the wider environment, and which is sympathetic to its location and complementary to the existing buildings and uses around it.

BIODIVERSITY STRATEGY

3.5.20. The planning and design of the project has been informed by the following strategy for biodiversity:

- In accordance with the Eden Project’s objectives as an education charity, to implement a project that contributes to the scientific and public understanding of the natural environment, drawing inspiration from the unique and irreplaceable character of Morecambe Bay;
- To reflect and acknowledge that Morecambe Bay is an incredibly dynamic ecosystem. Whilst this dynamism may bring resilience to change, it may also mean that small perturbations can result in unexpected adverse consequences. Thus, the Ecological Impact Assessment should follow the precautionary principle, carefully considering and responding to a wide range of possible effects;
- To achieve net gains for biodiversity within the site boundary through creation of a parkland with coastal habitats that, through landscape design and horticultural management, are resilient to climate change and high levels of visitor pressure;

- To create net gains for biodiversity in the wider area, through following the ten Biodiversity Net Gain Principles[1], specifically with reference to engagement with stakeholders, promotion of wider environmental benefits from research, creation of a net gain legacy and application of the mitigation hierarchy.

3.5.21. Whilst the site itself is an amenity landscape with very little habitat interest and does not support any protected species, the assessment has considered all possible direct and indirect effects of the construction and operation of the scheme on birds and habitats associated with the adjacent Morecambe Bay and Duddon Estuary SPA/SAC/Ramsar/SSSI.

3.5.22. Amendments to the scheme design and mitigation measures have been incorporated to minimise construction-stage disturbance during the sensitive winter period (e.g. controls over working times, noise and lighting). For the long-term operation, the design seeks to minimise spill of light and general disturbance to the shore, although it should be acknowledged this section of shore is already highly visited.

FLOOD MITIGATION STRATEGY

3.5.23. The risk posed to the proposed development, and of the proposed development exacerbating risk within the catchment, from fluvial sources, sewer & drainage infrastructure, groundwater sources and artificial sources are assessed to be low to negligible. Therefore, no measures are considered necessary to mitigate the risk associated with these sources. The focus is therefore on the mitigation measures required to address the coastal/tidal flood risk and pluvial flood risk

3.5.24. In terms of coastal/tidal flood risk management, part of the mitigation currently proposed for the development includes the provision of flood gates at two service entries to the north of the shell-like structures which will protect the ground floor and lower levels in the event of tidal flooding.

3.5.1. As the site is at risk of tidal flooding a Flood Management Plan will be required to be in place to manage the safety of users of the development during a flood event. This should include a list of flood warning types and an evacuation plan, as well as details of the operation and maintenance schedule of the flood mitigation measures such as the flood gates.

3.5.2. A pump system will be installed in the basement areas to deal with the residual risk of tidal flooding and this system will also deal with any surface water exceedance events that reach the lower site areas.

3.5.3. In terms of pluvial/overland flow flood risk management, external levels will be designed to direct exceedance flows away from buildings to mitigate the risk of surface water flooding during storm events in excess of the design of the proposed drainage strategy.

3.5.4. As mentioned above a pump system will be installed in the lower level of the development to deal with any surface water exceedance events that reach the lower site areas.

3.5.5. Safe access and egress for pedestrians will be provided via existing footpaths onsite which link to Marine Road Central. Service vehicles will use the existing promenade to access the site, however this route may be impassable during a flood event and therefore will need to be closed prior to such an event. Signage will be installed to inform users of the development.

[1] CIEEM, CIRIA, IEMA (2016) Biodiversity Net Gain: Good practice principles for development. Available at Biodiversity-Net-Gain-Principles.pdf (cieem.net) Accessed 5th August 2021

3.5.6. The surface water drainage system will collect surface water runoff from the site. This will include runoff from the roofs and surrounding hardstanding areas. Primary runoff from ground will be from hard impermeable surfaces such as roof and any exposed areas of hardstanding.

3.5.7. Roof water runoff will be collected and transferred to rainwater storage for re-use as irrigation. The storage will be provided in the form of blue roof storage and rainwater tanks.

3.5.8. Collection of external surface water runoff will be captured by the site's sustainable drainage (SuDS) systems, avoiding the use of conventional drainage such as gullies, linear/channel drains.

3.5.9. Two plausible surface water drainage options (discharge to soakaways or discharge to culvert) are currently being investigated further and the exact option will be confirmed in due course, with the detailed drainage design secured by planning condition.

3.5.10. The drainage strategy considers the use of sustainable drainage techniques in accordance with local planning policy. The CIRIA SuDS Manual contains a hierarchy of sustainable methods of capturing and storing rainwater in a descending order: from drainage into the ground to recharging water resources. Since infiltration is not possible, surface water will be stored on site in open water features and then released at a controlled rate.

3.5.11. Non-infiltration SuDS features will not reduce the amount of surface water discharged; however, it will significantly delay and mitigate the peak flood flows from the site.

3.5.12. Further details are set out in the Drainage Strategy Report that forms part of the planning submission documentation.

FOUL WATER DRAINAGE STRATEGY

3.5.13. The foul water drainage strategy has been developed in accordance with United Utilities (UU) requirements and Building Regulations.

3.5.14. As detailed in the Drainage Strategy Report submitted with the planning application, a pre-development enquiry was submitted to UU who advises that:

"Foul flow from this site will be allowed to drain into the public foul water/combined sewer system. The proposed foul connection with a maximum pass forward flow of 5 l/s is acceptable to us in principle."

3.5.15. The estimated peak discharge rate for foul water has been calculated as 5l/s. This is based on 90% of the potable water discharging to the foul water network with a peak factor of 6. As the existing combined sewer located in Marine Road Central are relatively large (300 and 450 dia. pipes), it is assumed there is sufficient capacity in the pipes for foul water to discharge to the combined network.

3.5.16. The current proposal for the foul water strategy will include internal foul water from the proposed building only. The connection point, located in Marine Road West, and the flow rate has previously been agreed with United Utilities. The foul network will follow the external line of the building before discharging to the agreed connection. The existing manhole has an approximate invert level of 4.00 m AOD, therefore, any foul water from ground floor level (7.72 m AOD) will be conveyed via a gravity system. As the lower ground level is at 4.5 m AOD, a pumped system will be required. The pumping station will be designed to adoptable standards and is proposed to be located on the lower ground floor in the South Plant room.

3.5.17. Once the detailed scheme design progresses, a more accurate foul flow will be calculated based on the proposed MEP requirements.

3.5.18. A Utilities Assessment has been prepared by Buro Happold and is submitted as part of the planning application documentation.

3.5.19. In summary, the existing utility infrastructure network around the site has been assessed with the utility requirements of the proposed development in mind. A summary of the anticipated requirements for each utility is set out below:

- Power:
  - Existing sub-station on site to potentially be relocated.
  - New connection to be provided to serve approximate 2.5MVA demand.
- Gas:
  - No diversion required and no new connection required.
- Surface water:
  - Existing 1,200m culvert crossing the site. Potential diversion required.
  - New connection required to public sewer.
- Foul water:
  - No diversion anticipated; new connection required.
- Potable water:
  - No diversion anticipated; new connection required.
- Telecommunications:
  - No diversion anticipated; new connection required.

3.5.20. Further details are set out in the aforementioned Utilities Assessment.

LIGHTING STRATEGY

3.5.21. Lighting will play a key role in the success of the Eden Project North development. The various public spaces will be used a great deal after dark, in particular during the winter months.

3.5.22. The lighting design will take into consideration the environmental impact of the lighting based on the relevant environmental assessment reports and will integrate with the current lighting presidencies. Lighting shall also be designed to support discouragement of anti-social behaviour.

3.5.23. The external lighting shall be addressed utilising general luminaire typologies:

- Directional low-level light sources with a maximum tilt of 10degrees to primary pedestrian routes and designated vehicle parking;
- Low level lighting bollards to secondary pedestrian routes;
- Wall mounted directional fixtures integrated into ramps and landscape furniture;
- Integrated lighting to landscaping furniture (benches) to provide accent and ambience; and
- Integrated lighting to low level façade details and entrance canopies to enhance architectural form and create a welcoming atmosphere after dark.

3.5.24. The emission of direct light into the night sky and water are to be mitigated and any undue spill light onto areas adjacent the proposed developments red line boundary.

3.5.25. The water and beach will be maintained as a dark corridor for preservation of all relevant protected wildlife. Illumination of external circulation routes directly adjacent the bay shall generally be addressed at low level and light distribution directed towards landside.

3.5.26. The overall waste management strategy for construction and operational waste at the proposed development will follow the principles of circular economy, waste hierarchy and local and national waste policies. Waste reduction, reuse and recycling will be prioritised at each design stage and during construction and operation.

3.5.27. Operational waste generated at the proposed development is expected to be managed either through the local authority (Lancaster City Council) or a private waste collectors. Ambitious sustainability goals, including an overarching target for zero operational waste to landfill, mean that waste reduction, reuse and recycling will be prioritised during design and operation. Waste will be segregated at source into at least 3 streams (residual, mixed recyclables and organic waste) throughout the site, consistently across front and back of house areas. Litter bins to allow source segregation will be provided across the site, as well as intermediate storage areas before being transported to the main waste store to the east of the site. An on-site facilities management team will manage waste within the site and move waste to the main store at off-peak hours. Waste will be collected from the main waste store and transported for treatment on and off-site. Organic waste is proposed to be treated on-site through composting and the remaining waste streams will be treated, recovered or disposed of off-site. A detailed operational waste management plan will be prepared at future design stages which will expand on this approach and provide further detail of the strategy that will be implemented.

3.5.28. Construction and demolition waste is also expected to be managed through a private waste contractor(s). At design stages, measures will be implemented to reduce of waste where possible considering modular design, materials procurement and off-site fabrication. On-site, at construction stage, plans will be implemented to reduce impacts of waste through mitigation measures such as on-site segregation, staff training and overall materials management on-site. A detailed construction waste management plan will be prepared at future design stages which will provide a comprehensive approach to how mitigation measures will be implemented, as well as potential waste savings at each stage.

3.6. CONSTRUCTION PROPOSALS

PROGRAMME

3.6.1. Construction is currently anticipated to commence in Quarter (Q) 2 of 2022. The development would be delivered in a single phase with the construction period estimated to take 24 months, before completion in Q2 2024.

PROPOSED KEY CONSTRUCTION ACTIVITIES

3.6.2. A series of assumptions have been made in relation to the proposed site preparation, earthworks and construction activities following discussions with EPIL. Where assumptions have been made, it is stated within each technical chapter.

SECURITY AND FENCING

3.6.3. The intention is that the application site will be secured with the erection of full height close boarded hoarding (or similar) throughout the construction phase. The potential to retain partial pedestrian and cyclist access along the promenade toward the northern boundary of the site during the construction phase is to be determined at a later date.

3.6.4. The hoardings will be positioned at a safe distance from the line of any boundary works or perimeter walls, allowing the minimum safe space of construction plant within the hoarding.

3.6.5. The application site will be fully secured based on an access permit system and security staff or other controls at vehicular and pedestrian entrances. The application site will have permanent CCTV monitoring during construction, and this will be provided by an insurance approved contractor.

CONSTRUCTION EMPLOYMENT

3.6.6. It is estimated that the net additional construction employment for the local area would be 439 person years, whilst at the regional level the figure stands at 673 person years (234 person years above the local figure).

3.6.7. Further details are contained within **Chapter 15: Socio-Economics**.

CONSTRUCTION ACCESS / HAULAGE ROUTES, PARKING AND TRAFFIC

3.6.8. Vehicles will access the application site via agreed entrances controlled by fully trained gatekeepers and traffic marshals, construction traffic will enter and exit through gates in a one-way direction if this can be accommodated.

3.6.9. Pedestrian traffic will enter the application site via a separate entrance and will be fully segregate from the construction traffic.

CONSTRUCTION COMPOUNDS

3.6.10. The location of the Principal Contractor's compound(s) have not been identified at this stage and will be largely dependent on the appointed Principal Contractor for the proposed development, which will be determined in due course.

GROUND REMEDIATION WORKS

3.6.11. A Contaminated Land Preliminary Risk Assessment (Phase 1 Site Investigation) was undertaken by WSP in June 2019.

3.6.12. The assessment concluded that there are likely to be areas of substantial Made Ground thickness, given parts of the site have been reclaimed from the sea. Natural soils underlying the site are expected to be relatively permeable to mobile contamination, though the fresh surface water / groundwater environment is considered to have a relatively low sensitivity to contamination. The site is located adjacent to a SSSI (Morecambe Bay), which would be relatively sensitive to contaminants migrating from the site.

3.6.13. There is the potential for soil / groundwater contamination associated with:

- Made Ground;
- Relatively limited potentially contaminative previous uses of the site and surrounding areas; and
- Radon gas.

3.6.14. If present, contamination could pose potential risks to a range of sensitive receptors via a range of exposure pathways, both during the construction phase and following redevelopment. It is considered that soil / groundwater contamination, if present, could be dealt with via relatively simple measures to either remove the impacts in advance of development (e.g. excavation and removal of any areas of contamination) or which could be incorporated into the development to prevent migration or exposure during / following development (e.g. construction of hardstanding / capping and / or the inclusion of gas membranes).

3.6.15. The assessment recommends that an intrusive ground investigation is undertaken to confirm if there are any potentially complete contaminant linkages that will require remedial action. The investigation would likely comprise assessment of:

- Ground conditions including Made Ground composition and depth;
- The presence / absence of soil / groundwater contaminants in Made Ground and natural soils and associated risks to human health and the groundwater environment;
- The ground gas regime including radon and implications for redevelopment;
- Contamination risks to new water pipelines; and
- Potential disposal / re-use of excavated soils within the development

3.6.16. It has been agreed with LCC planning officers that the requirement for intrusive ground investigation works would be secured by planning condition and any remedial works would be completed prior to commencement of the development.

3.6.17. For further details see **Chapter 9: Ground Conditions**.

CRANES

3.6.18. Cranes will be used during construction of the proposed development. However, the type and size of any cranes utilised during the construction phase will be determined by the appointed Principal Contractor.

EARTHWORKS AND SITE LEVELS

3.6.19. The levels strategy currently mimics the existing landscape levels across the site, as much as possible, to minimise the amount of earthworks required. Without a site investigation a number of assumptions have been made with regards to excavated material. The top 300mm of existing material is currently assumed to be unusable on site and will need to be removed; this equates to approximately 12,400m3 of material. The remaining cut material will, where proven by suitable chemical and geotechnical testing, be reused as fill material across the site. This will leave an approximate shortfall of 12,600m3 of material that will need to be imported to site for fill material. Following the site investigation, the above-mentioned figures will be refined to suit the material properties found on site.

FOUNDATION SOLUTIONS

3.6.20. The foundations will be piled. The exact piling method is still to be confirmed but it is likely that the CFA (non-percussive) technique will be adopted during construction.

CONSTRUCTION OF BUILDINGS / HARDSTANDING AND INSTALLATION OF PLANT / EQUIPMENT

3.6.21. The construction phase of the proposed development will involve a variety of different plant and equipment to undertake relevant works. The exact plant and equipment to be utilised throughout the construction phase will be sourced by the appointed Principal Contractor. The type and number of plant is likely to be variable over the construction period and is likely to be dependent on the nature of the construction activity.

CONSTRUCTION WASTE

3.6.22. As stated, in the overview of the waste management strategy, construction and demolition waste is also expected to be managed through a private waste contractor(s). At design stages, measures will be implemented to reduce of waste where possible considering modular design, materials procurement and off-site fabrication.

3.6.23. On-site, at construction stage, plans will be implemented to reduce impacts of waste through mitigation measures such as on-site segregation, staff training and overall materials management on-site.

3.6.24. A detailed construction waste management plan will be prepared at future design stages which will provide a comprehensive approach to how mitigation measures will be implemented, as well as potential waste savings at each stage.

KEY CONSTRUCTION PRACTICES

3.6.25. Construction will be expected to follow at least best practice, with contractors being required to adhere to the Considerate Constructors Code or similar.

3.6.26. At tender stage selected contractors will need to provide a preliminary Construction Environmental Management Plan (CEMP) and indicative programme. The preparation of a CEMP is an established method of managing environmental impacts resulting from demolition and construction works.

3.6.27. The CEMP would be submitted to Lancaster City Council (and other relevant bodies) prior to the commencement of the works. Compliance with the CEMP is anticipated to be secured by appropriate planning conditions or obligations, and the obligations contained within it passed onto the main contractors as 'Employer's Requirements' within the contract for the works.

REFERENCES

- Reference 3.1: Town and Country Planning (Use Classes) (England) Order 1987 (as amended 2020) – Statutory Instrument 2015 No. 597
- Reference 3.2: IEMA Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation. [Online] accessed via https://www.iema.net/assets/templates/documents/iema_guidance_documents_eia_climate_change_resilience_and_adaptation%20(1).pdf
- Reference 3.3: BS5228

4

REASONABLE ALTERNATIVES CONSIDERED

4. REASONABLE ALTERNATIVES CONSIDERED

4.1. INTRODUCTION

4.1.1. This chapter outlines the main alternatives to the proposed development that have been considered by EPIL, together with the principal reasons for proceeding with the proposed development.

4.2. REQUIREMENT FOR THE CONSIDERATION OF ALTERNATIVES

4.2.1. Schedule 4(2) of the EIA Regulations 2017 (Ref. 4.1) states that an ES should include;

"A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects".

4.2.2. To accord with Schedule 4(2) of the EIA Regulations 2017, design alternatives have been considered for the proposed development.

4.3. SCHEME DESIGN ALTERNATIVES

4.3.1. Due to the significant number of physical site constraints, which are set out in greater detail in the Design & Access Statement, the extent of design alternatives during scheme evolution is somewhat limited.

4.3.2. Physical site constraints include but are not limited to:

- The location of the proposed buildings (shells) is tightly constrained by the existing promenade to the north, east and west and the pedestrian and cycle route to the south;
- The southern approach / area of public realm is similarly constrained, by an access road to the west, between the site and Midland Hotel, which provides access to the RNLI lifeboat station, Marine Road Central to the south and the Grade II listed War Memorial to the east;
- Proximity of the Grade II* listed Midland Hotel to the east and Grade II* listed Winter Gardens to the south/southeast;
- Existing sewer and drainage infrastructure pass beneath the site which has a 5m stand-off zone;
- 16m offset (easement) from the edge of the flood defences;
- The site topography is relatively flat with levels between +7m and +8m AOD. There is a lower area at the centre of the site and raised areas to the north. A key aspect of the design philosophy and sustainability strategy is to work with the existing constraints as far as possible;
- The exposed coastal location and prevailing wind conditions requires careful siting and geometry of the built form.

4.3.3. Following an extensive design and technical feasibility exercise undertaken between 2019 and early 2021, three potential layout options were conceived that worked as far as possible within the aforementioned site constraints. These can be summarised as follows:

- **Option A** – All buildings to be sited within the 'main development site' north of the pedestrian/cycle route with a southern and western area of public realm supported by ancillary infrastructure. Arena located to the east which will predominantly be a landscaped area when not in 'event mode'. Visitor centre integrated into main development site. This was the option pursued and developed into the scheme design subject to this planning application;

- **Option B** – Followed the same principles as Option A but the arena was centrally located. This option was ultimately discounted as it brought built form closer to the south/southeast boundaries and closer to the Grade II* Winter Gardens; and
- **Option C** – Was a variation of Option B with the centrally located arena but with a satellite visitor centre located within the southern approach. This option was discounted as it brought built form closer to the Grade II* Midland Hotel and limited the ability to create a high quality and extensive area of public realm and supporting infrastructure in the southern approach.

4.3.4. As stated, Option A was the design option pursued and forms the basis of the scheme submitted with this application and coupled with the maximum development parameters, is the scheme that this ES and assessment work has been prepared.

4.4. SUMMARY AND CONCLUSION

4.4.1. A number of alternatives have been studied by EPIL and the design team and an overview of potential options following the extensive design and technical feasibility stage has been provided above. The design of the proposed development has taken into account the significant physical site constraints as well as other environmental constraints, which have been integrated into the scheme design pursued as part of this application. In doing so, a number of potentially significant effects have either been reduced in severity, removed altogether or created positive effects.

4.5. REFERENCES

- Reference 4.1: Town and Country Planning (Environmental Impact Assessment) Regulations 2017. Statutory Instrument 2017 No. 571.

5

APPROACH TO EIA

5. APPROACH TO EIA

5.1. INTRODUCTION

5.1.1. This chapter outlines the approach to the Environmental Impact Assessment (EIA), in particular the objectives and overall strategy for the EIA developed by WSP, EPIL and the wider project consultant team. Scoping has been an ongoing process, which is documented within this chapter alongside the evidence base associated with those factors and elements scoped out of the assessment.

5.1.2. The approach to consultation is also outlined in this chapter, together with the approach to proportionate assessment including the assessment criteria and the methodology for assessing cumulative effects.

5.1.3. The EIA has been undertaken in accordance with the EIA Regulations 2017, National Planning Practice Guidance, IEMA's Environmental Impact Assessment Guide to Shaping Quality Development and guidance specific to the factors assessed.

5.1.4. The ES will also examine the proposals in relation to relevant policies in the development plan, taking account of emerging policy, guidance and proposals. The key components of Lancaster City Council's development plan relevant to the Eden North scheme are:

- **Lancaster Local Plan Part One – Strategic Polices and Land Allocations DPD (2020)** – which provides the overarching policy approach to the location and control of development, sustainability and mitigating environmental impacts;
- **Lancaster Local Plan Part Two – Development Management Policies DPD (2020)** – provides more granular policy guidance relating to key design principles, sustainable design and mitigation if impacts;
- **Morecambe Area Action Plan (2014)** – drills down further, containing planning policies tailored to specific sites in Morecambe; and
- **Energy Efficiency in New Development Planning Advisory Note (2020)** – this guidance note underpins sustainable design policy and makes clear that "non-residential buildings should meet the BREEAM Excellent standard".

5.1.5. In addition, the National Planning Policy Framework (NPPF) is an important material consideration in planning decision-making and contains a presumption in favour of sustainable development as well as overarching policy guidance in respect of economic growth and regeneration, a drive for more active and healthy lifestyles, transport and highways safety, preserving the historic environment and protecting and enhancing the natural environment. A detailed overview of the Site's status in relation to relevant planning policy is discussed within the Planning Statement.

5.2. OBJECTIVES OF THE EIA

5.2.1. The key objectives of the EIA are as follows:

- Set the legal framework;
- Document the consultation process;
- Consider the alternatives to the Proposed Scheme;
- Establish baseline environmental conditions at the Site and within the surrounding area;
- Identify likely significant environmental effects during the design process so that some effects can be avoided, prevented, reduced or, if possible, offset prior to the assessments within the Environmental Statement (ES) (i.e. demonstrating an iterative approach to EIA);

- Identify, predict and assess the environmental effects associated with the Proposed Scheme: beneficial and adverse; permanent and temporary; direct and indirect and short / medium / long term; significant or not significant;
- Identify, predict and qualitatively assess the cumulative effects of the Proposed Scheme including those associated with the other developments;
- Identify suitable mitigation measures to avoid, prevent, reduce or, if possible, offset likely significant adverse effects on the environment and identify the likely significant residual effects following the implementation of these measures; and
- Identify monitoring measures where likely significant residual adverse effects are identified.

5.2.2. Although not a requirement of the EIA Regulations 2017, opportunities for environmental enhancement are also explored.

5.3. SCOPING (REGULATION 15)

SCOPING REPORT

5.3.1. As set out in Section 1.3 of **Chapter 1: Introduction**, an EIA Scoping Report was submitted to LCC on 14 June 2019 and a scoping addendum on 30 July 2021, alongside a request for a formal Scoping Opinion in accordance with Regulation 15(1) of the EIA Regulations 2017. As part of LCC's responsibility under Regulation 15(4) of the EIA Regulations 2017, consultation was undertaken with the following consultees:

- Lancaster City Council (Planning, Environmental Health, Economic Development, Landscaping, Nature Conservation, Heritage and Conservation);
- Lancashire County Council (Highways Authority, Local Lead Flood Authority);
- Highways England;
- Environment Agency;
- Natural England;
- Historic England;
- Arnside and Silverdale AONB Partnership;
- Bay Search and Rescue;
- Cadent Gas;
- Greater Manchester Ecological Unit (GMEU);
- Lancashire Constabulary;
- Lancashire Fire and Rescue;
- Morecambe Town Council; and
- United Utilities.

5.3.2. The EIA Scoping Report (**Appendix 1.1**) and Scoping Addendum (**Appendix 1.4**) outlined that the Proposed Scheme has the potential to result in likely significant effects on the environment associated with the following factors:

- Chapter 6: Townscape, Seascape and Visual Impact Assessment
- Chapter 7: Cultural Heritage
- Chapter 8: Nature Conservation and Biodiversity
- Chapter 9: Ground Conditions and Geology
- Chapter 10: Hydrology, Drainage and Flood Risk
- Chapter 11: Traffic, Transport and Access
- Chapter 12: Noise and Vibration
- Chapter 13: Air Quality

- Chapter 14: Wind, Daylight/Sunlight and Microclimate
- Chapter 15: Socio-economics
- Chapter 16: Population and Human Health

5.3.3. These factors and their associated likely significant environmental effects have been taken forward and assessed within this ES and are therefore *scoped in* to the EIA.

5.3.4. As EIA is an iterative process taking place alongside the design of the Proposed Scheme, the process of scoping the assessment has been ongoing.

5.3.5. A Scoping Addendum was submitted to LCC on 30 July 2021. Whilst the proposed development remains predominantly in line with the parameters set out in the 2019 Scoping Report, there have been refinements to certain elements of the scheme that are the result of an extensive design feasibility and alignment exercise that has taken place since LCC issued its Scoping Opinion on 30 August 2019. The elements of the scheme that have changed are summarised below:

- The red line boundary contained at Appendix 1 of the 2019 Scoping Report (which has been reduced to include only the main development site and exclude off-site areas previously included) has been amended, as per the Site Location Plan at **Figure 1.1**. Accordingly, the site area has reduced from circa 14.8 hectares to circa 4.58 hectares in size;
- The description of development set out at paragraph 2.10 and use classes set out at paragraph 2.12 of the 2019 Scoping Report (amended simply to account for recent changes to planning use classes in the General Permitted Development Order) and also to refer to "associated infrastructure" within the description – refer to the comparison at **Table 5.1** below;
- The maximum building footprint has increased from 16,838sqm (GEA) to 18,000sqm (GEA);
- The proposed Parking Strategy has been agreed in principle with officers at Lancaster City Council and Lancaster County Council which includes the following in the Day 1 Scenario:
  - 389 spaces within the J34 / Caton Road Park & Ride facility;
  - 443 spaces split across several car parks within Morecambe Town Centre, including provision of accessible spaces.
- There has been an increase in the amount of anticipated daily visitors from up to 500 visitors per hour to up to a maximum of 750 visitors per hour;
- The capacity of the outdoor arena (which has increased in capacity to 6,000) has changed compared with what was stated at paragraph 2.11 of the 2019 Scoping Report – refer to the comparison at **Table 5.2**;
- The frequency of late evening events at the outdoor arena has been refined to comprise up to 8 events per calendar year (during the summer period);
- There will no longer be any vehicular parking within the application red line boundary (as set out in the aforementioned Parking Strategy);
- The indicative opening year of the development as set out at paragraph 2.15 of the 2019 Scoping Report has changed from 2022 and 2024 to ensure consistency with the revised development programme;
- Within the southern area of public realm and main pedestrian approach into the site from Marine Road Central, permission will be sought for a canopy-like structure primarily to provide weather protection for visitors plus flexible spaces that can potentially accommodate Class E food and beverage and retail outlets, house renewable energy technologies and/or provide sheltered cycle parking.

5.3.6. No other elements of the scheme have changed.

5.3.7. The following tables provide a comparison of the description of development and development parameters contained in the 2019 Scoping Report and those proposed as part of this addendum report (changes indicated in **red**).

Table 5.1 – Comparison of description of development and use classes sought

2019 Scoping Report	2021 Scoping Addendum
Demolition of existing buildings and proposed construction of major mixed leisure development in association with Eden Project (including use classes A1, A3, A4, B1, D1, D2 and Sui Generis), public realm, landscaping, car parking and associated engineering works	Demolition of existing buildings and proposed construction of major mixed leisure development in association with Eden Project (including use classes **E, F1 and F2** and Sui Generis), public realm, landscaping, car parking and associated **infrastructure and** engineering works

Table 5.2 – Comparison of maximum development parameters

2019 Scoping Report	2021 Scoping Addendum
▪ Maximum building height of 37.3m AOD; ▪ Maximum building footprint of 16,838sqm (GEA); ▪ Maximum visitor numbers of 1 million per annum with an estimated average of 760,000 per annum. There will be timed ticketing to control visitor flows. The proposed development has been designed to accommodate a maximum of 4,000 visitors per day. Feasibility studies indicate an estimated average of 100 days per annum of up to 3,000 visitors; 200 days per annum of up to 2,000 visitors; and 60 days per annum of up to 1,000 visitors. There will be a maximum of 500 visitors per hour accessing the site. ▪ Maximum core hours of operation (main site): - Daily: 09:00 – 21:00 ▪ Maximum hours of operation (main site – summer time): - Daily: 09:00 – 00:00 ▪ Maximum 4,000-person capacity outdoor arena to host late evening events during the following hours: - Daily: 18:00 – 00:00 (music finishing at 23:00)	▪ Maximum building height of 37.3m AOD; ▪ Maximum building footprint of 18,000sqm (GEA); ▪ Maximum visitor numbers of 1 million per annum with an estimated average of 760,000 per annum. There will be timed ticketing to control visitor flows. The proposed development has been designed to accommodate a maximum of 4,000 visitors per day. Feasibility studies indicate an estimated average of 100 days per annum of up to 3,750 visitors; 200 days per annum of up to 2,500 visitors; and 60 days per annum of up to 1,250 visitors. There will be a maximum of 750 visitors per hour accessing the site. ▪ Maximum core hours of operation (main site): - Daily: 09:00 – 21:00 ▪ Maximum hours of operation (main site – summer time): - Daily: 09:00 – 00:00 ▪ Maximum 6,000-person capacity outdoor arena to host up to 8 late evening events per calendar year (summer months only) during the following hours: 18:00 – 00:00 (music finishing at 23:00)

▪ On-site parking limited to visitors with mobility issues	▪ A canopy-like structure primarily to provide weather protection for visitors plus flexible spaces that can potentially accommodate Class E food and beverage and retail outlets, house renewable energy technologies and/or provide sheltered cycle parking.

5.3.9. The scoping responses received from external consultees in respect of the 2019 ES Scoping Report and 2021 ES Scoping Addendum are also presented in **Appendix 1.3 and Appendix 1.5** respectively. The responses are helpfully summarised in the appendices of the LCC Scoping Opinions. Each technical chapter sets out the scoping and other pre-application feedback received from consultees and ultimately how responses have been taken into account during the preparation of this ES. The comments generally follow the structure of the EIA Scoping Report.

FACTORS/ELEMENTS SCOPED INTO THE ASSESSMENT

5.3.10. Following receipt of the Scoping Opinion, consultation and ongoing scoping, the factors and elements scoped into the EIA are set out in the respective technical chapters.

5.4. CONSULTATION

5.4.1. As part of the EIA process and in addition to the formal consultation undertaken in conjunction with the scoping process, technical consultation with a range of statutory and non-statutory consultees has been ongoing since 2019. Details of the technical consultation undertaken for each assessment is provided in the respective technical chapters. Details of the public consultation undertaken is set out in the Statement of Community Engagement (SCE).

5.5. APPROACH TO THE ASSESSMENT OF THE PROPOSED DEVELOPMENT

5.5.1. This section outlines the phases of the proposed development that have been assessed, together with the approach to the baseline conditions, future baseline conditions, cumulative effects and design tolerances. It also sets out the overarching approach to the EIA, together with project specific requirements for the assessment of effects.

5.5.2. The proposed development has been assessed against the description, design principles and tolerances and supporting plans as detailed in **Chapter 3: Description of the proposed development**. The maximum extent of the planning application boundary and building footprint / height has been assessed as the worst-case situation. There is therefore some degree of flexibility to allow the proposed development to evolve (i.e. reduce in size) if necessary.

5.5.3. In order to avoid duplication of assessment, assumptions have been made in relation to measures to be implemented under existing or pending consents.

BASELINE SCENARIO

5.5.4. Baseline information (environmental characteristics and conditions) has been collated, based upon surveys undertaken and desk-based information available at the time of the assessment. Technical chapters 6 to 16 provide details of the baseline information and a summary is provided in **Chapter 2: The Existing Site**. Any limitations establishing the baseline are described in technical chapters 6 to 16.

5.5.5. There are slight variances across the ES depending on the use of existing data obtained through other sources and the dates when surveys were undertaken. This has been clearly outlined within technical chapters 6 to 16.

5.5.6. The dates of surveys and the dates when data sources have been accessed are provided within technical chapters 6 to 16.

FUTURE BASELINE

5.5.7. Schedule 4(3) of the EIA Regulations 2017 requires consideration of the likely evolution of the current state of the environment (baseline scenario) in the absence of the proposed development, as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge (the 'future baseline'). Whilst there are considerable limitations to the predictions that can be made about natural baseline conditions at a future point in time, some assessments require projections to account for future change, such as traffic growth. The ES topic areas that have considered the future baseline are as follows:

- **Transport, traffic and highways** – future baseline scenarios assessed for 2025 and 2031, as requested by Highways England;
- **Air quality** – future baseline scenarios assessed for 2024 and 2039; and
- **Noise** – future baseline scenarios assessed for 2024 and 2039.

5.5.8. Due to the aforementioned limitations, necessary assumptions and lack of evidence associated with the future baseline (i.e. it cannot be accurately measured), a detailed consideration of the effects of the proposed development against the future baseline would generally not result in a robust assessment. However, consideration has been given, in descriptive terms, within each relevant technical chapter to likely significant environmental effects arising from the proposed development in relation to the future baseline.

ASSESSMENT OF MAJOR ACCIDENTS AND DISASTERS

5.5.9. Schedule 4(8) of the EIA Regulations 2017 states that an ES must include the following:

"A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned…. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies".

5.5.10. An assessment of major accidents and disasters has not been scoped into this ES.

ASSESSMENT OF HEAT AND RADIATION

5.5.11. Schedule 4(5)(c) of the EIA Regulations 2017 states that an ES must include the following:

"A description of the likely significant effects of the development on the environment resulting from, inter alia:

(c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste"

5.5.12. An assessment of heat and radiation has not been scoped into this ES. Bespoke ES chapters and associated assessment are however provided in respect of noise and vibration and air quality. Furthermore, the application is supported by a Lighting Strategy and Waste Management Strategy.

ASSESSMENT CRITERIA

5.5.13. The classification of each effect identified has been assessed based on the magnitude of change (or impact) due to the Proposed Scheme and the sensitivity/value of the affected receptor to change, as well as a number of other factors that are outlined in more detail below. The classification of residual effects has been assessed with regard to the extent to which additional mitigation measures will avoid, prevent, reduce or, if possible, offset adverse effects.

5.5.14. The assessment of likely effects presented in technical chapters 6 to 16 have taken into account a number of criteria to determine whether or not the likely effects are significant. Wherever possible and appropriate, the effects have been assessed quantitatively. The following criteria have been taken into account when classifying the likely effects:

- Relevant legislation and planning policy;
- International, national, regional and local standards;
- Likelihood of occurrence of the effect;
- Geographical extent of effect;
- Sensitivity and/or value of the receptor;
- Magnitude and complexity of impact;
- Whether the effect is temporary or permanent;
- Duration (short, medium or long-term), frequency and reversibility of effect;
- Whether the effect is direct or indirect, secondary or transboundary;
- Inter-relationship between different effects (both cumulatively and in terms of likely effect interactions); and
- The outcomes of consultations.

5.5.15. Where factor specific methodology deviates from this approach, for example as a result of following factor specific guidance, this is set out in the methodology section of the technical chapter.

SENSITIVITY/VALUE OF RECEPTORS

5.5.16. The sensitive receptors considered within this ES are identified within technical chapters 6 to 16. The sensitivity of these receptors to change is also defined within technical chapters 6 to 16 and has been determined where available and appropriate by quantifiable data, the consideration of existing designations and professional judgement. The categories used (very high, high, medium, low and negligible), unless otherwise stated, are shown in **Table 5-1**. Where factor specific methodology deviates from this approach, for example as a result of following factor specific guidance, this is set out in the methodology section of the technical chapter.

MAGNITUDE OF CHANGE (IMPACT)

5.5.17. The magnitude of change (impact) is predicted as a deviation from the established baseline conditions, as a result of the proposed development. The magnitude of these changes is also defined within technical chapters 6 to 16 and has been determined where available and appropriate by quantifiable data, available appropriate national and international standards or limits (World Health Organisation (WHO) Limits, European Union (EU) Quality Standards, etc.) and professional judgement. The scale used (major, moderate, minor, negligible and no change), unless otherwise stated, is shown in **Table 5-1**.

5.5.18. The magnitude of change identified is based on the peak potential magnitude of change, i.e. the greatest likely magnitude of change that may be experienced by a sensitive receptor (existing or proposed).

CLASSIFYING EFFECTS

5.5.19. Determining the classification of effects has been undertaken using professional judgements (assumptions and value systems) that underpin the attribution of significance. Each effect has been assessed against the sensitivity of the receptor and the magnitude of change, as shown in **Table 5-1**. Where more than one effect classification exists for any given scenario (e.g. slight or moderate), professional judgement is used to assign a single effect classification.

Table 5-1 - Matrix for Classifying Effects

		Magnitude of Change (Impact)				
		No Change	**Negligible**	**Minor**	**Moderate**	**Major**
Sensitivity/Value	**Very High**	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

5.5.20. The terms as used within **Table 5-1** have been defined below, applying to both beneficial and adverse effects:

- **Very Large effect**: effects at this level are material in the decision-making process;
- **Large effect**: effects at this level are likely to be material in the decision-making process;
- **Moderate effect**: effects at this level can be material decision-making factors;
- **Slight effect**: effects at this level are not material in the decision-making process; and
- **Neutral effect**: no effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

5.5.21. Unless otherwise stated in the technical chapters of this ES, effects that are classified as **moderate or above** are significant. Effects classified as below **moderate** are not significant.

5.5.22. Tables summarising the potential effects associated with each factor, required mitigation measures and residual effects are provided at the end of each technical chapter. The tables provide a clear distinction of the type of effect:

- Beneficial or adverse;
- Permanent or temporary;
- Direct or indirect;
- Short, medium or long-term;
- Secondary, cumulative or transboundary; and
- Significant or not significant.

5.5.23. In terms of the duration of an effect, short-term has been considered as 1 year (or below), a medium-term effect has been 1 to 15 years in duration and a long-term effect has been considered to be greater than 15 years in duration. Any variation to these definitions arising, for example, from differences in assessment methodology or guidance is explained in technical chapters 6 to 16.

5.5.24. Additional (secondary and tertiary) mitigation describes actions that will require further activity in order to achieve the anticipated outcome, and measures that will be required regardless of any EIA assessment, as it is imposed, for example, as a result of legislative requirements and/or standard sectoral practices. Examples of secondary include additional detailed design, for example to comply with proposed lighting limits or developing a travel plan for the proposed development. Examples of tertiary mitigation include considerate contractor's practices that manage activities which have potential nuisance effect (e.g. through the implementation of a Construction Environmental Management Plan).

5.5.25. Where likely significant adverse effects have been identified in the assessment, measures to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment are described. Monitoring is required where there are significant adverse residual effects. In some cases, for instance where there is uncertainty of residual effects remain, it may also be appropriate to implement monitoring.

5.5.26. Proposed additional mitigation and monitoring measures are set out within technical chapters where necessary. **Chapter 3: Description of the proposed development** sets out the embedded (primary) mitigation required as part of the proposed development.

5.6. CUMULATIVE EFFECTS

5.6.1. Schedule 4(5)(e) of the EIA Regulations 2017 states that the ES should include a description of the likely significant effects of the development on the environment resulting from:

'*the cumulation of effect with other existing and / or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources*.'

5.6.2. Regulation (4)(2)(e) refers to the need to assess:

'the interaction between the factors referred to in sub-paragraphs (a) to (d).

5.6.3. There is no widely accepted methodology or best practice for assessing cumulative effects, although various guidance documents exist. The following approach has been adopted for the assessment of cumulative effects, based on previous experience, the types of receptors being assessed, the nature of the Proposed Scheme, the other developments under consideration and the information available to inform the assessment. The approach was outlined in the 2019 EIA Scoping Report (**Appendix 1.1**).

5.6.4. Effect interactions, or intra-project effects, are the combined or synergistic effects caused by the combination of effects of the proposed development on a particular receptor which may collectively cause a greater effect than individually. In-combination, or inter-project effects are the combined effects of the proposed development on a common receptor together with other developments.

5.6.5. Following discussion with Lancaster City Council, it is noted that there are no committed developments within a circa 500m radius of the site that would be of a scale or significance to warrant cumulative assessment with the proposed development. The absence of committed development is also in part due to the locational characteristics of the site, whereby the site lies adjacent to Morecambe Bay and therefore development is highly unlikely to take place.

5.6.6. As such, the technical chapters have not cumulatively assessed inter-project/in-combination effects with other developments, with the exception of the nature conservation and biodiversity (Chapter 8) (which following review of potential sites within the zone of influence from an ecological perspective scopes out cumulative assessment) and the transport, traffic and highways chapter (Chapter 11) which is supported by a Transport Assessment which has utilised the SATURN traffic model provided by Lancashire County Council, which already includes committed developments across the district.

5.6.7. Assessment of intra-project cumulative effects, where relevant, are presented in technical chapters 6 to 16.

5.7. ENVIRONMENTAL ENHANCEMENT

5.7.1. Although not a requirement of the EIA Regulations 2017, opportunities for environmental enhancement are also explored in technical chapters 6 to 16, where relevant and feasible. However, environmental enhancement measures are not taken account of in the assessment of likely significant effects.

5.8. LIMITATIONS AND ASSUMPTIONS

5.8.1. Schedule 4(6) of the EIA Regulations 2017 states that an ES should include

'...details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved…'

5.8.2. Where there are limitations or assumptions used within the EIA, these are clearly identified in this ES. Assumptions specific to certain assessments have been identified in the appropriate technical chapters 6 to 16.

5.9. REFERENCES

- Reference 5.1: Town and Country Planning (Environmental Impact Assessment) Regulations 2017. Statutory Instrument 2017 No. 571.
- Reference 5.2: Planning Practice Guidance. [Online] accessed via https://www.gov.uk/government/collections/planning-practice-guidance
- Reference 5.3: IEMA Environmental Impact Assessment Guide to Shaping Quality Development. [Online] accessed via https://www.iema.net/assets/uploads/iema_guidance_documents_eia_guide_to_shaping_quality_development_v7.pdf
- Reference 5.4: Planning Portal [Online] accessed via https://www.planningportal.co.uk/
- Reference 5.5: The Conservation of Offshore Marine Habitats and Species Regulations 2017. Statutory Instrument 2017 No. 1013

6

TOWNSCAPE, SEASCAPE AND VISUAL IMPACT ASSESSMENT

PUBLIC

6. TOWNSCAPE, SEASCAPE AND VISUAL IMPACT ASSESSMENT

6.1. INTRODUCTION

6.1.1. An assessment of the likely significant effects of the proposed development on townscape, seascape and landscape character and on visual amenity has been undertaken by The Environment Partnership (TEP) Ltd.

6.1.2. The proposed development comprises the demolition of existing buildings and the proposed construction of major mixed leisure development in association with Eden Project, public realm, landscaping, cycle parking, energy pods, and associated infrastructure and engineering works on 'the site'.

6.1.3. The site comprises circa 4.58 hectares in Lancaster City Council's (LCC) administrative area. It comprises land on the coastline, to the north and west of Morecambe Town, bound by Morecambe Promenade to the north, east and west; The Midland Hotel (Grade II* listed) to the southwest; and the A589 Marine Road Central to the south, with the Winter Gardens (Grade II* listed) and adjacent retail and entertainment businesses on the southern side of this road.

6.1.4. This chapter of the Environmental Statement (ES) presents the findings of the Townscape, Seascape and Visual Impact Assessment (TSVIA), which has been undertaken in accordance with The Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3) (Landscape Institute (LI) and Institute of Environmental Management and Assessment (IEMA), 2013), and other relevant industry guidance identified at section 6.3 below.

6.1.5. In the context of the proposed development this TSVIA also encompasses landscape aspects, beyond settlement including Morecambe and Lancaster, within a 15km study area, discussed in section 6.3 below.

6.1.6. The purpose of TSVIA is twofold:

- It provides a systematic and objective assessment of the potential effects of development upon baseline townscape, seascape and landscape character and upon visual amenity; and
- It informs design of development to avoid, reduce or minimise impact on important baseline resources.

6.1.7. The method of assessment for identifying likely significant effects is summarised in section 6.3 of this chapter and is detailed in **Appendix 6.1**. This chapter describes the baseline conditions of the site and the surrounding area that may be affected by the proposed development within the 15km study area. The scope of this TSVIA is discussed under section 6.3 below.

6.1.8. This TSVIA provides a description of the baseline townscape, seascape, landscape and views; discusses the sensitivity of townscape, seascape, landscape and views in which the development is proposed and could potentially impact on, before considering the anticipated effects of the proposed development on landscape character and on views during construction and operation.

6.1.9. Potential impacts have considered the layout and design of the proposed development as shown on architect drawings submitted with the planning application, including layout plans, elevations and sections, and as discussed within the Design and Access Statement (DAS). Landscape design proposals also are assessed as part of the proposed development.

6.1.10. Potential construction phase impacts are assessed with design interventions (embedded mitigation measures) and as residual effects following the identification of additional mitigation measures.

6.1.11. Potential operational phase effects are assessed on completion, and in the short and medium-term (between year 0 and year 15) and after 15 years (for the long-term). Residual effects also are considered following the identification of additional mitigation measures.

6.1.12. This TSVIA also considers the potential impact of the proposed development on night-time character (within the townscape, seascape and landscape potentially affected), and on night-time views during construction and operation.

6.1.13. This assessment should be read with reference to TSVIA figures listed below, and provided at **Volume 4** of this ES:

- Figure 6.1: Environmental Designations within 15km Study Area;
- Figure 6.2: Relevant Local Plan Policy and Environmental Designations within 7km of the Site;
- Figure 6.3: Topography;
- Figure 6.4.1: Published Landscape and Seascape Character Areas;
- Figure 6.4.2: Published Landscape Character Areas within Areas of Outstanding Natural Beauty;
- Figure 6.5: Townscape Analysis within 1km of the Site;
- Figure 6.6: Zone of Theoretical Visibility (ZTV) Mapping (Bare Earth);
- Figure 6.7: Zone of Theoretical Visibility (ZTV) Mapping (Screened), and Representative Viewpoints within 15km Study Area;
- Figure 6.8: Representative Viewpoints and Visual Receptors within 1km of the Site;
- Figure 6.9: Representative Viewpoints within 7km of the Site;
- Figure 6.10: Distant Viewpoints within the Arnside and Silverdale AONB; and
- Figures 6.11.1 – 6.11.18: Existing Views from Representative Viewpoints (Type 1 Photomontages).

6.1.14. Verified photomontages of the proposed development (on completion) are provided for seven viewpoints discussed in the visual baseline section of this TSVIA. Verified photomontage figures are listed below:

- Figure 6.12.1: Verified Photomontage Viewpoint 1;
- Figure 6.12.2: Verified Photomontage Viewpoint 3;
- Figure 6.12.3: Verified Photomontage Viewpoint 5;
- Figure 6.12.4: Verified Photomontage Viewpoint 6;
- Figure 6.12.5: Verified Photomontage Viewpoint 8;
- Figure 6.12.6: Verified Photomontage Viewpoint 10; and
- Figure 6.12.7: Verified Photomontage Viewpoint 11.

6.1.15. The method for the production of verified photomontages is briefly discussed in section 6.3 of this chapter and is detailed in **Appendix 6.2**. The method is in accordance with guidance contained in LI Technical Guidance Note 06/19 Visual Representation of Development Proposals.

6.2. POLICY CONTEXT

6.2.1. This section reviews national and local planning policy relevant to the site and the surrounding area, and pertinent to townscape, seascape, landscape and views.

European Landscape Convention

6.2.2. The European Landscape Convention (ELC) came into force in the UK on 1st March 2007; the principal component of the ELC is the need to develop a framework of policies (economic, social and environmental) dedicated to the protection, management and planning of landscape, and raising awareness of landscape issues at all levels.

6.2.3. The ELC adopts a broad definition of landscape: *"landscape means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors".*

6.2.4. This places a broad emphasis on landscapes everywhere and in any condition – land, inland water, marine, natural, rural and peri-urban, outstanding, ordinary or degraded. It therefore provides the focus on landscape as a resource in its own right.

6.2.5. The ELC recognises that today's landscapes are the result of continuous change and that this change will continue in the future. The ELC Implementation Framework places the emphasis on the effective planning, good design and sensitive management of landscapes with people in mind. UK planning policy is compliant with this approach.

National Planning Policy Framework (July 2021)

6.2.6. The Revised National Planning Policy (NPPF) (July 2021) sets out the Government's planning policies for England and how these are expected to be applied at a local level in development plans and how developers should address them. The Framework places great emphasis on plans and developments contributing to sustainable development.

6.2.7. The sub-topics beneath the goal of Delivering Sustainable Development that are most relevant to townscape, landscape and views within the assessment study area are:

- Section 12: Achieving well-designed places; and
- Section 15: Conserving and enhancing the natural environment.

NPPF Section 12: Achieving well-designed places

6.2.8. Section 12 recognises the importance of good design as *"the creation of high quality, beautiful and sustainable buildings and places is fundamental to what the planning and development process should achieve"*.

6.2.9. Paragraph 126 states that good design is a key aspect of sustainable development.

6.2.10. Under paragraph 130, planning policies and decisions should ensure that developments are sympathetic to local character and history, including the surrounding built environment and landscape setting, while not preventing or discouraging appropriate innovation or change.

NPPF Section 15: Conserving and Enhancing the Natural Environment

6.2.11. Paragraph 174 of Section 15 states that the planning system should contribute to and enhance the natural and local environment by protecting and enhancing valued landscapes (in a manner commensurate with their statutory status or identified quality in the development plan). Paragraph 175 indicates that plans should distinguish between the hierarchy of international, national and locally designated sites and allocate land with the least environmental or amenity value, where consistent with other policies in the Framework.

6.2.12. Paragraph 176 of the NPPF notes that great weight should be given to conserving landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation landscape and scenic beauty. The conservation of wildlife and cultural heritage are important considerations in all these areas, and should be given great weight in National Parks and the Broads.

6.2.13. Paragraph 185 of Section 15 states that planning polices and decisions should limit the impact of light pollution from artificial light on local amenity.

6.2.14.

Planning Practice Guidance

6.2.15. The NPPF is accompanied by Planning Practice Guidance (PPG) available online. Those elements of PPG addressing matters in the scope of this TSVIA, and relevant to the proposed development are detailed below, and the guidance has been considered when designing and assessing the proposed development.

Design

6.2.16. PPG emphasises the importance of good quality design as an integral part of sustainable development. PPG on design advises on the key points to consider on design, which include:

- Ensuring development can deliver a wide range of planning objectives;
- Enhance the quality of buildings and spaces, by considering, amongst other things, form and function; efficiency and effectiveness and their impact on well-being; and
- Address the need for different uses sympathetically.

Natural Environment

6.2.17. PPG reinforces the NPPF's commitment to recognising the intrinsic character and beauty of the countryside and supports the use of landscape character assessment as a tool for understanding local distinctiveness and the use of Natural England's guidance on landscape character assessment.

Local Planning Policy

6.2.18. Lancaster City Council's (LCC) Development Plan was adopted in July 2020 and comprises:

- Local Plan Part One: Strategic Policies and Land Allocations Development Plan Document (DPD);
- Local Plan Part Two: Development Management DPD.

Lancaster Local Plan Part One: Strategic Policies and Land Allocations DPD

6.2.19. The Strategic Policies and Land Allocations DPD identifies land to meet specific development needs of the District over the next 15 years as well as areas which are worthy protection due to their environmental, economic and social value.

6.2.20. The following policies of the Strategic Policies & Land Allocations DPD are relevant to this TSVIA:

- Policy SP7 Maintaining Lancaster's Unique Heritage;
- Policy EN2 Areas of Outstanding Natural Beauty; and
- Policy EN5 Local Landscape Designations.

6.2.21. These policies are set out in the table below and are discussed in greater detail in the Planning Statement:

Table 6.1. Relevant Local Plan Strategic Policies

Relevant Policy	Description
SP7 Maintaining Lancaster's Unique Heritage	The character of the district is shaped by both the local landscape and townscape built heritage. The district has a rich cultural history that dates back to the Roman and prehistoric period and contains a large range of historical assets that chronicle the history of the district through the ages. These are important assets that are protected, either via listing or other designation, from proposals that would harm their heritage significance. The Local Plan will ensure that these designations are protected or enhanced so that their long-term status can be secured.

Relevant Policy	Description
EN2 Areas of Outstanding Natural Beauty	Lancaster district contains two Areas of Outstanding Natural Beauty (AONB) that are designated for their national landscape importance. They are: • Arnside and Silverdale Area of Outstanding Natural Beauty • Forest of Bowland Area of Outstanding Natural Beauty. The landscape character and visual amenity of both AONBs and their settings will be conserved and enhanced. All development in the AONBs should be sustainable, consistent with the primary purpose of AONB designation and guided by the relevant AONB Management Plan. Proposals will be expected to have due regard to all relevant policies contained within the Local Plan, including the Development Management DPD and, where appropriate, the Arnside & Silverdale AONB DPD.
EN5 Local Landscape Designations	Policy EN5 identifies two local landscape designations: Key Urban Landscapes (KUL) and Urban Setting Landscapes (USL). KULs include those areas within the main urban area which are integral to the built form of the district, providing a setting for important features and/or heritage assets. They play an important role in defining the townscape of the main urban areas and are inextricably linked to the experience of the wider setting of these features. These areas also provide amenity value for local residents and the wider community. Development proposals within these areas will only be permitted where they preserve the open nature of the area and the character and appearance of its surroundings. Proposals will be expected to have due regard to all relevant policies contained within the Local Plan, in particular Policy DM46 of the Development Management DPD which relates to development and landscape impact.

Lancaster Local Plan Part Two: Development Management DPD

6.2.22. The Development Management DPD sets out a series of generic planning policies which will be used to determine planning applications.

6.2.23. The policies from the Development Management DPD which are relevant to this TSVIA include:

- Policy DM26 Public Realm and Civic Space;
- Policy DM29 Key Design Principles;
- Policy DM37 Development Affecting Listed Buildings;
- Policy DM38 Development Affecting Conservation Areas;
- Policy DM43 Green Infrastructure;
- Policy DM45 Protection of Trees, Hedgerow and Woodland; and
- Policy DM46 Development and Landscape Impact.

6.2.24. These policies are set out in the table below and discussed in further detail in the Planning Statement:

Table 6.2. Relevant Local Plan Policies within Development Management DPD

Relevant Policy	Description
DM26 Public Realm and Civic Space	The Council will expect development proposals to make a positive contribution to their surroundings. This should be achieved using good design, layout and high quality materials, to create positive, safe and attractive streetscapes that contribute to the visual amenity of their locality and encourage good accessibility and connectivity between buildings and urban spaces.

Relevant Policy	Description
DM29 Key Design Principles	New development should be as sustainable as possible and make a positive contribution to the surrounding landscape and/or townscape. The Council will expect development to: *General Principles* ▪ Contribute positively to the identity and character of the area through good design, having regard to local distinctiveness, appropriate siting, layout, palate of materials, separation distances, orientation and scale; ▪ Ensure there is no significant detrimental impact to amenity in relation to overshadowing, visual amenity, privacy, overlooking, massing and pollution; and ▪ Promote diversity and choice through the delivery of a balanced mix of compatible buildings and uses. *Green Infrastructure and the Natural Environment* ▪ Deliver net gains in green infrastructure, retaining and enhancing, where possible, appropriate amounts of garden/outdoor space for occupiers of both proposed and neighbouring uses; and ▪ Provide sufficient landscaping areas/buffer zones and appropriate levels of open space provision to mitigate development impacts on adjoining sensitive uses and the open countryside.
DM37 Development Affecting Listed Buildings	Proposals affecting Listed Buildings should conserve and, where appropriate enhance those elements which contribute to its significance. All proposals should be based on a thorough understanding of the building's significance.
DM38 Development Affecting Conservation Areas	Any development proposals and/or alterations to buildings, features and open spaces in Conservation Areas should preserve or enhance the character and appearance of the Conservation Areas. Specifically, they will be required to demonstrate that: ▪ Proposals respect the character of the surrounding built form and its wider setting, in terms of design, siting, scale, massing, height and the materials used; ▪ Proposals will not have an unacceptable impact on the historic street patterns / boundaries, open spaces, roofscape, skyline and setting including important views into and out of the area; and ▪ Proposed uses are sympathetic and appropriate to the character of the existing building and will not result in any detrimental impact on the visual amenity and wider setting of the Conservation Area.
DM43 Green Infrastructure	The Council seeks to prevent the fragmentation and isolation of Green Infrastructure. To achieve this the integrity and connectivity of the Green Infrastructure network will be managed, maintained, protected and enhanced. Opportunities to extend the framework of green spaces and green corridors in the district should be taken and development proposals that will result in damage to the integrity of or severance of a green corridor will be resisted by the Council.
DM45 Protection of Trees, Hedgerows and Woodland	The Council will support the protection of trees and hedgerows that positively contribute, either as individual specimens or as part of a wider group, to the visual amenity, landscape character and/or environmental value of the location. The Council will also protect ancient trees and ancient woodland.

Relevant Policy	Description
	The Council will expect appropriate opportunities to encourage the planting of new trees, hedgerows and woodland, making use of indigenous species, throughout the district in an effort to mitigate against the impacts of Climate Change, and to enhance the character and appearance of the district.
DM46 Development and Landscape Impact	*Development affecting Protected Landscapes* In determining planning applications the Council will attach great weight to the protection of nationally important designated landscapes. The Council will require proposals that are within, or would impact upon the setting of, designated landscapes to be appropriate to the landscape character type and designation. Development proposals should, through their siting, scale, massing, materials, landscaping, vernacular style and design seek to contribute positively to the conservation and enhancement of the protected landscape and its setting. *Development affecting Local Landscape Designations* Key Urban Landscapes and Urban Setting Landscapes are two local landscape designations identified on the Local Plan Policies Map. The contribution that these designations make to the character and setting of the urban areas will be conserved and important natural features safeguarded, providing particular regard to the historic townscape and built form of the urban areas. Within these areas the Council will only support development that preserves the open nature of the area and the character and appearance of its surroundings in accordance with Policy EN5 of the Strategic Policies & Land Allocations DPD. *Development outside of Protected and Designated Landscapes* In addition to nationally protected and locally designated landscapes the district also has a range of landscapes and townscape which are valued, unique and provide a distinct sense of place, which the Council seeks to protect and enhance. Outside of protected and designated landscapes the Council will support development that is in scale and keeping with the landscape character and is appropriate to its surroundings in terms of siting, scale, massing, design, materials, external appearance and landscaping. Consideration will be given to both the individual and cumulative impacts of a proposal. *Development affecting Coastal Landscapes and Seascapes* Proposals located in coastal locations should be considered against their impacts on coastal landscapes and seascapes, in particular in relation to Morecambe Bay and the Lune Estuary.

Morecambe Area Action Plan

6.2.25. The Morecambe Area Action Plan was adopted on 17 December 2014 as a Development Plan Document (DPD). The Plan creates a framework for economic development and conservation of environmental and heritage assets in the town.

6.2.26. The site is identified in the Morecambe Area Action Plan under Policy DO2 as a site for leisure investment and development.

6.2.27. Relevant policies include:

- Policy SP1 Key Pedestrian Routes and Spaces;
- Policy SP3 Morecambe Main Seafront and Promenade; and
- Policy DO2 Strategic Leisure – Seafront Headland, Central Promenade.

6.2.28. These policies are set out in the table below and are discussed in further detail in the Planning Statement:

Table 6.3. Relevant Policies within the Morecambe Area Action Plan

Relevant Policy	Consideration of Policy within this TSVIA
Policy SP1 Key Pedestrian Routes and Spaces	The Council requires that development proposals fronting onto or including for any element of this network should relate well to it and the space around in how buildings are: sited; in the scale and massing of buildings and through other aspects of good urban design.
Policy SP3 Morecambe Main Seafront and Promenade	The Council will protect this main seafront and promenade from development other than that which will demonstrably enhance the open character or is reasonably required to provide or improve opportunities for appropriate informal recreation and enjoyment and will not otherwise harm the open character. The Council will require that any development is to a high quality of design.
Policy DO2 Strategic Leisure - Seafront Headland, Central Promenade	The Council identifies a strategic opportunity for leisure investment and development within the area defined on the Local Plan Proposals Map as Development Opportunity Site DO2. The Council will further require that any development relates well to heritage assets including the Midland and the Winter Gardens and assists in the improvement of public realm within the Main Seafront and Promenade and the reworking of Marine Road Central to improve amenity and safety for pedestrian crossings.

6.3. ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

6.3.1. This TSVIA has been carried out by experienced Chartered Landscape Architects at TEP Ltd. It has been undertaken in accordance with GLVIA3 (LI and IEMA, 2013), and with consideration to;

- Technical Information Note (TIN) 05/2017 Townscape Character Assessment (LI, 2008);
- An Approach to Landscape Character Assessment (Natural England, 2014);
- An Approach to Seascape Character Assessment (Natural England, 2012); and
- An Approach to Seascape Sensitivity Assessment (Marine Management Organisation. (MMO), 2019).

6.3.2. GLVIA3 defines townscape as: *"the character and composition of the built environment including the buildings and the relationships between them, the different types of urban open space, including green spaces, and the relationship between buildings and open spaces."*

6.3.3. Seascape is defined in GLVIA3 as: *"landscapes with views of the coast or seas, and coasts and adjacent marine environments with cultural, historical and archaeological links with each other.'* An Approach to Seascape Character Assessment (Natural England, 2012) uses the definition: *"an area of sea, coastline and land, as perceived by people, whose character results from the activities and interactions of land with sea, by natural and/or human factors."*

6.3.4. GLVIA3 defines landscape as: *"an area, as perceived by people, the character of which is the result of the action and interaction of natural and/or human factors.'* Landscape character is defined in GLVIA3 as: *"a distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse."*

6.3.5. The method, including assessment criteria, is described in detail in **Appendix 6.1**, and is briefly discussed below.

6.3.6. The assessment of effects includes embedded mitigation measures i.e. those mitigation measures that are an integral part of the design of the proposed development. Additional mitigation is identified at section 6.7 below, following the assessment of potential impacts and cumulative effects.

6.3.7. The duration and reversibility of townscape, seascape, landscape and visual impacts have been assessed with the following considerations:

- Short term: 0-5 years during the construction period and during the operation of the finished development;
- Medium term: 5-15 years, which represents the establishment phase of planting proposed, where relevant; and
- Long term: 15 years onwards for the life of the proposed development.

6.3.8. The TSVIA is based on field assessment undertaken during June and July 2021 when trees and hedges were in leaf. Seasonal differences in effects arising due to varying degrees of screening and filtering from vegetation are mentioned where relevant.

6.3.9. The TSVIA involved the following key stages:

- Desk based assessment involving a review of relevant information, guidance and planning policy relating to the type of development proposed and to townscape, seascape, landscape and visual amenity;
- Site survey and assessment to augment the baseline assessment, assess the impacts of the proposed development and undertake photography at viewpoint locations;
- Consultation with LCC, and the Arnside and Silverdale and Forest of Bowland AONB Partnerships, to agree the scope of the TSVIA study area and assessment viewpoints;
- Baseline reporting and preliminary assessment;
- Preparation of baseline drawings to inform the assessment;
- Preparation of photomontages to assist in the assessment of effects;
- Assessment and reporting of effects, including effects on night-time character and views;
- Assessment of in-combination effects; and
- Assessment of residual effects following identification of additional mitigation.

Baseline Photography

6.3.10. Baseline photographs for Viewpoints 1 to 18 are presented as Type 1 photomontages and are shown at **Figures 6.11.1** to **6.11.18** at **Volume 4**. Photography was taken during July 2021. The time and date when each photograph was taken is detailed on each viewpoint figure.

6.3.11. Type 1 photomontages (**Figures 6.11.1** to **6.11.18** at **Volume 4**) have been produced in accordance with the guidance contained in LI Technical Guidance Note 06/19 Visual Representation of Development Proposals.

6.3.12. A photograph from each viewpoint was taken using a 50mm lens on a 21.1-megapixel full frame digital Single Lens Reflex (SLR) camera (Canon EOS 5d Mark II with a 50mm EF 50mm F/1.4 USM lens).

6.3.13. ‘Panorama’ baseline photographs have been taken, and the rotating angle between adjacent photographs is approximately 20° (about 50% overlap on field of view). This means that each panoramic photograph is constructed using only the centre 50% of each shot with the 25% left and right hand edges being discarded. Panorama baseline photographs have been joined together in Adobe Photoshop.

6.3.14. Images are displayed in a format compliant with LI guidance. Where appropriate, the approximate horizontal extent of the site is marked on baseline photography, by comparing the view with satellite imagery utilising GIS, and by using field survey knowledge. The approximate horizontal extents shown do not indicate the scale and massing of proposed built-form.

Scope

6.3.1. An initial step in the assessment process involves defining the scope of the assessment.

6.3.2. The physical scope of this TVIA has been informed by:

- Desk study, including the identification of designated landscapes, key viewpoints and landmarks; analysis of landform (as shown on **Figure 6.3 at Volume 4**); and analysis of Zone of Theoretical Visibility (ZTV) mapping (discussed below);
- Consultation with LCC, and the Arnside and Silverdale and Forest of Bowland AONB Partnerships; and
- Field assessment, including analysis of site features and features of the surrounding townscape, seascape and landscape; and analysis of landform and screening by built-form and vegetation in the site's immediate context, and in its surroundings.

6.3.3. A study area extending up to 15km from the site boundary has been identified as providing sufficient context within which an assessment of potential townscape, seascape, and landscape impacts, and an assessment of potential impacts on people’s views, can be framed. The large extent of the study area acknowledges that there are distant views across Morecambe Bay and the coastline towards the site on the coastal edge of Morecambe; and that there are distant views towards the site from within the Arnside and Silverdale AONB to the northeast (from higher ground and the coastline), and some distant elevated views from high ground within the Forest of Bowland AONB to the east and southeast.

6.3.4. Within the 15km study area, the scope of the assessment is further defined, as discussed below.

Zone of Theoretical Visibility (ZTV)

6.3.5. ZTV mapping shows the area in which the proposed development theoretically would be visible and is included as **Figures 6.6** and **6.7** at **Volume 4**.

6.3.6. **Figure 6.6** shows the ZTV generated from a bare earth terrain and does not take account of the screening effect of features within the townscape and landscape such as settlements and woodland blocks.

6.3.7. The ZTV shown on **Figure 6.7** takes account of the screening effect of settlements and woodland blocks using a height value of 8m for buildings and 10m for woodland based on OS Open Map Local data. The ZTV does not account for the localised screening effect of vegetation, including hedgerows, individual trees, and small tree groups.

6.3.8. The purpose of ZTV mapping is to inform scoping, including the identification of assessment viewpoints, and to inform 'on the ground' assessment. It shows potential theoretical visibility only and does not indicate potential visual effects or show the likely significance of effects. The ZTV does not indicate how much of the proposed development would be visible. The proportion of the proposed development that would be visible will vary and, in some cases, only a very small part of the proposed development theoretically would be visible. Field assessment was undertaken to identify how much of the proposed development is likely to be visible and to assess the change to views and visual amenity.

6.3.9. The ZTV is based on information shown on planning application drawings, including Drawing 'A02 1003 Site Layout Plan' and Drawing 'A06 1001 Proposed Elevations'. The height of each shell proposed is based on Above Ordnance Datum (AOD) levels shown on the Proposed Elevations drawing.

6.3.10. Screened ZTV mapping shown on **Figure 6.7** at **Volume 4** indicates that screening by existing buildings and vegetation restricts theoretical visibility of the proposed development to the coastline of Morecambe Bay, and areas of open sea in Morecambe Bay with a fragmented pattern of theoretical visibility to the south and east of the proposed development. The Screened ZTV indicates theoretical visibility from the southern fringes of the Arnside and Silverdale AONB with small areas of theoretical visibility across higher ground. The ZTV also extends over areas of high ground within the Forest of Bowland AONB to the east and southeast.

Scope of Assessment within the 15km Study Area

6.3.11. The most significant townscape, seascape and visual effects of the proposed development within the 15km study area, would be experienced at the site and in its immediate surroundings. Due to the site's location on the coastal edge of Morecambe, potential impacts of the proposed development also would be experienced along the coastline, with greater impacts on the local townscape and seascape, predominantly along the Morecambe Promenade and settlement edge, within approximately 1km of the site boundary.

6.3.12. There also would be potential impacts on townscape, seascape, landscape, and views in the wider area, the most notable being on designated landscapes and heritage assets with views towards the site and proposed development, within 7km of the site boundary. Designated landscapes and relevant heritage assets are discussed under section 6.4 Baseline Conditions below.

6.3.13. Beyond 7km, potential impacts would be on landscape and seascape character, and views from the Arnside and Silverdale AONB and its immediate setting; and on landscape character and views within the Forest of Bowland AONB and its western fringes.

6.3.14. Representative viewpoints within the 15km study area, discussed under section 6.4 Baseline Conditions below, have been selected with consideration to the above and have been agreed with LCC, and the Arnside and Silverdale and Forest of Bowland AONB Partnerships.

Night-time Assessment

6.3.15. This TSVIA includes an assessment of the effect of the proposed development on night-time character and views. The 'Lighting Statement' prepared by Buro Happold and submitted with the planning application provides outline design criteria for the implementation of external artificial lighting for the proposed development.

6.3.16. Night-time character and views discussed under section 6.4 Baseline Conditions below, has considered existing lighting sources at and surrounding the site and has considered whether lighting is characteristic or uncharacteristic of the area.

6.3.17. The night-time assessment considers the external lighting strategy discussed within section 6.0 of the Design and Access Statement (DAS); and is a descriptive and qualitative assessment of impacts. It does not assign significances of effects.

Consultation

6.3.18. A summary of consultation which has been undertaken in relation to the TSVIA is included in the table below, in chronological order.

Table 6.4 Consultation

Consultee	Date	Comments	Response
Arnside and Silverdale AONB Partnership	June 2019	*"Within the Landscape, seascape, townscape and visual amenity section, we support the proposed viewpoints 12 (View from the PRoW between Park Point and Far Arnside, within the Arnside & Silverdale AONB) and 13 (View from Warton Crag looking south across Morecambe Bay). We also recommend the inclusion of additional viewpoints in the AONB: Jack Scout, Arnside Knott and King William's Hill. It is important that viewpoints on Warton Crag and Arnside Knott are at an appropriate location where the Eden project site can actually be seen, such as the lower outcrops on Warton Crag and Heathwaite on Arnside Knott."*	AONB views were considered and discussed with LCC and the Arnside and Silverdale AONB Partnership in June 2021, as indicated below.
LCC	Scoping Opinion 30th August, 2019	*"Section 9 of the submitted Scoping Report provides an acceptable approach to assessing the landscape and visual impacts of the main project. The project area is within the built-up area of Morecambe and occupies a prominent position along the coastline. Therefore, the approach to adopt a townscape and seascape assessment, encompassing wider landscape impacts beyond the settlement, is an acceptable to the LPA. The suggested approach and methodology appears to broadly accord with current best practice guidance (Landscape Institute and Institute of Environmental Management and Assessment Guidance (3rd Edition) 2013) and is a suitable basis for undertaking the assessment."*	The TSVIA method is detailed in **Appendix 6.1**, and is discussed briefly, within section 6.3 above.
LCC	Scoping Opinion 30th August, 2019	*"The proposed viewpoints are all suitable and reasonable suggestions, although additional viewpoints from Torrisholme Barrow and the Ashton Memorial should be explored as part of the scope for the ES.* *Given the potential heights of the development and comments from consultees, the LPA are of the opinion the study area should be increased to*	The TSVIA study area has been increased to 15km from the site boundary, and is discussed above (within section 8.3), as part of defining the scope of this assessment. All viewpoints identified by the Arnside and Silverdale AONB Partnership have been considered, and it was discussed with LCC in

Consultee	Date	Comments	Response
		15km in order to capture potentially wider landscape and visual effects of the project from both the Forest of Bowland Area of Outstanding Natural Beauty (FoB AONB) and the Arnside and Silverdale Area of Outstanding Natural Beauty (A&S AONB). This should capture the additional viewpoints recommended by consultees, which are as follows: • *Jack Scout (A&S AONB)* • *Arnside Knot (A&S AONB)* • *King William's Hill (A&S AONB)* • *Jubilee Tower (FoB AONB)* *The LPA accept that the number of viewpoints has to be reasonable and proportionate to the scale of the project. Consequently, the LPA would recommend further engagement over the selection of the most representative viewpoints in consultation with the key consultees ahead of the formal submission of the planning application and accompanying ES."*	June 2021 that viewpoints in the vicinity of viewpoint 17 and 18 below, in addition to a viewpoint from Warton Crag would adequately represent views and inform judgements on potential impacts on views from the Arnside and Silverdale AONB. This TSVIA includes: • Viewpoint 13, at the trig point at Torrisholme Barrow; • Viewpoint 14, at the viewing platform partway up the Ashton Memorial; • Viewpoint 15, at the top of Jubilee Tower within the Forest of Bowland AONB; • Viewpoint 17, Jenny Brown's point seating area within the Arnside and Silverdale AONB; and • Viewpoint 18, vantage point within Arnside Knot Wood within the Arnside and Silverdale AONB. In June 2021, TEP emailed the Forest of Dean AONB Partnership to confirm that a viewpoint from the Jubilee Tower (viewpoint 15) was included within this TSVIA.
LCC	9th June 2021	Following a virtual meeting with LCC when TEP presented the 15km study area, updated Screened ZTV mapping, and updated TSVIA viewpoints, LCC provided viewpoints which the Conservation Officer was keen to see as part of the heritage assessment, and commented as follows: *"I appreciate the guidelines for the LVIA and the Heritage Assessment will be different, but as far as visualisations are concerned they should be accurate if the LPA is to rely on them when assessing the townscape/heritage impacts.* *Overall, the selected viewpoints are reasonable. In terms of providing photomontages, I would agree the main focus needs to be at the very local level around the site including the sequential views experienced along the seafront (in both directions). We would expect*	TEP and the project heritage consultant at WSP reviewed the viewpoint locations provided by the Conservation Officer and updated TSVIA viewpoint locations where appropriate. Further to the virtual meeting with LCC, and the review of views provided by your Conservation Officer, TEP updated the assessment viewpoints and identified photomontage viewpoint locations. Information was provided to LCC on 25th June 2021, for comment. Verified photomontages to accompany this TSVIA are provided as **Figures 6.12.1 to 6.12.7** at **Volume 4.** Verified photomontages have been produced in accordance with LI Technical Guidance Note 06/19 Visual Representation of

Consultee	Date	Comments	Response
		these to be verified photomontages. Longer distance views may get away with type 2 photomontages and/or wireframes. *If you could cross reference the suggestions attached with your selected viewpoints (as some will tally) and provide me with a list of the viewpoints where you think verified views will be appropriate we can review and confirm by return email."*	Development Proposals, and as described in the method provided at **Appendix 6.2**.
Arnside and Silverdale AONB Partnership	21st June 2021	The Arnside and Silverdale AONB Partnership advised as follows: Viewpoint 12 – *"PRoW between Park Point and Far Arnside is on the cliff."* Viewpoint 13 – *"Warton Crag. There are nature reserves across Warton Crag and permissive paths - see 'A Guide to Warton Crag Nature Reserves' : https://www.arnsidesilverdaleaonb.org.uk/wp-content/uploads/2018/09/warton_crag_reserves_guide_2018.pdf. There are good views from the footpaths to the west and above the Main quarry, and the summit. These footpaths are publicly accessible and the views can be south west as well.* *Walking along the Silverdale coast, PRoW and Lancashire Coastal Way, from SD470738 south of Heald Brow, along the coast and past Brown's Houses to Jack Scout is also where there could be a viewpoint."*	This advice was considered when finalising the location of assessment viewpoints 16 to 18 within the AONB; and additional photographs from the AONB have been provided within section 6.4 Baseline Conditions below.
LCC	7th July 2021	LCC confirmed that, *"As far as the* [viewpoint] *table goes and the assessment, the viewpoints identified are reasonable. The 5 selected viewpoints for verified photomontages (within the 1km range) will give representative views at the local level and, again, are reasonable. I will chase up our conservation officer in the morning in case we have further comment. The scope for the type and number of verified montages, does not address my concerns set out in my previous email. I still feel that you need to capture at least a couple of verified viewpoints outside the 1km range particularly when approaching Morecambe from Carnforth direction. This way you can capture the sequential views along the promenade as you move toward the site."*	TEP undertook additional photomontage photography when on site the next day (8th July), from two distant viewpoints on the coastline, including an existing viewpoint agreed with LCC.

Consultee	Date	Comments	Response
LCC	13th July 2021	LCC confirmed that it was *"of the opinion that 2 additional verified viewpoints are required as part of the ES. The locations of these are as follows:* • *On the promenade close to the Venus and Cupid statue - this view provides a more distant view of the site from an important gateway location into the town.* • *Promenade west of the lifeboat station (at the headland that leads to the slipway). From this view, we get the full sweep of the bay, the built frontage and it an equivalent view to the one that they have agreed to the SW."*	TEP confirmed that additional photomontage photography had been taken on 8th July to take account of LCC comments on 7th July 2021. Whilst the viewpoint locations selected by TEP were not the same locations provided by LCC on 13th July, the location of the original viewpoint 10 was not altered, based on viewpoint 10 being acceptable and in a location previously identified by your Conservation Officer. This view also is representative of a distant view from the coastline on the approach to Morecambe, similar to the view further north identified at LCCs first bullet point. The second additional TEP viewpoint is more distant than the second viewpoint identified by LCC, but is similar and is in addition to the verified photomontage view for viewpoint 6, closer to the site and in the vicinity of the Clock Tower.
LCC	26th July 2021	LCC confirmed that it was satisfied with the 2 additional verified photomontage viewpoints selected by TEP along the coastline and referred to above.	Additional viewpoints are included within this TSVIA as representative viewpoints 10 and 11, discussed under section 6.4, Visual Baseline below.

Limitations and Assumptions

6.3.19. Field assessment was carried out during the daytime in June and July 2021, and views were surveyed from publicly accessible locations only. Where the views from private properties have been considered, the assessment has been carried out from the nearest publicly accessible viewpoint.

6.3.20. Consideration has been given to the seasonal differences in effects arising from the degree of vegetative screening and/or filtering of views that would apply in summer and winter. Thus, the assessment has been provided for "average" and "worst-case" situations (the latter being the season with least leaf cover and therefore minimal vegetative screening).

6.3.21. The Screened ZTV, and the TSVIA have assumed that existing woodland and trees beyond the site will be retained and managed in accordance with best practice.

6.4. BASELINE CONDITIONS

6.4.1. This section refers to relevant landscape designations, and cultural heritage and nature conservation designations that may make a contribution to townscape, seascape and landscape character and to visual amenity; and summarises relevant information from published character assessments and appraisals. This section also describes the townscape and seascape character of the site and land immediately surrounding it, following desk study and field assessment, and discusses townscape, seascape and landscape value with the 15km study area.

6.4.2. Visual receptors (i.e. people that experience views of the site and who are likely to experience views of the proposed development) also are identified and described in this section of the TSVIA. Existing views are described, views experienced by receptors that will be the focus of the visual assessment. Eighteen assessment viewpoints have been selected to best inform the description of baseline views and the assessment of potential impacts and are identified at **Table 6.6** below.

Environmental Designations

6.4.3. Landscape, cultural heritage and nature conservation designations in the TSVIA study area are shown on **Figures 6.1** and **6.2** at **Volume 4**.

6.4.4. In accordance with GLVIA3, relevant designations are considered as part of determining the value of the townscape, seascape and landscape potentially affected by the proposed development.

6.4.5. This TSVIA does not assess the potential impacts of the proposed development on the significance of cultural heritage assets such as Conservation Areas (CA), Listed Buildings or Registered Parks and Gardens (RPG), nor does it assess the potential impacts of the proposed development on the qualifying interests or integrity of nature conservation designations such as Sites of Special Scientific Interest (SSSI).

6.4.6. A judgement is made regarding the contribution that cultural heritage assets and nature conservation designations make to townscape, seascape and landscape character below, and as part of identifying the value of the townscape, seascape and landscape potentially affected by the proposed development.

6.4.7. The potential impacts and significance of effects of the proposed development on cultural heritage assets is provided in Chapter 7 (Cultural Heritage and Archaeology) of the ES, and the potential impacts and significance of effects of the proposed development on nature conservation designations is provided in ES Chapter 9 (Ecology).

Landscape Designations

6.4.8. The site is not in any international, national or local landscape designations.

6.4.9. The Arnside and Silverdale AONB is approximately 5.6km to the north of the site at its closest point, and the Forest of Bowland AONB is approximately 8km to the east of the site at its closest point. AONBs are particularly special landscapes whose distinctive character and natural beauty are so precious that it is in the nation's interest to safeguard them. AONBs are unique and irreplaceable national assets which along with National Parks represent our finest countryside.

6.4.10. There are numerous 'Key Urban Landscapes', (a form of local landscape designation) within the townscape and landscape context of the site. A Key Urban Landscape (KUL) is an area of open land protected by Policy EN5 of the Lancaster Local Plan Part One: Strategic Policies and Land Allocations DPD.

6.4.11. KULs of particular relevance to this TSVIA include:

- Heysham Head KUL;
- Torrisholme Barrow KUL; and
- Williamson Park KUL.

6.4.12. There is inter-visibility between the coastal edge or higher ground within the above KULs, and the site and proposed development.

6.4.13. The Heysham Head KUL is approximately 480m to the southwest of the site at its closest point. This area is to the north of Port of Heysham and is characterised by undeveloped open coastal grassland, low cliffs and foreshore that extends along the coast of Morecambe Bay. This area is of high scenic quality and experiences panoramic views across Morecambe Bay.

6.4.14. Torrisholme Barrow KUL is approximately 2.8km to the east of the site. Torrisholme Barrow forms the undeveloped setting to the Torrisholme bowl barrow Scheduled Monument as well as providing visual amenity to the adjacent residential properties to the west. In the northwest, there is a large pocket of woodland and there are orchards associated with the farm on Slyne Road. There is a strong rectilinear field pattern of well-established and managed hedgerows and hedgerow trees which contribute to local landscape character. The drumlin is the focus of Torrisholme Barrow which provides views out from the urban edge.

6.4.15. Williamson Park, approximately 6.5km southeast of the site, also is designated as a KUL. The Park is elevated on a north-south ridge which rises above Lancaster to approximately 109m AOD. The Park includes grassland, rocky outcrops, water features and extensive woodland and tree planting. Views are available from the ridge, particularly westward across Lancaster with Morecambe Bay beyond. The Grade I Listed Ashton Memorial is a prominent building which dominates Lancaster's skyline. The Park is used extensively for information, recreation and provides many opportunities for panoramic views across Lancaster. The park's elevated landform, rocky outcrops, tree cover, ornamental planting, lawns, lake with fountain and landmark historic buildings combine to create high scenic quality.

Cultural Heritage Designations

6.4.16. The site is within Morecambe Conservation Area (CA). The special character of the Morecambe CA stems from its relationship with Morecambe Bay, which has driven the economy of the area, both in terms of its resources and its spectacular views.

6.4.17. There are numerous Listed Buildings within Morecambe CA. Those in the immediate vicinity of the site and with a direct visual relationship with the site, include:

- The Midland Hotel (Grade II*);
- Wall and Piers to Midland Hotel Car Park (Grade II);
- Morecambe War Memorial (Grade II);
- Winter Gardens (Grade II*);
- Morecambe Railway Station Building (Grade II); and
- 217, 219 and 221 Marine Road Central (Grade II).

6.4.18. The Morecambe War Memorial to the immediate south of the site was designed by Thomas Mawson who is widely regarded as one of the country's most important landscape architects of the Edwardian era.

6.4.19. The West End Morecambe CA is approximately 350m southwest of the site at its closest point. There is some inter-visibility between the site and the West End CA, referring to its northern and western edges.

6.4.20. There are Scheduled Monuments scattered throughout the 15km study area. The closest to the site is Torrisholme bowl barrow approximately 2.8km to the east. Views from Torrisholme Barrow are considered as part of the visual baseline below.

6.4.21. The Ashton Memorial Gardens and Williamson Park is a Grade II RPG approximately 6.5km to the south east of the Site. The Park is on steeply sloping land that overlooks the city of Lancaster and the Lune Estuary beyond to the west.

6.4.22. The Park shares a boundary with the wooded ground of Lancaster Moor Park to the east, to the west there are playing fields and to the north and south is residential development. The boundary is formed by fencing on the west and stone walls on the other sides. The land slopes away steeply from the Memorial giving long distance views to the north west, west and south west. A ramped grass platform lies approximately 100m north of the Memorial. There are footpaths which continue through to the northern part of the park which give views through the trees across steep drops. Views from Ashton Memorial Gardens and Williamson Park are considered as part of the visual baseline below.

Nature Conservation Designations

6.4.23. The site is immediately adjacent to Morecambe Bay which is designated as a Ramsar Site, SSSI, Special Area of Conservation (SAC) and Special Protection Area (SPA). Morecambe Bay is one of the largest areas of intertidal estuarine flats within Britain and is of international significance for wintering wading birds and of national significance for wintering wildfowl.

6.4.24. The site is within the Morecambe Bay Limestones and Wetlands Nature Improvement Area. One of the primary purposes of the Nature Improvement Area is to improve and connect the area's special wetland, limestone grassland and woodland habitats.

6.4.25. The above nature conservation designations typically comprise identifiable seascape and landscape features such as intertidal estuarine flats, wetland, grassland or woodland, although the nature conservation interests for which they are designated do not otherwise contribute to townscape, seascape and landscape character within the study area, (for example, Morecambe Bay does not appear materially different to other seascapes).

6.4.26. The environmental designations identified above are considered further in this TSVIA when forming a judgement on townscape, seascape and landscape value.

Review of Published Character Assessments and Appraisals

6.4.27. This sub-section summarises key characteristics of the townscape, seascape and landscape described in published CA Appraisals and character assessments, followed by an analysis of the townscape, seascape and landscape based on fieldwork undertaken by Chartered Landscape Architects. The following documents have been reviewed as part of this desk-study:

- Morecambe Conservation Area Appraisal;
- Morecambe Historic Town Assessment Report;
- Lancashire Historic Landscape Characterisation Study;
- A Local List of Lancashire's Unregistered Historic Designed Landscapes;
- Seascape Character Assessment for the North West Inshore and Offshore Marine Plan Areas;
- Morecambe Coast and Lune Estuary National Character Area (NCA) Profile 31;
- Bowland Fringe and Pendle Hill NCA Profile 33;
- Morecambe Bay Limestones NCA Profile 20;
- A Landscape Strategy for Lancashire, Landscape Character Assessment;
- Arnside and Silverdale AONB Landscape and Seascape Character Assessment; and
- Forest of Bowland AONB Landscape Character Assessment.

<u>Published Townscape Character</u>

Morecambe Conservation Area

6.4.28. The site is within the Morecambe CA. LCC has produced a CA Appraisal which outlines the special interest of the CA and provides management objectives.

6.4.29. Key characteristics of the Morecambe CA are:

- *"Its relationship with the Bay;*
- *The original Poulton Village layout and its seventeenth century buildings;*
- *The fishermen's cottages, such as those on Morecambe Street and Lord Street;*
- *The uncomplicated vernacular of the early nineteenth century cottages;*
- *The long terraces of nineteenth century boarding houses;*
- *Remnants of the resort's nineteenth century entertainment buildings: Winter Gardens (Victoria Pavilion);*
- *Art Deco heritage, including the Midland Hotel, the Woolworths and Hitchens buildings;*
- *Natural stone and cobble boundary walls; and*
- *Cobble and stone sett floorscapes."*

6.4.30. The CA Appraisal splits the CA into four distinct Character Areas. The site is within the Central Attraction Area. This area is focussed along the seafront and provides views across the Bay, its sandy beaches, the promenade, and the Eric Morecambe statue, commemorating the comedian in his hometown, in particular. It has a large amount of open space and a number of large, listed buildings such as the Midland Hotel, Winter Gardens and the Old Railway Station building. Combined with the pleasant formal gardens, this area has a predominately social character in contrast with the residential and retail functions of the adjacent conservation area.

6.4.31. The Harbour Band Arena on the site's western boundary is highlighted as appearing neglected which influences people's perception of the rest of the CA and the wider town.

6.4.32. To the east of the site, beyond Euston Road, is the distinctive townscape of Victoria Street and Edward Street, dominated by St Laurence's Church. This townscape developed from around 1860 into the 1880s and is characterised by terraced housing.

6.4.33. Around Green Street is the Green Street and Euston Road Conservation Area Character Area. This area has a mixture of residential, retail and leisure outlets resulting in a varied and lively atmosphere. The central part of the Conservation Area is a westward extension of old Poulton which mainly developed in the wake of the railway to provide guesthouse accommodation for holidaymakers and as a result includes a large number of pleasant Victorian and Edwardian terraces.

6.4.34. To eastern edge of Morecambe CA is the Poulton CA Character Area. This area is focussed on the historic village of Poulton and is characterised by its medieval, organic streetscape and simple, vernacular structures. Despite being immersed into the much larger settlement of Morecambe, the old Poulton character area has successfully retained some sense of a self-contained village, with buildings and streets of an intricate, human scale and a charming atmosphere and aesthetic character.

West End Conservation Area

6.4.35. Southeast of Morecambe CA is the smaller West End CA. The West End CA covers approximately 5 hectares and reflects its heritage as a Victorian seaside resort. There are some visible reminders of its historic parts, including the Alhambra theatre building on the seafront and the Victorian and Edwardian guest houses.

6.4.36. The West End CA is described in the 'Morecambe Historic Town Assessment Report', (produced by Lancashire County council and Egerton Lea Consultancy in February 2006), as being *"the most significant area of 19th century development outside the town centre. The area was a planned development by the Midland Railway Company with the earliest parts of the development dating to the 1880s."* It also is noted that "*West End was laid out in a gridiron pattern of streets of stone-built terraces."*

6.4.37. The key views out of the CA are those over the bay. There are some views across the shore and sea back towards the site and The Midland Hotel.

6.4.38. The setting of the CA is the shore along Marine Road West and the later areas of early 20th century development that followed the same grid layout pattern of development.

Lancashire Historic Landscape Characterisation (HLC)

6.4.39. LCC has identified three Historic Landscape Character Areas (HLCA) across and surrounding the site, including 'Modern Settlement', 'Sand and Mudflats', and 'Modern Recreation'.

6.4.40. The following paragraphs summarise the historic landscape characteristics of these HLCAs, which are shown on **Figure 7.1** included within the Cultural Heritage and Archaeology ES Chapter.

Modern Settlement

6.4.41. The majority of the site is within the Modern Settlement HLC Area. This HLC Area is commonly an expansion of ancient and post-medieval settlement with the present-day landscape influenced by the survival of farmsteads, roads, tracks and boundaries of the pre-urbanised agricultural landscape in some areas.

6.4.42. In this HLC Area, there are many important industrial remains associated with the textile industry. This characteristic townscape of textile mills, terraced industrial workers' housing and associated shops, pubs and places of worship creates a sense of place.

6.4.43. Listed Buildings are frequent across this HLC Area, the majority of which are farmhouses or domestic houses, but also include structures associated with the textile industry, the railways and canals.

Sand and Mudflats

6.4.44. The north-eastern corner of the site and the Stone Jetty to the northwest are within the Sand and Mudflats HLC Area. This area is characterised by lines of abandoned brushwood fencing and other structures associated with fishing, often unrelated to other visible features. The type may also include shipwreck sites, groynes, baulks, tide mills, piers, jetties, beacons, lighthouses, channel walls, stone banks, sewage outfalls, shell middens, artificial oyster and mussel beds, trackways and causeways. Today these are important for their conservation interest and aesthetic appeal, and are often used for leisure and recreation.

Modern Recreation

6.4.45. The Modern Recreation HLC Area is to the southwest of the site on an area of former fairground. The Modern Recreation HLC Area includes golf courses, large playing fields, parks, and other amenity land. This HLC Area is most found in areas adjacent to or within towns, or at seaside resorts. Historic attributes specific to this area include sports grounds and stadia, historic golf course buildings and, potentially, common land (often retained in an urban context as informal open space).

A Local List of Lancashire's Unregistered Historic Designed Landscapes

6.4.46. The Local List of Lancashire's Unregistered Historic Designed Landscapes provides a description of the historic interest of such sites and builds on the 1998 Historic Designed Landscapes of Lancashire Research Report.

6.4.47. Whilst the site is not on the list, the 2013 report highlights that further research is needed into historic designed landscapes in Lancashire. The Bennis and Dyke 1998 report (paragraph 5.2) identified a number of specific topics which merited in depth assessment: One of these topics was promenades, and the 2013 report highlights that the promenade and public gardens of Morecambe require further study as *"they are significant places in terms of the regional tourism economy, and are thus vulnerable to large-scale regeneration developments".*

Published Seascape Character Assessment

Seascape Character Assessment for the North West Inshore and Offshore Marine Plan Areas

6.4.48. The Seascape Character Assessment for the North West Inshore and Offshore marine plan areas was prepared by LUC for the Marine Management Organisation (MMO) in 2018.

6.4.49. The study places the site within Marine Character Area (MCA) 33: Morecambe Bay. This MCA comprises the enclosed estuarine bay of Morecambe, where the rivers Leven, Kent, Lune and Wyre emerge into the Irish Sea. The indented coast, enclosed by the Furness peninsula, means that a large area of sand and mud flats has built up. This vast intertidal area of shifting sands supports rich ecological habitats and wealth of birdlife. Gathering of cockles and other shellfish is an important industry in the area. The surrounding coasts are settled, with the towns of Fleetwood and Morecambe facing the bay. Panoramic vistas, with a backdrop of mountains to the north and wooded hills to the east, add to its unique character

6.4.50. The Lake District National Park and World Heritage Site adjoins, and slightly overlaps in several places, the river mouths on the northern edge of the MCA. Warton Sands, on the eastern side of the Bay, lies within the Arnside and Silverdale AONB, which includes the coastline between Carnforth and Milnthorpe.

6.4.51. Key characteristics of MCA 33 include:

- *"A shallow bay, mostly less than 10m deep and often below 5m, with a complex coastline incorporating the estuaries of four large rivers: the Leven, Kent, Keen, Lune and Wyre.*
- *Receives sand and mud from the surrounding hills and coastal sediments carried from the south by strong tidal currents and large tidal range of 10.53m.*
- *Intertidal estuarine flats of fine sand and mud, interlaced by a system of shifting tidal channels, creating a dynamic and changing seascape.*
- *The largest continuous intertidal area in Britain, with over 310km2 exposed at low tide. Harbours are a long way inshore, with approach and exit normally only possible at high tide.*
- *Glacial till forms many coastal features, including Carboniferous limestone cliffs along the Silverdale coast to the north of the Bay. Foulney Island is a notable shingle feature.*
- *Accretion is causing salt marshes to grow, with regular maintenance required to remove silt from shipping channels. Erosion is also occurring in places along the western shores. This erosion and accretion is a natural process, and is affected by man-made structures. The channel dynamics of the Kent estuary have a major influence, cyclically scouring away coastal salt marshes and depositing the material elsewhere.*
- *Natural systems much modified over time by human intervention: much of the coastal marshland has been drained for farmland. Coastal defences continue to be developed in places.*
- *Morecambe Bay's salt marshes, sand and mud flats and rocky skaers are designated at an international level and support large populations of wintering waterfowl, waders and seabirds.*

- *Until the 19th century the sands of the Bay were used, at low tide, as a principal access route between the Lancashire and Cumbrian coasts. Access can still be taken, led by the Queen's Guide to the Sands, an ancient royal appointment.*
- *The collection of cockles, mussels and shrimps, traditionally using shallow-drafted Morecambe Bay prawners, was historically an important part of the Bay's economy.*
- *The Bay is a valuable source of seed mussels, which are exported for planting in other estuaries. Aquaculture for oysters has also become established.*
- *Although the fishing industry is much declined from former years, the Bay remains important for high value commercial cockle and mussel fisheries, plus other commercial fishing for brown shrimp, crab and lobster, bass, flounder, sole, plaice, mu The construction of the Lancaster Canal and the arrival of railways led to a more rapid development of trade and tourism centred on Morecambe. The Arnside Viaduct remains a key feature in the bay. Fleetwood was also developed as a major fishing port.*
- *Morecambe remains the focus for tourism in the area, though Arnside & Silverdale and the Furness coast are popular for less intensive tourism. Recreational angling is also important for tourism.*
- *The Port of Heysham plays a key role in providing freight services to the Republic of Ireland and Northern Ireland and passenger services to the Isle of Man. Heysham nuclear power station is a notable visual landmark from coast and sea.*
- *Away from urban areas a strong sense of tranquillity and isolation results from the expansiveness of views and general absence of development.*
- *This is a very animated landscape, with the character of the Bay's surface constantly changing, through the interplay of tides and light and the movement of its birdlife.*
- *There are panoramic vistas across the bay from all directions, including views from the Lake District National Park, Forest of Bowland AONB, and Arnside & Silverdale AONB (e.g. Arnside Knott).*
- *Morecambe Bay forms a key component to the seascape setting of the Arnside and Silverdale AONB. In turn the elevated land of the protected landscapes form a scenic backdrop to views across the Bay from its seaward sidellet, turbot, whitebait, codling, flatfish and thornback ray."*

Published Landscape Character Assessments

6.4.52. Existing Landscape Character Assessments have been prepared at the National and County level covering the site and its context. The location and extent of these Landscape Character Areas (LCAs) is illustrated on **Figure 6.4.1**. At the County level the boundaries between different LCAs are considered to be zones of transition.

6.4.53. The hierarchy of information has been assessed to determine the key characteristics of the area, its condition and inherent sensitivity to change. At the National and County level the characteristics identified are generally typical over a large area and cannot be applied to specific sites or development proposals. Instead they describe the broad landscape context of the area. At the District level the characteristics, existing landscape condition, and management guidelines relevant to the site and the development are identified.

Natural England's National Character Area Profiles

6.4.54. The site is within National Character Area (NCA) 31: Morecambe Coast and Lune Estuary.

6.4.55. NCA 31: Morecambe Coast and Lune Estuary is a relatively small and low-lying NCA bordering Morecambe Bay. It includes areas of high population in the towns of Heysham and Morecambe and the City of Lancaster, but also encompasses areas of high tranquillity, particularly around the Lune Estuary and westwards along the Pilling Coast. Its distinctive identity is strongly linked to the coastal environment along its margin with Morecambe Bay, and inland through the estuaries of the Lune and the Keer. There is a longstanding cultural link to the coastal environment through fisheries, trade and tourism. Away from the coast and urban areas, the landscape is mainly one of pastoral agriculture.

6.4.56. Key characteristics of NCA 31 include:

- *"Broad and relatively flat lowlands enclosed by escarpments which open out dramatically into the undulating landscape of the coastal strip with substantial drumlin features.*
- *The sheltered expanse of the Lune Estuary with its salt marshes and tidal channels overlooked by low ridges on the Heysham peninsula and around Lancaster.*
- *Panoramic vistas across Morecambe Bay from Lancaster and higher ground, to backdrops of the Cumbrian Fells and across the Lune Estuary from Sunderland Point and the Heysham peninsula towards the Bowland Fells.*
- *Range of coastal landscape features including extensive salt marshes backing extensive sand and mud flats, particularly around the Lune Estuary; reclaimed mosses and marshland; a small area of intact remnant mossland at Heysham; sand and shingle beaches north of the Lune Estuary; and Millstone Grit sandstone cliffs at Heysham.*
- *Intensively managed pastoral landscape bounded by ditches in the lowest-lying reclaimed areas, hedges with mature trees in low-lying areas and grading into stone walls on drumlin fields and upland foot slopes with limited extent of semi-natural habitats away from the coastal strip.*
- *Low woodland cover throughout with woodland largely restricted to the sides of the Lune Valley on the boundary of the NCA and small copses on farmland.*
- *Presence of Heysham power station, which is a dominant feature on the visual profile of the coastal strip and is widely visible from adjacent NCAs, as well as the associated infrastructure such as power lines which are also widely visible.*
- *The cathedral city of Lancaster, market town and former administrative capital of Lancashire. Mainly built from Millstone Grit sandstone, the city overlooks a former fording point at the head of the Lune Estuary with a castle, cathedral, neo-Georgian town hall, canal and Victorian parks.*
- *Rural architecture, including farmsteads, that mostly results from rebuilding in brick and stone in the late 18th and 19th centuries, with fragments of earlier timber frame, sandstone, Millstone Grit and earth constructions, with fields subject to high levels of boundary change since the mid-19th century.*
- *Coastal developments that reflect a long history of a visitor economy and associated recreation, including the sea front facade at Morecambe with hotels, amusements and a promenade, and a range of caravan sites and golf courses along the more rural parts of the coastal strip from Heysham north to Carnforth.*
- *Traversed north–south by the west coast transport network including the M6, the West Coast Main Line railway and the Lancaster Canal, which pass between the Bowland Fells and Morecambe Bay"*

6.4.57. Relevant Statements of Environmental Opportunity (SEO) include:

- *"SEO 1: Maintain and enhance the historic and landscape character and the internationally significant habitats of the coastal environment, including the mudflats, salt marsh, sand dunes, vegetated shingle and the Lune Estuary, to support its key features, reflect the dynamic nature of the coastal systems, and ensure that the area remains able to regulate coastal flooding and*

sequester and store carbon, while providing access and recreation that is sensitive to the character of the coastal zone;

- *SEO 4: Promote the social, economic and cultural value of a healthy natural environment and embed wide understanding of sustainable management, building on the proximity of areas of exceptional environmental value, particularly the coastal zone, to areas of high population density".*

6.4.58. The Bowland Fringe and Pendle Hill NCA (33) lies to the east of the study area. This is described as an undulating, rolling landscape strongly associated with numerous river valleys. Land cover is varied, incorporating hay meadows, pastures, broadleaved woodland (which often occurs in valley bottoms and sides), parkland and water bodies. The principal land use is pastoral and the area's long farming history, including well-maintained field boundary hedgerows, contributes significantly to its character.

6.4.59. The Morecambe Bay Limestones NCA (20) is a lowland landscape arcing round the head of Morecambe Bay, comprising limestone hills with prominent scars, cliffs, screes and exposed limestone pavements separated by areas of low-lying undulating farmland The character of the landscape is shaped by underlying geology, with areas of flat open grazing marsh framed by dramatic limestone outcrops, extensive salt marshes and sand flats, limestone woodland and grasslands. The dynamic landscape of the coastal fringe is dominated by the intertidal foreshore with extensive areas of mudflat, sand flat and salt marsh backed by low limestone cliffs, pebble beaches or manmade sea defences.

County Level: A Landscape Strategy for Lancashire, Landscape Character Assessment (2000)

6.4.60. With reference to Lancashire County Council's Landscape Character Assessment, the site is within the Industrial Age Urban Landscape Character Type (LCT). This LCT is characterised by planned development of Victorian and Edwardian residential areas, characterised by a unity of architectural character, with small red brick or stone-built terraces in working class districts and larger brick or stone semi-detached villas in broad, tree-lined streets in areas dominated by middle class residents. The street pattern is rectilinear, on a regular grid. Prominent stone public buildings, built by wealthy patrons, large public parks, promenades and urban squares are landmarks in central districts. This period left a legacy of attractive urban areas, with a formal character. Within this urban landscape type, squares, parks and to a certain degree, urban cemeteries, contribute significantly to the quality of life enjoyed by residents and workers. Many sites retain elements of their original design and planting; for some, however, neglect, vandalism and inadequate management has created a rather utilitarian appearance.

6.4.61. Beyond Morecambe to the northeast and southeast is the Low Coastal Drumlins LCT. This LCT is characterised by areas of low, whaleback hills around 40m high. The strong pattern of pastures emphasises the undulating topography, with neat, low cut thorn hedges traversing the drumlins. Trees and shrubs are limited in this agricultural landscape, although small copses occur on the tops and sides of the drumlins. Minor roads and the Lancaster Canal wind around the drumlins while overhead powerlines and major transport routes typically cut across these areas.

6.4.62. The LCT is sub-divided into a number of Landscape Character Areas (LCAs), with the areas closest to Morecambe within LCA 12A: Carnforth-Galgate-Cockerham. This LCA supports an extremely high proportion of built development including the large settlements of Lancaster and Morecambe and recent built development along the A6. There are strong transport links throughout the LCA including the Lancaster Canal (navigable from Preston to Carnforth), M6, A6 and West Coast Main Line railway, which run side-by-side in a north-south orientation. Woodland is limited to small plantations, woods associated with former estates and rarely, fragments of ancient woodland in unusual hilltop or hillside settings.

6.4.63. To the east of the M6 is the Farmed Ridges Landscape Character Type (LCT). The LCT is characterised by grit outcrops, with their distinctive ridge profiles separating them from the adjacent lowland agricultural landscapes. Wooded sides are a key characteristic of this LCT, with the ridges supporting a mosaic of mixed farmland and woodland.

6.4.64. The LCT is sub-divided into a number of Landscape Character Areas (LCAs). LCA 7C: Langthwaite Ridge is characterised by the rounded ridge, which separates the city of Lancaster and developed coastal drumlin landscape from the rural landscapes of the Bowland Fells. It is typical of a farmed ridge with a rich mosaic of pasture, woodland and parkland. The LCA provides suitable location for reservoirs and communication masts which stand out against the skyline. Mixed woodlands are a common feature of the landscape, associated with the Quernmore estate and the reservoirs.

6.4.65. The Moorland Hills LCT is to the east of the study area. This LCT is characterised by steeply incised hillsides which allow long views across wide valleys or the surrounding lowlands. Landcover is typically blanket bog, heather moor, and acid grassland although the presence of several large woodland blocks, both broadleaved and coniferous, distinguishes these lower moorland hills from the high moorland core.

6.4.66. LCA 2B: Central Bowland Fells is of relevance to this assessment as there are potential views towards the site from within this LCA. The Central Bowland Fells LCA comprises land beyond the limit of Fells, with enclosed farmland occurring on the central massif of the Bowland Fells. Landcover is semi-natural and is typical of acid upland areas. There are few intrusive elements in this landscape, although the geometric conifer plantations are prominent locally and are unsympathetic to the landform. There are far reaching panoramic views from the edges of the Fells; particularly from the Jubilee Tower.

6.4.67. The Mosslands LCT is to the south of the built-up area of Morecambe. This is described as an extremely flat, low lying landscape comprised of peat deposits which were formerly an extensive series of lowland raised mires. The mires are now largely reclaimed and managed for intensive arable crop production, including market gardening and to a lesser extent, dairying. Fields are typically large and geometric in shape, defined by straight drainage ditches and post and wire fences. Hawthorn hedgerows are restricted to the straight, narrow roads which cross the mosslands and shelter belts, often comprising Poplar or Scots Pine, are visible on the horizon. The flat topography allows for long reaching views across this open landscape and vertical elements, such as electricity pylons, are particularly visible. Older buildings and small, loose-knit linear villages are sited on low sand and gravel or boulder clay ridges on the edges of the peat. The lack of lighting and kerbs maintains a rural character, although a variety of modern building styles and materials are evident.

6.4.68. LCA 16F: Heysham Moss lies between the built-up areas of Lancaster and Heysham. It is largely a pastoral landscape where fields are drained by straight ditches and divided by post and wire fencing, resulting an open and expansive landscape. Electricity pylons, associated with the nearby Heysham Power Station, are a particularly noticeable feature .The proximity of the city of Lancaster influences the character of the mossland in the north of the character area where trading estates, residential estates and caravan parks spill out onto the mosslands, obscuring the landscape pattern and eroding the rural nature of the landscape.

6.4.69. The Wooded Limestone Hills and Pavements LCT lies towards the north of the study area. This is a diverse, small scale landscape of rolling hills, species rich grassland and scrub, ancient woodlands, rocky outcrops, limestone pavements, reed beds and pools and a small eutrophic lake. Some of the land is rough grazing, much of it tending to revert to scrub woodland. The landscape is rich in visible historic features including evidence of former industry and historic field patterns; lime kilns indicate burning of lime for a variety of uses. Abandoned limestone quarries are a feature and often provide valuable habitats for wildlife, or are used for recreational activities. LCA 20A: Arnside and Silverdale is the only LCA within the Wooded Limestone Hills and Pavements LCT and exhibits all of its key characteristics.

6.4.70. The Open Coastal Marsh LCT occurs along the north-eastern edge of Morecambe Bay. This type is characterised by marshes and intertidal flats which extend to the low water mark. The landscape pattern is relatively simple with areas of grazed grassland incised by creeks and channels, providing texture to this otherwise flat landscape. There is an absence of settlement or man-made features which contrasts strongly with areas more inland.

6.4.71. LCA 18b: Hest Bank – Silverdale Marshes lies within the TSVIA study area. These marshes are on a raised platform backed by cliffs of sand and clay from Hest Bank to Carnforth and by the steep limestone cliffs of the Arnside and Silverdale wooded limestone hills further north. The marshes are open areas of sea-washed turf, grazed by cattle and sheep, and patterned by narrow rills, winding muddy creeks and brackish pools. Traditional turf cutting activities take place resulting in a patchwork of stripped and naturally regenerating areas on the southern half of the marsh.

Arnside and Silverdale AONB Landscape and Seascape Character Assessment

6.4.72. Chapter 9 of the AONB Landscape and Seascape Character Assessment considers the setting of the AONB. The setting of the AONB includes both those areas from where the AONB can be seen, i.e. when looking towards the AONB and areas which are seen from the AONB, when looking out from within its boundaries.

6.4.73. Views out of the AONB to the surrounding lowlands and hills, particularly across Morecambe Bay are an essential and integral part of the Arnside and Silverdale AONB, and one of its special qualities.

6.4.74. To the south the setting of the AONB includes Warton flood meadows, the drumlin farmland and coastal marshes along the east side of Morecambe Bay, Carnforth, the Forest of Bowland AONB and Lancaster, including the Ashton Memorial, and Blackpool.

6.4.75. The effects of all types of development outside the AONB, on the setting of the AONB, is identified as a key force for change. This includes effects experienced both when looking into the area, and on the views out of the AONB, for example affecting characteristic skylines.

6.4.76. Three Landscape Character Types (LCT) form the setting of the AONB. LCT H: Low Coastal Drumlins is of relevance to this assessment and encompasses parts of LCA 12a Carnforth - Galgate – Cockerham to the north of the site.

6.4.77. The key characteristics of the Low Coastal Drumlin LCT within the Arnside and Silverdale AONB are:

- *"Low north-north east to south-south west orientated drumlin and hill landforms extending south along the coast of Morecambe Bay.*
- *The orientation, pattern, small to medium scale and 'egg shape' of the drumlins. •*
- *The distinctive hedges and walls and their relationship with the drumlin forms.*
- *Development focussed along the transport corridor of the Lancaster Canal, railway, A6 and M6, with towns such as Carnforth being historic 'railway' towns.*
- *Coastal farmland, generally 'improved', is interspersed with frequent campsites and caravan parks.*

- *Towns are of mixed character, having extended from their original stone built nucleated forms to encompass modern and industrial development.*
- *Drumlins are used for housing estates or comprise rolling agricultural land enclosed by trimmed hedges or in places limestone walls.*
- *The coastal strip affords panoramic views over the tranquil low lying open estuary of Morecambe Bay, with industrial features such as Heysham Power Station present in views.*
- *The quarried face of Warton Crag forms a backdrop to views from Warton."*

6.4.78. Key values of the Low Coastal Drumlins include:

- *"Industrial heritage of the iron and steel industry, and its remaining influence on the local landscape and townscape of Carnforth;*
- *Expansive views across Morecambe Bay and towards the hills of the AONB;*
- *Visitor appeal of historic railway and vintage trains at Carnforth; and,*
- *Historic interest and recreational opportunities along the Lancaster Canal."*

6.4.79. The overall condition of the Low Coastal Drumlins LCT is described as moderate. The distinctive 'grain' of the drumlin's orientation is evident although less prominent than that found in the drumlin farmland. Some areas within Carnforth are reported to be in need of renewal and there is evidence of missing and neglected hedgerows, poorly maintained over mature field trees, poorly maintained limestone drystone walls and loss of landscape features along the motorway/West Coast Main Line transport corridor.

6.4.80. The Low Coastal Drumlins LCT is reported to have moderate - high visual sensitivity overall, as a result of the inter-visibility with the Arnside and Silverdale AONB, Hutton Roof, and the Lake District. From elevated parts of the drumlins, visibility across the landscape to these distinctive features is good although hedgerow trees and copses limit views from many areas.

6.4.81. The moderate - high ecological sensitivity is represented by the combination of pasture, hedges, hedgerow trees and river/canal/brook corridors. There is a rich industrial – especially railway – heritage within Carnforth which, in conjunction with the distinctive drystone limestone walls and clusters of historic buildings in settlements results in a moderate – high cultural sensitivity.

6.4.82. Overall, the Low Coastal Drumlins LCT is reported to have a moderate - high level of inherent sensitivity. As a result, overall capacity to accommodate change without compromising the key characteristics of the Drumlin Farmland LCT is considered to be limited.

6.4.83. LCA H1: Carnforth Coastal Drumlins encompasses the town of Carnforth. The coastal drumlins and hills surrounding Carnforth are lower and less dense than the drumlin farmland further north and east. The Forest of Bowland AONB provides a backdrop of moorland hills to the south east, beyond the Lune Valley. The area around Carnforth and following the Lancaster Canal, the railway, A6 and M6 transport corridor is developed, with a string of towns which merge into Lancaster, located on the higher ground above the coastal strip of intertidal flats and saltmarsh.

6.4.84. Relevant development management guidelines include:

- *"S5: Maintain the high proportion of undeveloped views and skylines which form the setting to the AONB. Reduce the extent of influence of development, for example so that it affects localised sections rather than large proportions of skylines. Overall development should not become key element in views from the AONB or have a defining influence on the overall experience of the landscape (i.e. developments should remain occasional features within the views and not result in a significant cumulative impact).*

- *S6: Ensure that new development does not have a detrimental impact on the AONB's essential or key characteristics, cherished views, defining features, or adversely affect the reasons or features for which the AONB was designated.*
- *S12: Ensure that development does not result in a net loss of key features and characteristics."*

6.4.85. Views from Warton Crag within The Low Coastal Drumlins LCT are considered further as part of the visual baseline below.

6.4.86. The Arnside and Silverdale AONB seascapes include extensive areas of Morecambe Bay and the River Kent and the River Keer estuaries. The dynamic and changing coastline includes flats, cockle sands and saltmarshes, bounded in places by shingle bays, rising to low cliffs with caves.

6.4.87. Seascape Character Type A: Intertidal Flats covers an expansive area of Morecambe Bay within the AONB boundary. This intertidal seascape is usually underwater at high tide. The intertidal flats are dynamic, open, undeveloped, tranquil, characterised by birdsong, and at times windswept and exposed. The estuary and narrow fringes of saltmarsh are enjoyed for recreational activities such as walking, and fishing, or enjoying views along the coastal edge.

6.4.88. Views are open and panoramic, with open skylines formed by the seaward horizon. Views are generally uninterrupted and skylines largely undeveloped, although Heysham Power Station and an offshore wind farm are clearly visible in the distance.

6.4.89. The open and exposed character and the dynamic nature of the area contribute to its distinctive and valued perceptual qualities. These include the shifting patterns of light, textures and colours; a sense of wildness and remoteness; and the perception of natural processes at work. The presence of wildlife and large numbers of birds and their calls are also important to the experiential qualities here.

6.4.90. Settlement is apparent along the margins of the bay, and the coast is important for recreation. There are a number of camping and caravan sites, shoreside car parks, footpaths, and favoured fishing spots where people enjoy the interface between land and sea.

6.4.91. The key characteristics of the Intertidal Flats Type within the Arnside and Silverdale AONB include:

- *"the dynamic and changing seascape and foreshore, with shifting and quick sands backed by low limestone cliffs and occasional shingle bays;*
- *the vast open character of the intertidal flats which extend to the sea and skylines of the estuary;*
- *the low limestone cliffs and caves backing small limestone shingle beaches, with strongly characteristic wind-sculpted coastal woodland and limestone pastures providing a rural and undeveloped margin to the area;*
- *the movement and turbidity of the water, reflected in its silty brown colour;*
- *the seasons, weather conditions, and time of day having a strong influence on the area, including the mood of the sea and sky;*
- *the sight and sounds of gently lapping water, birds feeding on the flats and at times water moving more swiftly along skeers with standing waves; and*
- *the presence of distant development on the skyline, such as Heysham Power Station, an offshore wind farm, settlement along the west coast of the bay, are reminders of a more developed world beyond the AONB".*

6.4.92. Particularly sensitive features of characteristics include the balance of open and undeveloped skylines above the flat sea and seaside settlements fringing the area which are of a strong traditional and vernacular style.

6.4.93. Pressure for development along the coastline is identified as a key force for change on seascape character. This can have a particular effect on the character of the setting of the AONB, the views into the AONB from outside and those looking out of the AONB.

6.4.94. The overall condition of the Intertidal Flats Seascape Character Type is reported to be good. The seascape is a dynamic and changing environment has an overwhelming sense of 'naturalness' with little evidence of the seascape being changed by human activities. Land use change is evident in areas beyond the seascape type, e.g. Heysham Power Station and an offshore wind farm are visible on the distant skyline but, their impacts are substantially mitigated by the effects of distance.

6.4.95. The Intertidal Flats Seascape Character Type is reported to have very high visual sensitivity overall, as a result of the strong sense of openness, generally uninterrupted skylines and strong inter-visibility with the dramatic distant hills of the Lake District and wooded hills within the AONB. The key features of the seascape, especially the semi-natural and natural habitats are intact and clearly recognisable.

6.4.96. Overall capacity to accommodate change without compromising the key characteristics of the Seascape Character Type is reported to be very limited, apart from change which reinforces positive attributes such as habitat enhancements.

6.4.97. Development management guidelines are reproduced in the table below.

Table 6.5: AONB Development Management Guidelines

Guidelines	
A3	Influence future development within the AONB, and in landscapes forming the setting to the AONB intertidal flats, in ways to reduce the extent of its influence upon the area, for example so that development affects localised sections of, rather than large proportions of skylines which form horizons to views. Seek to maintain a high proportion of undeveloped horizons and to restore the currently more developed parts of skylines which form the setting to the intertidal flats. These include the open water and land along the west and south east coasts of Morecambe Bay, the Lake District southern fells, Furness Peninsula and landscapes within the AONB
A4	Ensure that built development and infrastructure is kept to an absolute minimum.
A6	Influence future development within and in landscapes forming the setting to the intertidal flats so that the overall character and integrity of this seascape, its key characteristics, cherished views, defining features, and the reasons for designation are not significantly affected. Ensure that consideration is given to siting, design and appropriate mitigation measures to avoid or reduce adverse effects.
A7	Ensure that development does not result in a net loss of key features and characteristics.

6.4.98. Seascape Character A1: East Morecambe Bay comprises extensive areas of intertidal flats at the north-eastern end of Morecambe Bay. Views out across the wide expanse of Morecambe Bay are characteristic of this area. Views are open and panoramic with largely undeveloped skylines. Morecambe and Heysham Power Station can be seen to the south; Ulverston and an offshore windfarm in the far distance can be seen to the west. Grange over Sands on the far side of the estuary is clearly visible.

6.4.99. Whilst this description of seascape relates specifically to seascape within the AONB, some of the characteristics of the intertidal flats are applicable to the seascape in the vicinity of the site.

Forest of Bowland AONB Landscape Character Assessment

6.4.100. Parts of the 15km study area extend into the Forest of Bowland AONB. The character areas identified in the Forest of Bowland AONB Landscape Character Assessment extend outside of the AONB boundaries and take into account the fact that landscape character units may not necessarily coincide with administrative boundaries.

6.4.101. LCTs within the study area include LCT N: Farmed Ridges.

6.4.102. Key characteristics of this LCT include a mosaic of mixed farmland and woodland; low stone walls to demarcate field boundaries; a settlement pattern of isolated stone farmsteads; and rounded ridge profiles of the gritstone outcrops.

6.4.103. The Farmed Ridges LCT can be sub-divided into a number of LCAs. LCA N1: Quernmore lies on the western edge of the AONB. The key characteristics of this LCA include: panoramic, open views from the western edge of this area across Lancaster; dense, mixed woodland on the top of the ridge which provides a strong sense of enclosure; a distinctive landscape pattern of mixed woodland and pastoral farmland, predominantly delineated by stone walls; and minor road corridors, which often are lined with trimmed hedgerows.

6.4.104. Overall ecological and landscape character sensitivity within the Farmed Ridges LCT is assessed as moderate as a result of patches of mixed woodland which contribute to the mosaic pattern. Visual sensitivity is also assessed as moderate, resulting from the intermittent sense of enclosure provided by areas of dense woodland.

6.4.105. Specific landscape management guidelines include to:

- *"Conserve long, open views across surrounding lowlands from ridge-top settlements and roads;*
- *Minimise vertical structures on the skyline;*
- *Retain the predominantly rural character of the ridges by minimising the use of urban elements such as kerbs and street lights outside settlement."*

6.4.106. The Undulating Lowland Farmland LCT lies to the southeast of the Farmed Ridges LCT. This LCT is characterised by mixed farm woodlands, copses and hedgerow trees; an intricate tapestry of grazed fields; and a patchwork of wood and pasture when viewed from the fells.

6.4.107. The Undulating Lowland Farmland LCT, is sub-divided into a number of LCAs. LCA E2: Quernmore forms part of the western boundary of the AONB. Key characteristics of this LCA include: a distinctive pattern of low drystone walls; a patchwork of pastoral fields, interspersed with patches of coniferous and mixed woodland; a network of minor roads, often lined with stone walls; telecommunications masts and pylons on the ridge to the west of the AONB; and the buildings of Lancaster University when looking west.

6.4.108. The overall landscape and visual sensitivity of the LCT is moderate, however it is noted that encroachment of large-scale development such as wind farms, masts and pylons into the area have an effect on landscape character.

Character of the Site and its Immediate Surroundings

6.4.109. This sub-section describes the townscape and seascape character of the site and land immediately surrounding it, following desk study and field assessment.

6.4.110. The site is to the north and west of Morecambe Town Centre and comprises an area of public realm bound by the Morecambe Promenade to the east, north and west, and bound by Marine Road Central and Morecambe War Memorial and Gardens to the south, and the Grade II* listed Midland Hotel to the southwest. A promenade also runs east west through the centre of the site.

6.4.111. The RNLI lifeboat station is immediately north of the site adjoining the Morecambe Promenade. The Stone Jetty extends out from the promenade to the northwest of the site. It comprises public realm with sculptures, seating opportunities and bay views, and includes a café with outdoor seating.

6.4.112. Morecambe Bay is to the east, north, and west of the site and Morecambe Town Centre and public realm is to the south.

6.4.113. The site comprises five distinct areas:

- The Harbour Band area in the north-western corner of the site which is laid out as public open space following the demolition of the former bandstand;
- The redundant Bubbles site comprising the former swimming pool complex temporarily used by fair rides and attractions;
- The dome theatre southeast of the Bubbles complex built in 1979 and presently disused;
- The Bay Arena Car Park to the east; and
- The Promenade Gardens in the south-western corner of the site.

6.4.114. The site appears redundant in parts, for example across the former Bubbles site, and is used for part of the year by a visiting fairground that brings noise, lights and human activity onto the site. The fairground includes a tall rotating ride, which introduces a temporary structure onto the site that is taller than buildings adjacent to the site and is visible from the surrounding area.

6.4.115. Existing structures within the site, and the existing promenades running through the site are shown on drawing **'A01 1001 Existing Structures and Constraints Plan'** submitted with the planning application. This drawing also shows key buildings adjacent to and overlooking the site, including The Midland Hotel; the RNLI lifeboat station; Morecambe War Memorial and Gardens; and the Winter Gardens.

Physical Influences

6.4.116. The Harbour Band area is broadly flat and is at approximately 7m AOD. There are some concrete retaining walls present in the north-western corner of this space, beyond which ground levels are approximately 7.5m AOD.

6.4.117. The former Bubbles site is enclosed by concrete retaining walls. The former swimming pool is at approximately 4.5m AOD with concrete steps leading up to a viewing area at up to approximately 7m AOD. Beyond this is a steep bank and staircase leading up to the seafront promenade.

6.4.118. The dome theatre is laid out as an amphitheatre, rising from approximately 6.5m AOD at the stage to approximately 7.5m AOD on its eastern edge with the Bay Arena car park. The Bay Arena car park is broadly flat at approximately 8m AOD.

6.4.119. The Promenade Gardens are broadly flat at approximately 7.5m AOD.

6.4.120. From the western and eastern parts of the site there are some long-distance views across Morecambe Bay. In the central area of the site views are foreshortened by the former Bubbles complex swimming pool.

Land Use, Land Cover and Vegetation

6.4.121. The site primarily comprises previously developed land as described above. The former Bubbles complex comprised a swimming pool, slides and other recreational activities. Areas of greenfield land are limited to landscaping as part of previous public realm works.

6.4.122. Within the Bay Arena car park, within the eastern part of the site, there are some small areas of ornamental shrub planting. The western edge of the car park is defined by escallonia hedges which are managed to approximately 1.5m in height.

6.4.123. The western and south-western parts of the site comprise the Promenade Gardens with informal lawns and areas of ornamental planting. Close to the western site boundary are a number of Scots pine trees set behind a hedge comprising boxwood, privet and elder. To the eastern edge of the Promenade Gardens are a number of topiary shrubs.

6.4.124. Along the northern site boundary, including the seafront promenade, there is a linear group of scrubby trees including species such as ash, buckthorn and elder. There also are some individual trees including ash, oak and Norway spruce.

6.4.125. The Morecambe War Memorial adjacent to the southern boundary of the site is characterised by areas of ornamental planting. The northern boundary adjacent the site is defined by holly and elder hedges approximately 2m in height. The War Memorial Gardens are partly enclosed, providing a sense of tranquillity. The memorial comprises a rectangular stepped granite pillar supporting a large lying bronze lion, alert and looking north (out towards Morecambe Bay). There are inscriptions on the granite relating to the First and Second World Wars and the names of those remembered. It has a circular immediate setting of open hard surfacing around it. It is a Grade II listed building.

6.4.126. Following the closure of the former Bubbles complex, the site remains largely accessible by pedestrians via the seafront and inland promenades. Surfacing includes bitumen macadam in a range of colours with no real sense of continuity across the site.

Existing Settlement and the Built Environment

6.4.127. The site is bound to the north, east and west by the promenade which extends east-west along the Bay of Morecambe. The RNLI lifeboat station is immediately to the north of the site adjoining the seafront promenade.

6.4.128. The Stone Jetty, which was built in 1853 as a wharf and rail terminal, extends out from the seafront promenade to the northwest of the site. The Stone Jetty is now a recreational feature that has been subject to past renovation, including artwork on the ground surface and finials to the pillars of railings in the form of birds that are seen in Morecambe Bay. There are numerous seating and viewing areas on the jetty. The former station building with adjoining lighthouse both remain on the jetty and are Grade II Listed. The former station building offers café services.

6.4.129. Adjoining the western boundary of the site is the Grade II* listed Midland Hotel, up to 3 storeys in height, up to 22.8m AOD.

6.4.130. The site is bound to the south by the A589 Marine Road Central beyond which is the Winter Gardens, which is a Grade II* listed building; amusement arcades; shops; public realm; and car parking serving Morecambe Town Centre.

Seascape Character

6.4.131. The coastline of Morecambe within approximately 1km of the site runs in a fairly consistent northeast southwest direction with occasional coves.

6.4.132. Key characteristics of the seascape include:

- Rip rap sea defences around the stone jetty, along the northern boundary of the site and eastwards towards the Eric Morecambe statue;
- The Wave Reflection Wall extending west along the seafront promenade from The Midland Hotel;
- Open character, allowing views across the Bay towards the Arnside and Silverdale AONB and the Lake District National Park; and
- The presence of development along the coastline.

Townscape Value

6.4.133. There are no national or local designations that relate to landscape quality across the site although the site is within the western edge of Morecambe CA, which ascribes local value to the townscape within the CA and in its setting.

6.4.134. As mentioned in the Method Statement at **Appendix 6.1**, GLVIA3 advises that landscape (townscape) value should be evaluated. The Method explains the factors used to inform judgements about landscape (townscape) value which are derived from GLVIA3 and the Landscape Institute's Technical Guidance Note 02/21 (LI-TGN 02/21).

6.4.135. The following table summarises pertinent information for each factor and concludes with an overall judgement on the value of the townscape, seascape and landscape in the study area.

Table 6.6: Townscape, Seascape and Landscape Value

Factor	Summary Information
Natural Heritage	The eastern part of the site comprises areas of hard standing used for car parking, interspersed with small patches of introduced shrubs. The central area of the site comprises a large area of hardstanding associated with the former Bubbles complex, surrounded by open areas of short mown amenity grassland and some less regularly mown areas of grassland on surrounding banks. To the south-west lies the Promenade Gardens which are laid out as formal gardens with a range of ornamental hedges and shrubs. There are no Tree Preservation Orders on the site or within its immediate surroundings. The ecological reasons for the nature conservation designations identified within 15km of the site have a limited influence on townscape character potentially affected by the proposed development.
Cultural Heritage	The site is entirely within the Morecambe CA, but the presence of existing built form generally limits visibility away from the seafront. The site is close to a number of Listed Buildings including Midland Hotel (Grade II*); Morecambe Railway Station Building (Grade II); piers to Midland Hotel Car Park (Grade II); Morecambe War Memorial (Grade II); The Winter Gardens (Grade II*); and Nos. 217, 219 and 221 Marine Road Central (Grade II). These Listed Buildings contribute to the townscape character of the site and its immediate surroundings.
Townscape condition	The site comprises the former Bubbles complex including structures associated with the previous swimming pool, public gardens and areas of hardstanding and car parking. The site is within the Morecambe Conservation Area where there is some consistency in terms of architectural styles, most notably The Midland Hotel and arcade buildings along Marine Road Central which are in an Art Deco style. There also is the Winter Gardens on the southern side of Marine Road Central and the site. The site is overlooked by The Midland Hotel, and the Winter Gardens and commercial shops on the southern side of Marine Road Central. The shops and arcades along Marine Road Central are generally older and in not as good condition as the recently refurbished Midland Hotel and the relatively modern RNLI Lifeboat Station to the north of the site. There are few trees or other landscape features within the site that contribute positively to local townscape character. The Morecambe War Memorial lies beyond the southern site boundary.

Factor	Summary Information
	The site and surrounding townscape generally is representative of the localities described within the Morecambe Conservation Area Appraisal.
Associations	The site has no known associations with renowned artists or writers. The site has however appeared on national television, annually for a long time, as it was the venue for Miss Great Britain. The Bay television series also features many locations around Morecambe including some in the locale of the site. The Morecambe War Memorial to the immediate south of the site was designed by Thomas Mawson who is widely regarded as one of the country's most important landscape architects of the Edwardian era. The town of Morecambe is commonly associated with Eric Morecambe, the English comedian. There is a statue to commemorate Eric Morecambe along the seafront promenade to the northeast of the site.
Distinctiveness	The site does not contain any rare landscape elements or features and is ordinary or common place. There is no indication from published information on townscape character that the site and its environs contain features or elements which are considered particularly important examples.
Recreational value	The site comprises an area of public realm and is subject to public access via existing foot and cycle ways, through the site and along its boundaries. Within the site, National Cycle Route (NCR) 700, also known as The Bay Cycle Way, follows the route of the seafront promenade to the north of the site. The Lancashire Coastal Way (LCW) runs along the southern boundary of the site.
Perceptual (Scenic)	The location of the site on the edge of Morecambe allows open views across Morecambe Bay towards the hills of the Arnside and Silverdale AONB and Lake District National Park. Views from the Stone Jetty extending northwest of the site, towards the Morecambe settlement edge include the distant hills of the Forest of Bowland AONB.
Perceptual (Wildness and tranquillity)	The site is predominantly brownfield land within and on the edge of the built up area of Morecambe and cannot be perceived as wild. The temporary fairground within the site, car parking within the eastern extent of the site and traffic movement along Marine Road Central to the immediate south, with its associated traffic noise and lighting, reduces tranquillity within the site, and in its the immediate surroundings.
Functional	The site is within the setting of Listed Buildings in the site's immediate context, including The Midland Hotel and the Winter Gardens. Morecambe Bay forms part of the setting to the Arnside and Silverdale AONB.
Overall judgement on value	Overall, the site and its immediate townscape context within the Morecambe CA is of local value. Local townscape, extending along the coastal settlement edge and Morecambe Promenade is of regional value. The wider townscape generally is of community value. KUL at Heysham to the southwest; at Torrisholme on the edge of Morecambe to the east; and encompassing Williamson Park, also an RPG, to the southeast within Lancaster, are of local value.

Seascape Value

6.4.136. Morecambe Bay forms an important part of the setting to the Arnside and Silverdale AONB and is appreciated in many views looking out from the AONB and its setting.

6.4.137. Morecambe Bay is subject to a number of ecological designations, including SSSI, SAC, SPA and a Ramsar Site, which indicates the high value of its natural heritage.

6.4.138. Scenic quality is very good with panoramic views across the Bay towards the Arnside and Silverdale AONB, and Lake District National Park.

6.4.139. Parts of the Bay are quite tranquil, particularly the northern and western edges which are generally more sparsely populated. Tranquillity reduces in closer proximity to the larger seaside resorts including Morecambe. The dynamic coastal environment with constantly changing views governed by the tide creates a distinctive sense of place.

6.4.140. Access routes along the margins of Morecambe Bay are especially important for access to the natural environment and sense of escapism that they provide from adjacent built up areas. The footpaths and cycle routes along the coast (including Morecambe Promenade) are popular with local residents and visitors from further afield.

6.4.141. The seascape of Morecambe Bay and MCA 33: Morecambe Bay is valued at a regional level.

Landscape Value

6.4.142. The Arnside and Silverdale, and Forest of Bowland AONB landscapes are of national value. Non-designated landscapes potentially affected by the proposed development, to the south and southeast of the site and Morecambe, are of community value. National Character Areas are of regional value.

6.4.143. Parts of LCA 7C and LCA 5I to the east of Lancaster are within the Forest of Bowland AONB. These landscapes are scenically important at a regional scale, but only parts are within the AONB which is afforded protection at a national level. Characteristics of tranquillity and/or wildness are evidenced across a limited area. Overall, these LCAs are valued at a regional level.

6.4.144. LCAs northeast of Morecambe, including LCA 12A, LCA 20A and LCA 18B are within or form part of the setting to the Arnside and Silverdale AONB. These LCAs contribute positively to the landscape and scenic quality of the AONB and are of national value.

6.4.145. LCA H1 as characterised in the Arnside and Silverdale AONB Landscape Character Assessment, and LCAs on the western edge of the Forest of Bowland AONB, are of national value. Whilst parts of these LCAs are outside of the AONB boundaries, these LCAs are integral to the landscape and scenic quality of the AONBs.

Visual Baseline

6.4.146. Visibility of the site and potential visibility of the proposed development, with reference to ZTV mapping (**Figures 6.6 and 6.7** at **Volume 4**) is discussed as part of identifying the scope of the TSVIA in section 6.3 above.

6.4.147. The following paragraphs identify visual receptors (i.e. people that experience views of the site and who are likely to experience views of the proposed development), and describe views from eighteen representative viewpoints, which have been selected to best inform baseline descriptions and the assessment of potential impacts.

Visual Receptors

6.4.148. Visual receptors are the people that experience views of the site and/or who likely would experience views of the proposed development. Visual receptors have been identified within the 15km study area, following desk study and field assessment. The focus of the TSVIA is on those receptors likely to experience noticeable or significant change to the views they currently experience and receptors potentially affected within designated townscape and landscapes.

6.4.149. Visual receptors subject to the visual assessment comprise:

- Persons on long distance recreational routes running alongside the site and beyond;
- Persons on the A589 Marine Road running alongside the site and the seafront, and on the A5101 along the distant coastline;
- Persons within the site, and in its immediate surroundings;
- Persons within the local townscape, (within 1km of the site), predominantly along the Morecambe Promenade, and along the settlement edge;
- Persons on the Bay waters and on the guided walk northeast of the site;
- Persons along coastal settlement edge within the wider Townscape; within Locally Designated landscapes to the southwest and east; and at Ashton Memorial and Williamson Park RPG (within 7km of the site);
- Persons on PRoW running through the landscape to the south and southeast of the site;
- Persons within Arnside and Silverdale AONB to the northeast; and
- Persons at Jubilee Tower in the Forest of Bowland AONB to the southeast.

6.4.150. Existing views experienced by the visual receptors referred to above, and which will be the focus of the visual assessment, are discussed following **Table 6.7** below.

Assessment Viewpoints

6.4.151. Eighteen representative viewpoints have been selected within the 15km study area. Each viewpoint is identified in **Table 6.7** below, and viewpoint locations are shown on **Figures 6.7 to 6.10** at **Volume 4**. Assessment viewpoints have been discussed and agreed with LCC, the Arnside and Silverdale AONB Unit and the Forest of Bowland AONB Unit.

6.4.152. Photographs showing the existing view from each viewpoint is shown at **Figures 6.11.1 to 6.11.18** at **Volume 4**. Photography is presented as a Type 1 Photomontage for each viewpoint, which includes an indication of the site location within the view, and in some instances the 'approximate horizontal extent of the site' is shown on the view.

6.4.153. Viewpoint photography assists in understanding the baseline visual environment, as well as the townscape, seascape, and landscape environment, at the site and in its context.

Table 6.6: Assessment Viewpoints

Viewpoint	Verified Photomontage Viewpoint	Viewpoint Location	Approx. Distance and Direction of the View towards the Site	Visual Receptors
1	Yes	Stone Jetty - in the vicinity of the Grade II Listed Former Station Building and Lighthouse	195m. Looking southeast.	Persons on the Stone Jetty, including persons at the café.

Viewpoint	Verified Photomontage Viewpoint	Viewpoint Location	Approx. Distance and Direction of the View towards the Site	Visual Receptors
2	No	Near the Rotunda Bar at the Grade II* Listed The Midland Hotel	Adjacent to the site's western boundary. Looking northeast to east.	Persons at or visiting The Midland Hotel; and persons on NCR 700 on part of the site's western boundary.
3	Yes	Southern side of the Marine Road Central near the southern entrance to The Midland Hotel	75m. Looking northwest to northeast	Persons on the A589 Marine Road Central; and at the car park; and at the former Station building.
4	No	Within the car park south of Marine Road Central near the Festival Market.	100m. Looking northwest to northeast	Persons at the car parking and approaching Marine Road Central; and persons at Festival Market.
5	Yes	At or near the junction between Northumberland Street and Marine Road Central.	25m. Looking west to north.	Persons on Marine Road Central and Northumberland Street.
6	Yes	LCW on the promenade, in the vicinity of the Grade II Listed Clock Tower.	325m. Looking southwest to north west.	Persons on the promenade, the LCW and NCR 700; and on the adjacent Morecambe beach.
7	No	Promenade west of the promenade steps and The Boardwalk pub.	645m. Looking northeast.	Persons on the promenade and on Marine Road West.
8	Yes	Battery Pay & Display Car Park, north of Sandylands Promenade.	1km Looking northeast.	Persons at the car park and on the promenade.
9	No	PRoW on the coastline, west of St Patrick's Chapel at the Heysham Coast National Trust site	3.3km. Looking northeast.	Persons visiting the National Trust site and coastal footpaths.
10	Yes	Morecambe Promenade northwest of the Morecambe Town Hall Gardens and Marine Road East	770m. Looking southwest.	Persons on the LCW, on NCR 700, and on the promenade.

Viewpoint	Verified Photomontage Viewpoint	Viewpoint Location	Approx. Distance and Direction of the View towards the Site	Visual Receptors
11	Yes	LCW on the promenade, alongside the Coastal Road and opposite the car park adjacent to Morecambe Golf Club	2.5km. Looking southwest.	Persons on the LCW and Coastal Road; and at the car park.
12	No	LCW near the Hest Bank railway level crossing and café	4.5km. Looking southwest.	Persons on the LCW and visiting the café; and residents on the coastline.
13	No	Torrisholme Barrow	2.8km. Looking west.	Persons at Torrisholme Barrow; and persons on Hexham Road and at properties on Hexham Road south of Torrisholme Barrow.
14	No	Ashton Memorial	6.6km. Looking northwest.	Persons at Ashton Memorial and Williamson Park.
15	No	Jubilee Tower within Forest of Bowland AONB	13.2km. Looking northwest.	Persons at Jubilee Tower.
16	No	Warton Crag permissive path	10km. Looking southwest.	Persons on permissive path at Warton Crag.
17	No	Jenny Brown's Point seating area	9.5km. Looking southwest.	Persons at the Jenny Brown's Point seating area
18	No	Arnside Knott Wood	13km. Looking southwest.	Persons at Arnside Knott Woods and Heathwaite, in woodland clearings and over and between intervening tree cover.

Existing Views

6.4.154. The following paragraphs discuss the location of visual receptors in relation to the site and describe views towards the site experienced by these receptors. The view from assessment viewpoints identified in the table above are described below where relevant.

Persons on Long Distance Recreational Routes running alongside the Site and beyond

Lancashire Coastal Way

6.4.155. The LCW extends from Silverdale in the north to Freckleton in the south. The LCW largely follows the route of the coastline but with a few inland diversions.

6.4.156. The LCW runs along the southern boundary of the site, on the northern side of the A589 Marine Road Central. Views are open along the Morecambe Promenade and include built development along the settlement edge, activity along the Marine Road, and along the Promenade. The site is visible on the seafront, backgrounded by The Midland Hotel, and including the Stone Jetty extending into the bay waters.

6.4.157. Viewpoints 3, 5, 6, 10, 11 and 12 show the nature of views towards the site experienced by persons on the LCW close to the site along Marine Road Central; and at increasing distances from the site along the Morecambe Promenade extending northeast along the coastline. **Photographs 1 and 2** below show the view from additional vantage points along the LCW.

Photography 6.1: View towards the site from the Morecambe Promenade, in the vicinity of the Eric Morecambe statue.



Photography 6.2: Distant view towards the site from the LCW, west of Bolton Town End, off of Shore Lane.



NCR 700

6.4.158. NCR 700, also known as The Bay Cycle Way, runs for 130km around Morecambe Bay. It runs along the Promenade along the eastern, northern and western boundaries of the site and runs on the same route as the LCW northeast of the site.

6.4.159. Views across the site from NCR 700 on the Promenade along the eastern and northern edges of the site are shortened by planting on the western side of the car park and are restricted by a wall, railings, and mature vegetation along most of the northern edge of the site. Views from NCR 700 are open across the site in the vicinity of the RNLI lifeboat station and running south north along the western edge of the site, between the Stone Jetty and The Midland Hotel.

NCR 69

6.4.160. NCR 69 also known as the 'Way of the Roses', starts/finishes at the Morecambe Promenade southwest of The Midland Hotel and the site. Views towards the site extend beyond Marine Road Central and are restricted by intervening built-form and mature roadside and car park trees.

Persons on the A589 Marine Road running alongside the Site and the Seafront, and on the A5101 along the distant coastline

6.4.161. Marine Road Central is to the south of the site and follows the length of the seafront from The Midland Hotel in the west to the junction with Lord Street in the northeast. The site is clearly visible when travelling along Marine Road Central in both directions. Visibility of the site is restricted in some views northeast from Marine Road West (in the direction of the Midland Hotel), and in views southeast, due to intervening buildings on the settlement edge and street furniture including lighting columns, and roadside planting and car parking. The Midland Hotel and RNLI lifeboat station adjacent to the site are distinguishable in distant road user views southwest towards the site on the approach into Morecambe.

Persons within the Site and in its Immediate Surroundings

6.4.162. **Figure 6.8** at **Volume 4** identifies visual receptors within approximately 1km of the site, and discussed below.

Persons within the Site

6.4.163. Views from within the site generally are open across the majority of the site, and comprise surrounding built-form, including The Midland Hotel, the Winter Gardens, and built development along the settlement edge. Views across the site from the Morecambe Promenade along the eastern, northern and western edges of the site are restricted by planting on the western side of the car park within the eastern extent of the site and within the northern extent of the site.

Receptor A: Persons at the Stone Jetty and Cafe (See Viewpoint 1)

6.4.164. The Stone Jetty was built by the North Western Railway in 1853 as a wharf and rail terminal for both passenger and cargo transport. Whilst no longer operational as a terminal, the former station building with adjoining lighthouse stand on the jetty and are both Grade II Listed. There are clear views across Morecambe Bay towards the Arnside and Silverdale AONB and Lake District National Park to the north, with the site clearly visible to the southeast.

Receptor B: Persons at the RNLI Morecambe Lifeboat Station (See Viewpoints 1 and 2)

6.4.165. Persons at the lifeboat station, including at the shop, have open views across the western extent of the site, in the context of The Midland Hotel and built development along Marine Road Central, including the Winter Gardens.

Receptor C: Persons at The Midland Hotel (See Viewpoints 1 and 2)

6.4.166. The Midland Hotel is adjacent to the western boundary of the site and has views north and northeast across the site and towards the Bay beyond. Car park and lower storey views northeast towards the site are filtered and screened by mature shrubs and trees along part of the site's western boundary. The Rotunda Bar is located in the northernmost part of the hotel with an outdoor terrace overlooking the site. Views from the main elevation of the hotel extend north and northwest across the Bay. The site is not a feature of these views.

Receptor D: Persons at the Morecambe Visitor Centre and Station Building (See Viewpoint 3)

6.4.167. Morecambe Visitor Centre is within the former train station building to the south and southwest of the site. At the entrance to the visitor centre and from the northern elevation of this building, the site is perceptible beyond Marine Road Central and The Midland Hotel car park.

Receptor E: Persons at Morecambe Winter Gardens (See Viewpoint 5)

6.4.168. There are open views across the site from the entrance and front, north facing, elevation of the Winter Gardens. Street level views from the building entrance include Marine Road Central, roadside parking, street lighting, and planting beds. Views include The Midland Hotel in the oblique view west and views north extend across the site towards Morecambe Bay and mountains beyond the Bay, with partial filtering and screening by mature shrubs and Pine trees on part of the site's western boundary.

Receptor F: Persons at Morecambe War Memorial

6.4.169. Views within the War Memorial are focussed on the Memorial itself and the direction of the lion at the top of the Memorial plinth, which faces towards Morecambe Bay beyond the site. Hedgerow provides some enclosure to the spaces created adjacent to the War Memorial. Views extend over hedgerow in the direction of the site to the north, east and west.

Photograph 6.3: View from the central reserve on Marine Road Central looking towards the site beyond Morecambe War Memorial.



Receptor G: Persons at Festival Market, Entertainment Venues and at Old Station Car Park (See Viewpoint 4)

6.4.170. There are views northwards towards part of the western extent of the site, beyond car parking and Marine Road Central.

Receptor H: Shoppers at Large Supermarkets and Persons on Central Drive.

6.4.171. Views northwards towards the site and the adjacent Midland Hotel are obscured by intervening built-form, including the Festival Market, and by intervening tree planting along Central Drive, within the Old Station car park and between the Skatepark and Trampoline Park.

Persons on Northumberland Street (See Viewpoint 5)

6.4.172. Northumberland Street runs north from Central Drive towards Marine Road Central opposite the south-eastern corner of the site. Views include the eastern extent of the site from the northern part of this road, seen beyond the traffic light junction with Marine Road Central.

Persons within the local townscape, (within 1km of the Site), predominantly along the Morecambe Promenade, and along the settlement edge *(See Viewpoints 6 and 10 to the northeast and Viewpoints 7 and 8 to the southwest)*

6.4.173. Persons along the Morecambe seafront include persons on the Morecambe Promenade and on the adjacent beach; and residents, visitors and workers at properties along the coastal settlement edge. Views generally are open and oblique towards the site and The Midland Hotel adjacent to the site. Views from the settlement edge on the northern edge of West End CA extend beyond brownfield land, a supermarket and built-form in the immediate surroundings of the site. The ground plane of the site is largely obscured in these views.

Persons on the Bay Waters and on the Guided Walk Northeast of the Site

6.4.174. There are open views across the Bay along the surrounding coastlines. The Midland Hotel and the Stone Jetty assist with locating the site in wide far reaching views, which include other development along the Morecambe settlement edge. Other development along the Morecambe seafront includes a 10 storey block of flats and a residential apartment block of varied height, up to 8 storeys. Heysham Nuclear Power Station is perceptible to the southwest of the site in some views.

Persons along the Coastal Edge and within Designated Landscapes in the Wider Townscape, (within 7km of the site) *(See Viewpoints 9, 11, 12, 13, and 14)*

6.4.175. **Viewpoints 11 and 12** show open far reaching views towards the site from the wider coastline and settlement edge. The site features in some views travelling southwards, seen in the distance beyond the Promenade and in the context of the settlement edge.

Heysham Coast

6.4.176. **Viewpoint 9** shows the nature of views from the Heysham coastal edge, approximately 3.3km distant from the site, in the vicinity of a promoted viewpoint with views towards Arnside Knott in the northeast.

6.4.177. The Heysham Coast is a National Trust site, which includes St Patrick's Chapel and limestone graves on higher ground and a published trail that links to footpaths and PRoW that run along the coastline in this location. Viewpoint 9 shows an open distant view northeast towards the site with higher ground visible beyond, including Arnside Knott.

6.4.178. The site is adjacent to The Midland Hotel and buildings on the settlement edge, and the tall, rotating fair ride locates the site in a very small part of the panoramic view.

Photograph 6.4: View from St Patrick's Chapel and limestone graves towards the site on the coastal settlement edge.



Torrisholme Barrow (See Viewpoint 13)

Torrisholme Barrow is a drumlin feature on the eastern edge of Morecambe. From the trigg point on the summit there are 360-degree views over Morecambe Bay and the city of Lancaster. The site is screened by intervening built-form and mature trees. The tall rotating ride within the centre of the site, is perceptible in the distance and assists with locating the site in the panoramic view. A similar view towards the site is experienced from Hexham Road and adjacent residential properties south of Torrisholme Barrow, see **Photograph 6.5** below.

Photograph 6.5: View from Hexham Road looking towards the site on the horizon, screened in the view.



Ashton Memorial (See Viewpoint 14)

6.4.179. The Grade I Listed Ashton Memorial in Williamson Park is a landmark feature in the Lancaster skyline. The memorial is located high above the park allowing panoramic views towards Morecambe Bay. The site is distant and screened by intervening built-form. The upper most part of The Midland Hotel is barely perceptible in the distance, but assists with locating the site in the panoramic view, which also includes Heysham Nuclear Power Station and wind turbines visible in part of the view.

Persons on PRoW running through the Landscape to the South and Southeast of the Site

6.4.180. PRoW 1-2 FP28 runs east of Heysham and there is an occasional view beyond foreground hedgerow in the direction of the view. The site is screened from view by intervening mature woodland. The tall rotating fair ride temporarily sited within the centre of the site, is partly visible in the distance above intervening mature woodland.

Photograph 6.6: View from PRoW east of Heysham looking towards the site in the distance, screened in the view.



6.4.181. PRoW 1-29 FP4 runs from Langthwaire Road in the north, (north of Langthwaite Reservoir), to Blea Tarn Road in the southwest. The PRoW is to the west of the Forest of Bowland AONB. Views northwest towards the site are limited due to intervening foreground hedgerow and intervening woodland and built-form. There is a section of lower hedgerow adjacent to the southern part of the PRoW that allows views in the direction of the site. The site is screened by intervening built-form and the upper part of The Midland Hotel, barely perceptible, assists with locating the site in the view.

Photograph 6.7: View from PRoW 1-29 FP4 looking towards the site on the horizon, screened in the view.



Persons within the Arnside and Silverdale AONB to the Northeast *(See Viewpoints 16, 17 and 18)*

6.4.182. Within the southern part of the Arnside and Silverdale AONB, is Warton Crag, a former quarry and an important visitor destination. At 163m AOD it is the highest point within the AONB and there are open far reaching views across the surrounding landscape and Morecambe Bay in the direction of the site. Viewpoint 16 shows a view towards the site from a permissive path near the top of the rock face at Warton Crag.

6.4.183. Northwest of Warton Crag, and south of the village of Silverdale, there is a small headland named Jenny Brown's Point on the AONB coastline. To the immediate west, is Jack Scout, (a nature reserve managed by the National Trust), accessed from a minor road largely enclosed by adjacent mature trees and shrubs. There are views across Morecambe Bay from Jenny Brown's Point and Jack Scout, including the site in the distant panoramic view southwest. Viewpoint 17 shows the view towards the site from a seating area on the southern edge of Jenny Brown's Point.

6.4.184. Between the villages of Silverdale in the south and Arnside in the north, the land is undulating and rises to 159m AOD at Arnside Knott; 104m AOD at Heathwaite and 70m AOD at King William's Hill. Mixed woodland extends across rising and high ground and largely restricts distant views southwest across Morecambe Bay towards the site. There are some views towards the site, (over and between woodland trees), from paths through Arnside Knott Wood and Heathwaite. Views are distant and panoramic across Morecambe Bay, and include the site in a very small proportion of the view southwest. Viewpoint 18 shows a view towards the site from higher ground within Arnside Knott Wood, where there is a gap in woodland trees.

6.4.185. The site is not readily distinguishable, located adjacent to The Midland Hotel, and in the context of tall development on the coastal edge of Morecambe just perceptible above surrounding built-form. Wind turbines are visible on the skyline beyond the site and Heysham Nuclear Power Station is clearly visible, comprising large built-form on the coastal edge southwest of the site.

6.4.186. Photograph 8.8 below shows the view from a PRoW running along the coastline, on top of a low cliff, between Park Point in the northwest and Far Arnside in the southeast. Views are distant and panoramic towards the site, which is barely perceptible. Heysham Nuclear Power Station is visible on the coastal edge, seen on the horizon.

Photograph 8.8: Distant view towards the site from a PRoW, approximately halfway between Park Point in the northwest and Far Arnside, in the southeast.



Persons at Jubilee Tower in the Forest of Bowland AONB to the Southeast *(See Viewpoint 15)*

6.4.187. The Jubilee Tower, at approximately 280m AOD, within the Forest of Bowland AONB is an important visitor attraction and is a marked viewpoint on OS maps. From the Jubilee Tower there are open panoramic views across Lancaster and Morecambe towards Morecambe Bay with the Heysham Nuclear Power Station visible on the coastline in the distance.

6.4.188. The site is not visible in the distant view. The Midland Hotel adjacent to the site, and the tall rotating fair ride that temporarily sits within the centre of the site, assist with locating the site in a very small proportion of the wide far reaching view available from Jubilee Tower, and similar vantage points on higher ground within the Forest of Bowland AONB.

Night-time Character and Views

6.4.189. The Campaign to Protect Rural England (CPRE) has produced detailed interactive maps that show how light pollution is distributed around the country and show where the darkest skies are in Britain. The CPRE worked with Land Use Consultants who analysed data captured by an American weather satellite in September 2015 that passes over the UK at 1.30am, to produce these interactive maps that are available online.

6.4.190. The interactive map shows that the site is not within a 'dark sky' area. The site is within the northern part of an area of Morecambe categorised as having close to the highest level of radiance (or the brightest night light) (between 16 and 32 NanoWatts/cm^2/sr). This area extends over Morecambe to east and south of the site.

6.4.191. The level of radiance (night lights) shining up into the night sky varies within the TSVIA study area. The level of radiance reduces relatively quickly north and west of the site, beyond the coastline and across Morecambe Bay, and is lower across the landscape to the south and northeast of Morecambe, and to the south, west and north of Lancaster.

6.4.192. The level of radiance (night lights) is at its brightest above Heysham Nuclear Power Station and Heysham Port on the coastline southwest of the site, and above the centre of Lancaster, southeast of the site beyond Morecambe.

6.4.193. The lowest levels of radiance (darkest night sky) are shown across Morecambe Bay, beyond the coastline, and across higher ground within the Arnside and Silverdale AONB, and the Forest of Bowland AONB.

Existing Light Sources at the Site and in its Surroundings

6.4.194. Lighting within the site includes:

- Column mounted lighting on the perimeter of the Bay Arena car park and arena within the eastern extent of the site;
- Vehicle lights entering and exiting the car park, (open 24 hours, 7 days a week); and
- Column mounted lighting along Morecambe Promenade along the eastern and northern boundaries of the site; and
- Temporary lighting associated with the fairground that visits the site.

6.4.195. The main existing light sources adjacent to and surrounding the site comprise:

- Column mounted lighting along the A589 Marine Road;
- Traffic lights and vehicle lights on the A589 Marine Road and adjoining roads;
- Car park lighting and vehicle lights at the Old Station car park and at The Midland Hotel;
- Lighting associated with adjacent buildings including The Midland Hotel, RNLI lifeboat station; Winter Gardens, Morecambe Visitor Centre and Station Building, and businesses and entertainment facilities south of the site;
- Column mounted lighting on the Stone Jetty; and
- Lighting along the Morecambe Promenade and associated with businesses and residential properties along the coastal settlement edge to the northeast and southwest of the site.

6.4.196. Light sources at the above locations influence townscape character and views of the site and its surroundings, including adjacent seascape. Lighting is characteristic of the site, and its surroundings, particularly within 7km of the site.

6.5. IDENTIFICATION AND VALUATION OF KEY IMPACTS (CONSTRUCTION AND OPERATIONAL)

6.5.1. The assessment of potential impacts during construction and operation of the proposed development on townscape, seascape, landscape and visual receptors identified in the section above, is provided below.

6.5.2. The following assessment should be read in conjunction with the criteria for determining the significances of effects on townscape, seascape and landscape, and on views within the TSVIA Method at **Appendix 6.1**

6.5.3. This assessment also should be read with reference to **Figures 6.1 to 6.11** provided at **Volume 4**, and verified photomontages shown on **Figures 6.12.1** to **6.12.7**.

6.5.4. Verified photomontages have been produced showing the proposed development in close views from its surroundings (Viewpoints 1, 3 and 5); and in views from Morecambe Promenade to the northeast (Viewpoint 6), and from a car park on the Morecambe coastline just over 1km to the southwest of the site, (Viewpoint 8), shown on **Figures 6.7** and **6.9** at **Volume 4**. Verified photomontages also are provided for two viewpoints more distant on the coastline to the northeast of the proposed development, at Viewpoints 10 and 11.

6.5.5. This section also includes an assessment of the effect of the proposed development on night-time character and views, with reference to external artificial lighting proposed and discussed within the 'Lighting Statement' prepared by Buro Happold Ltd, and briefly discussed under the heading Lighting Strategy below.

6.5.6. The following paragraphs discuss construction activity and aspects of the proposed development that would give rise to potential impacts on townscape, seascape, landscape and views.

Construction Phase Activity

6.5.7. Construction activity would commence Q2 2022 with completion anticipated and the proposed development becoming operational by 2024 (two-year build programme).

6.5.8. Whilst construction is likely to be phased across the site, for the purposes of this assessment, it is assumed that works would all be undertaken simultaneously as this represents the worst-case scenario.

6.5.9. The majority of potential impacts during construction are anticipated to be temporary and short-term in their duration. The removal of existing vegetation and built structures, as shown on drawing **'A01 1003, Demolition Plan'** submitted with the planning application, would be permanent.

6.5.10. Potential impacts during the construction phase would arise from the following:

- Site signage, traffic control and temporary haul routes;
- Temporary construction hoarding;
- Site offices, and construction compound;
- Temporary security and task lighting;
- Demolition works, and vegetation and tree removal;
- Soil stripping, and earthworks within the development area, including excavation for foundations and some slope stabilisation work;
- Material laydown areas, and temporary storage areas;
- Movement of construction vehicles and working machinery including heavy goods vehicles (HGV) and cranes;
- Piling works and construction of new built-form and structures, including at-height works higher that the 'shells' being built; and
- Implementation of soft and hard landscape proposals.

6.5.11. The 'Existing and Proposed Site Levels Section' planning drawing, (**Drawing A01 1004**) shows that there would be no significant changes to existing ground levels, and construction of new built-form would utilise lower ground levels within the site as far as possible.

6.5.12. Construction working methods will adopt best practices wherever practicable.

6.5.13. The 'Lighting Statement' prepared by Buro Happold and submitted with the planning application identifies that during construction, mobile task lighting shall be used to illuminate areas under construction during the hours of darkness.

6.5.14. Temporary construction hoarding will be 2.4m high and comprise of solid timber or metal panels with viewing windows built into the hoarding. It will be positioned to avoid blocking footways.

6.5.15. There are three options for the siting of the project office, indicated below in order of preference:

- Option 1: Offsite - Office space above shops adjacent to part of the eastern boundary of the Old Station car park;
- Option 2: Offsite - Portable buildings double stacked within the Old Station car park opposite the existing Promenade Gardens in the south-western corner of the site, beyond Marine Road Central; and
- Option 3: On site - Portable buildings double stacked within the existing Promenade Gardens in the south-western corner of the site (within the proposed landscape area known as The Energy Field).

6.5.16. Option 1 would mean that the project office would not be introduced into existing views.

6.5.17. Options 2 and 3 would introduce the project office into views experienced by:

- Persons on the LCW on the northern side of Marine Road Central in the vicinity of the site;
- Persons on Marine Road Central in the vicinity of the site;
- Persons at The Midland Hotel (Receptor C);
- Persons at Morecambe Visitor Centre and Station Building (Receptor D); and
- Persons at Old Station car park and visiting adjacent shops, the Festival Market and other local Entertainment Facilities (Receptor G).

6.5.18. The on-site project office (option 3) would be partially screened by temporary hoarding on the site boundary and existing trees retained along the southern end of the western site boundary would provide some filtering and screening of the project office above hoarding.

6.5.19. Option 3 would introduce the project office into views towards the Old Station car park. It would be seen in the context of existing buildings surrounding the car park and in the context of temporary hoarding and construction activity on the site north of Marine Road Central.

6.5.20. There also are three options for the siting of mess and welfare facilities, indicated below:

- Option 1: On site – double stacked 12 on 12 within the existing Promenade Gardens in the south-western corner of the site (within the proposed landscape area known as The Energy Field) (if project office off-site);
- Option 2: On site – double stacked 12 on 12, adjacent to the project office within the existing Promenade Gardens in the south-western corner of the site (Option 3 above); and
- Option 3: Off site within Old Station car park – double stacked 12 on 12 (only if project office is within existing first floor offices).

6.5.21. The on-site mess and welfare facilities (options 1 and 2) would be partially screened by temporary hoarding on the site boundary and existing trees retained along the southern end of the western site boundary would provide some additional filtering and screening. Option 3 would introduce the mess and welfare facilities into views towards the Old Station car park. They would be seen in the context of existing buildings surrounding the car park and in the context of temporary hoarding and construction activity on the site north of Marine Road Central.

6.5.22. An off-site logistics hub, intended for material storage and with the potential for off-site fabrication of new built-form, is proposed on brownfield land south of the site. This brownfield land is accessed off Marine Road West, and currently is enclosed by hoarding.

6.5.23. The logistics hub would be introduced into views experienced by:

- Persons on the Morecambe Promenade in the vicinity of the hub;
- Persons on Marine Road West in the vicinity of the hub;
- Persons at 'The Boardwalk' pub and residents on part of the northern edge of West End Conservation Area to the immediate south (Receptor D); and
- Persons at the adjacent supermarket area (Receptor H).

6.5.24. Temporary hoarding, in particular on the western boundary of the logistics hub, largely would screen activity in views experienced by the above receptors. Persons at 'The Boardwalk' pub, and residents to the immediate south on Highfield Crescent, (and within the northern edge of West End Conservation Area), would have some upper storey views across the temporary logistics hub. An existing wall, and mature trees and shrubs along part of the southern boundary of the brownfield land, would provide some screening and heavy filtering of close construction activity in some resident's views.

Operational Development

6.5.25. On completion, it is assumed that all construction activities would have ceased and the proposed development would be fully operational, and landscape design proposals implemented.

6.5.26. The operation phase is assessed on completion, when the proposed development including embedded landscape proposals, would have been implemented; for the short and medium-term (between year 0 and year 15 after completion); and for the long-term from year 15 onwards.

6.5.27. The following assessment assesses the potential impacts of the proposed development before additional mitigation discussed in section 6.7 below, is put in place.

6.5.28. Townscape, seascape, landscape and visual mitigation normally is embedded in the design of the development by a combination of actions, such as by siting and layout of the development; by the materials used to finish the development; and through the inclusion of landscape strategy. Landscape and visual assessment is used to develop and inform embedded mitigation, identifying potential impacts and where new planting should be incorporated into the design to reduce these impacts.

6.5.29. The following paragraphs discuss the proposed development and embedded townscape, seascape, landscape and visual mitigation, with reference to the layout, design and appearance of the proposed development including landscape design proposals.

<u>The Proposed Development and Embedded Mitigation</u>

6.5.30. The proposed development is expected to attract an average of 760,000 visitors per year with the site able to accommodate a maximum of 4,000 visitors per day. Core hours of operation would be between 09:00 and 21:00. The 6,000-person capacity outdoor arena would host a maximum of 8 late evening events per year in the summer season between the hours of 18:00 and 00:00.

6.5.31. The proposed development, including landscape design proposals, is shown on **Drawing 'A02 1002 Proposed Site Plan'**. **Drawing 'A06 1001 Proposed Elevations'** also shows the proposed built-form in relation to adjacent buildings.

6.5.32. The design of the proposed development is discussed in the DAS, with reference to the building design concept, proposed site arrangement, building massing and layout, external form, and building materials. Elevations and visualisations are included to illustrate the proposed development.

6.5.33. The following design considerations and features of the proposed development assist with minimising the potential impacts of the proposed development, in particular new built-form, on townscape, seascape, landscape and views:

- New built-form consists of four structural organic forms, inspired by shells, and reflecting the curve of the existing landmark Midland Hotel;
- The proposed 'shells' would occupy lower ground within the site and are separated from existing buildings adjacent by new high quality landscape design proposals;
- The height of key buildings adjacent to and overlooking the site, has been considered, including The Midland Hotel (reaching 22.8m AOD) and the Winter Gardens (reaching 27.5m AOD);
- The proposed built-form comprises a cluster of four 'shells' of different scales and heights (between 23.7m AOD and 36.9m AOD) to minimise their impact and to provide visual interest;
- Careful consideration has been given to the appearance and materiality of the proposed 'shells', (comprising a timber gridshell superstructure with flexible membrane cladding, including integrated photovoltaic panels in part), and to the interface between new built-form and the surrounding landscape proposals and existing public realm;
- A 'dunescape' plinth is proposed to connect the new built-form (shells) to the ground, and will be planted with a mixture of low growing coastal grassland and dune plants;
- Air Source Heat Pumps (ASHP)/Energy Pods proposed within The Energy Field landscape area, on the approach to the main entrance of new built-form, have been designed as part of the surrounding landscape proposals, and their form and lattice timber structure is organic and of a quality in keeping with the rest of the proposed development. The Energy Pods also have potential to demonstrate both solar and wind harvesting, as well as integrating covered cycle parking and seating for visitors. The Energy Pods support a 'sea foam' shelter that extends southeast towards Marine Road Central, offering a sheltered route for visitors arriving from the park and ride and coach drop-off;
- Views out across Morecambe Bay are maintained from the Morecambe Promenade and from within the proposed development; and
- Landscape design proposals would create high quality, innovative external spaces within the site of the proposed development, which enhance townscape character and include planting and hardscaping designed to reflect and complement its setting within the surrounding coastal environment.

Landscape Design

6.5.34. The Landscape General Arrangement is shown on **Drawing EDNN-TEP-ZZ-ZZ-DR-LA-001**. Landscape surrounding proposed built-form is designed as a series of external spaces with unique character and purpose that reflects the 'bayscape' and coastal environment present in the context of the proposed development and complements proposed built-form. The landscape design principles and concept are presented at section 4.0 of the DAS.

6.5.35. The Landscape General Arrangement comprises the following:

- The Rhythm Garden to the east of proposed built-from and the Tide Garden to the west, part of the visitor attraction, also designed to support outdoor events;

- The Energy Field south of the Eden North visitor attraction comprising a generous landscape area outside the pay boundary allowing permissive access for public use, including the Energy Pods referred to above;
- Northern Coastal Edge, comprising a raised landform edge defining the pay boundary of this side of the development. This edge references the natural patterns of cliffs, headlands and bays, and rises up to 4m above the existing promenade level;
- Western Space, comprising a shingle plaza and coastal lawn north of The Midland Hotel and west of the Tide Garden and proposed built-form. It is intended to provide permissive access for the public, and is designed to help facilitate the flow of pedestrians towards the Stone Jetty and around to the northern promenade; and
- Seasonal Support Space, south of the Rhythm Garden and directly opposite the Winter Gardens to the south beyond Marine Road Central, intended to provide a flexible space, that can accommodate temporary uses and pop-up facilities when the Rhythm Garden is being used for events; to offer outdoor gathering space for the Winter Gardens; and could be used to showcase or promote exhibitions being held in the seasonal programming space within the Natural Observatory.

6.5.36. **Drawings EDNN-TEP-ZZ-ZZ-DR-LA-012** and **EDNN-TEP-ZZ-ZZ-DR-LA-013** show sections through the Tide Garden and Energy Field, and through the Arena within the Rhythm Garden and the Northern Coastal Edge.

6.5.37. Other landscape drawings submitted within the planning application show the layout and design of each the above external spaces, and Section 4.0 of the DAS describes the arrangement and design of these spaces.

6.5.38. Section 5.0 of the DAS describes the appearance of hard landscape materials throughout the proposed development, including proposed surfacing, retaining walls and structures (comprising welded mesh gabion baskets or vegetated retaining wall systems), boundary treatments, street furniture (seating, picnic tables, litter bins, cycle stands), and naturalistic children's play elements. Wave and pebble forms will be used for seating, and the undulating wave form also is intended in the detailing of other items of street furniture.

6.5.39. **Drawings EDNN-TEP-ZZ-ZZ-DR-LA-008** and **EDNN-TEP-ZZ-ZZ-DR-LA-009** show surfacing proposals and boundary treatments. A deliberately constrained palette of external boundary treatments is proposed in order to achieve a cohesive scheme, which does not draw attention to the pay boundary. The boundary treatment palette predominantly uses a combination of glass balustrade and vertical slat hardwood timber balustrade. Where boundaries are proposed at the same level as areas with permissive access outside the pay boundary then these will be 2.0m in height. In general elsewhere, boundary treatments will be used in conjunction with level changes, to achieve the same effect as a 2.0m high barrier. An exception to this is at the edges of the seating terrace on the Northern Coastal Edge and to the edges of the Bay Glade Café Terrace and Restaurant deck, where a taller 2.0m high balustrade will be used to create shelter from the wind.

6.5.40. Section 5.0 of the DAS also describes the planting strategy for the proposed development, including native and non-native trees, and shrub and groundcover planting, including grassland.

6.5.41. The proposed planting strategy incorporates native species found in coastal habitats in order to maximise the biodiversity and potential habitat value of the proposed development; to offer an alternative to traditional ornamental and amenity seaside planting; and to provide an educational opportunity. Plants suited to local coastal conditions will be suitably robust, representing a sustainable approach to the long-term management of the proposed landscape.

6.5.42. Proposed tree planting includes:

- Pine trees (in addition to those retained on the southern end of the western boundary) within The Energy Field on the approach to the main entrance to proposed built-form;
- Trees, including some pine species, around the edges of the Tide Garden and Rhythm Garden, and along the Northern Coastal Edge; and
- Ornamental tree planting within the seasonal support space opposite the Winter Gardens.

6.5.43. Tree planting does not provide a specific screening function but is intended to generally soften the appearance of the proposed development, experienced within the site of the proposed development and from its immediate townscape and seascape context and to provide a transition to proposed built-form.

6.5.44. Plant sourcing and sizes is discussed within section 5.0 of the DAS. Tree planting will include a range of sizes including some larger tree specimens for their early impact on completion of the proposed development. Trees specified will range in height from 175-200cm to 350-400cm, and trees opposite the Winter Gardens will have a height of 400-450cm and a clear stem of 200cm minimum.

6.5.45. Shrubs and perennials (including grasses) have been selected from recognised plant communities recorded in the National Vegetation Classification and known to occur in the locality. Species have been carefully selected to include those with particularly attractive qualities that will offer seasonal and or year-round interest, and that will create an assemblage that is representative of the original plant community.

6.5.46. The native plant communities proposed for different external spaces proposed are as follows:

- Coastal Lawn: low growing coastal grassland community;
- Shingle Plaza: strand line and cliff edge plant communities;
- Northern Coastal Edge and north/northeast edge of Rhythm Garden: cliff-top and headland plant community;
- The Energy Field: mixture of low growing coastal grassland community and dune plant community, with a low growing wetland plant community to drainage swales;
- Rhythm Garden: mixture of low growing coastal grassland community and dune plant community, with reed bed and low growing wetland plant community to its southern edge; and
- Rain Garden (between the Rhythm Garden and Energy Field): stream gulley plant community.

6.5.47. Initial planting palettes for the different planting types proposed, are described in section 5.0 of the DAS.

6.5.48. Some areas of mixed ornamental and native planting also are proposed, comprising a mixture of shrub and herbaceous perennials tolerant of coastal conditions and chosen for their visual appeal through the year and their value as pollinator plants. Native species also will be included to add to the wildlife value of this planting and to showcase a hybrid approach.

External Lighting Strategy

6.5.49. The external lighting strategy for the proposed development is discussed within the 'Lighting Statement' prepared by Buro Happold and is presented within section 6.0 of the DAS.

6.5.50. The 'Lighting Statement' indicates that external lighting would comprise:

- Directional low level light sources with a maximum tilt of 10 degrees to primary pedestrian routes;
- Low level lighting bollards to secondary pedestrian routes;

- Wall mounted directional fixtures integrated into ramps and landscape furniture;
- Integrated lighting to landscaping furniture (benches) to provide accent and ambience;
- Integrated lighting to low level façade details and entrance canopies to enhance architectural form and create a welcoming atmosphere after dark; and
- Integrated lighting to landscape canopies.

6.5.51. To minimise potential adverse impacts of light pollution, including on night-time character and views, the following design principles will be applied:

- Luminaires with accurate optics - directional and with tight light beam angles, whenever appropriate;
- Cowls or light shield accessories, where necessary, to avoid light spill; and
- Lighting operated by time-based controls to limit post-curfew light spill.

6.5.52. The seascape adjacent to the proposed development will be maintained as a dark corridor, in particular for the preservation of relevant protected wildlife; and illumination of external circulation routes directly adjacent to the bay generally will be addressed at low level and light distribution directed inland.

Potential Impacts on Townscape, Seascape and Landscape

6.5.53. The assessment considers the sensitivity of the townscape, seascape and landscape, and the magnitude of the impact, to come to an overall judgement on the significances of effects, in accordance with the TSVIA Method at **Appendix 6.1**.

6.5.54. The assessment of the proposed development during construction and operation for each of the townscape, seascape and landscape receptors identified is summarised in **Table 6.8** below.

6.5.55. The following sub-section is structured as follows:

- Sensitivity;
- Potential Impact on Townscape, Seascape and Landscape during Construction;
- Potential Impact on Townscape, Seascape and Landscape during Operation; and
- Summary of Potential Impacts and Significances of Effect on Townscape, Seascape and Landscape during Construction and Operation.

Sensitivity

6.5.56. The assessment of townscape, seascape and landscape sensitivity is a combined judgement about the value of the townscape, seascape and the landscape, and the overall susceptibility to change of the townscape, seascape and landscape.

6.5.57. The susceptibility of townscape and landscape to change depends on the characteristics of the receiving townscape and landscape, and the nature of the proposed development. Susceptibility to change of the townscape and landscape potentially affected by the proposed development is discussed below.

Townscape Value

6.5.58. The site comprises previously developed land comprising the former Bubbles complex swimming pool, dome theatre, bay arena and car park and Promenade Gardens. The site is publicly accessible with the main through route traversing the site from east to west. The site is within the Morecambe CA, (which extends approximately 1km to the east of the site); although it is acknowledged that parts of the site are of low quality. Overall, the site is of local value.

6.5.59. For the purposes of this assessment, 'local townscape' comprises townscape on the edge of Morecambe where there is inter-visibility with the site, and includes Morecambe Promenade, within approximately 1km of the site boundary. Local townscape includes both the Morecambe and West End CAs which are of local value. The scenic quality of local townscape, which offers panoramic views across Morecambe Bay, results in recreational and tourist offer, which results in its renown at a regional level. Overall, local townscape is of regional value.

6.5.60. For the purposes of this assessment, 'wider townscape' is taken to mean the townscape on the edge of Morecambe extending between 1km and 7km from the site. The wider townscape, away from the centre and edge of Morecambe facing the bay, has less of a tourist. Overall, wider townscape is of community value, except where there are local landscape designations at Heysham to the southwest; Torrisholme Barrow to the east and at Williamson Park to the southeast. These locally designated landscape are of local value.

Townscape Susceptibility to Change

6.5.61. The site and its immediate surroundings have a medium susceptibility to change as a result of built development already present on site and the influence of surrounding buildings.

6.5.62. Townscape surrounding the site would not be physically affected by the proposed development, but the proposed development does have the potential to affect aesthetic and perceptual aspects of townscape such as key views. Local townscape (within 1km of the site boundary) has a medium susceptibility to change.

6.5.63. The susceptibility of the wider townscape to change, where there is some inter-visibility with the site and the wider built up area of Morecambe and Lancaster (between 1 and 7km of the site boundary) is assessed as medium.

6.5.64. The site is within the Central Attractions area of Morecambe CA. The Midland Hotel to the immediate west of the site (up to 3 storeys) and Winter Gardens to the south, on the southern side of Marine Road Central, influence townscape character within the CA. Development at the site has the potential to change the character and quality of part of the Morecambe Conservation Area. The susceptibility to change of Morecambe CA is medium.

6.5.65. West End CA is southwest of the site, with there is some inter-visibility between the site and the CA. The proposed development has the potential to change the character of part of the West End CA. The susceptibility of West End CA is medium.

Seascape Value

6.5.66. MCA 33 and the seascape character of Morecambe Bay is of regional value. This seascape is recognised as scenically important at a regional scale.

Seascape Susceptibility to Change

6.5.67. MCA 33: Morecambe Bay and the seascape of Morecambe Bay has a low susceptibility to change. This marine landscape is able to accommodate the operation (and construction) of the proposed development without suffering detrimental effects on its character.

Landscape Value

6.5.68. The Arnside and Silverdale AONB and Forest of Bowland AONB both contribute positively to landscape character and scenic quality. These landscapes are of national value.

6.5.69. The Ashton Memorial and Williamson Park RPG is recognised as being important at a local scale.

6.5.70. NCA 20, NCA 31 and NCA 33 are all of regional value. Parts of these NCAs include the Arnside and Silverdale and Forest of Bowland AONBs and all have panoramic views across Morecambe Bay.

6.5.71. The Industrial Age ULCT is characterised by planned development of Victorian and Edwardian residential areas. Public parks, promenades and urban squares have suffered from neglect, vandalism and inadequate management resulting in a utilitarian appearance. This ULCT is valued at a community level.

6.5.72. The LCAs to the south of Morecambe, including LCA 16F, LCA 12C and LCA 18D are valued by residents and workers within the community, but there are no defined areas of higher value. Rare features and elements are not identified in published landscape character assessments. Overall, these LCAs are valued at a community level.

6.5.73. Parts of LCA 7C and LCA 5I to the east of Lancaster are within the Forest of Bowland AONB. These landscapes are scenically important at a regional scale, but only parts are within the AONB which is afforded protection at a national level. Characteristics of tranquillity and/or wildness are evidenced across a limited area. Overall, these LCAs are valued at a regional level.

6.5.74. LCAs northeast of Morecambe, including LCA 12A, LCA 20A and LCA 18B are within or form part of the setting to the Arnside and Silverdale AONB. These LCAs contribute positively to the landscape and scenic quality of the AONB and are of national value.

6.5.75. LCA H1 as characterised in the Arnside and Silverdale AONB Landscape Character Assessment, and LCAs on the western edge of the Forest of Bowland AONB, are of national value. Whilst parts of these LCAs are outside of the AONB boundaries, these LCAs are integral to the landscape and scenic quality of the AONBs.

Landscape Susceptibility to Change

6.5.76. The Arnside and Silverdale AONB has a low susceptibility to change given the distance of this designated landscape from the site and the presence of existing development along the coastal edge, including Heysham Nuclear Power Station.

6.5.77. The Forest of Bowland AONB also has a low susceptibility to the change proposed.

6.5.78. The Ashton Memorial and Williamson Park RPG has a low susceptibility to change due to distance and intervening development between the proposed development and this RPG

6.5.79. NCA 20, NCA 31 and NCA 33 all have a low susceptibility to change. The proposed development has the potential to affect some key characteristics and qualities, but this would be in a very limited geographical area.

6.5.80. The County, Arnside and Silverdale AONB and Forest of Bowland AONB LCAs are all considered to have a medium susceptibility to change. The landscape generally is able to accommodate the operation and construction of the proposed development without suffering detrimental effects on its character.

Townscape, Seascape and Landscape Sensitivity

6.5.81. The sensitivity of each townscape, seascape and landscape receptor identified is summarised in the table below.

Table 6.7: Townscape, Seascape and Landscape Sensitivity

Receptor	Value	Susceptibility to Change	Sensitivity
Townscape Character			
The site and surrounding townscape (within the CA and its setting)	Local	Medium	Medium
Local townscape including Morecambe Promenade	Regional	Medium	Medium
Wider townscape (excluding designated areas)	Community	Medium	Low
Conservation Area Character Areas			
Morecambe Conservation Area, including: Central Attraction Area Victoria Street/Edward Street Green Street to Euston Road Poulton	Local	Medium	Medium
West End Conservation Area	Local	Medium	Medium
Relevant Designations within the Wider Townscape			
Heysham Coast KUL	Local	Medium	Medium
Torrisholme Barrow KUL	Local	Low	Low
Williamson Park RPG	Local	Low	Low
Williamson Park KUL	Local	Low	Low
Marine and Seascape Character			
MCA 33: Morecambe Bay	Regional	Low	Low
Seascape character of Morecambe Bay	Regional	Low	Low
Areas of Outstanding Natural Beauty and their Setting			
Arnside and Silverdale AONB and its setting LCA H1: Carndorth Coastal Drumlins	National	Low	Medium
Forest of Bowland AONB and its setting LCAs on the north-western edge of the AONB	National	Low	Medium
National Landscape Character Areas			
NCA 31: Morecambe Coast and Lune Estuary NCA 33: Bowland Fringe and Pendle Hill NCA 20: Morecambe Bay Limestones	Regional	Low	Low
County Landscape Character Areas			
Industrial Age ULCT	Community	Medium	Low
LCAs south of Morecambe	Community	Medium	Low
LCAs east of Lancaster	Regional	Medium	Medium
LCAs northeast of Morecambe	National	Medium	High

Potential Impact on Townscape, Seascape and Landscape during Construction

6.5.82. The construction phase would result in alterations to the townscape, some of which would be temporary (i.e. the introduction of plant and machinery and associated activities), while some would be permanent (removal of structures and vegetation) and also apparent during the operational phase (i.e. the emergence of new built form).

The Site and Surrounding Townscape

6.5.83. During the construction phase direct adverse impacts to townscape components would result from changes in land cover and vegetation and alterations to the existing topography, for example through excavation for foundations, roads and services. There would be disturbance of the existing ground levels across the full area arising from the removal and storage of topsoil and excavation for roads, foundations, services and drainage.

6.5.84. Some existing vegetation, including the ornamental hedges within the bay arena car park and promenade gardens would be removed. The existing pine trees along the western site boundary would be retained and protected during construction and supplemented with new pine tree planting.

6.5.85. Existing structures including the sub-station and store on the western boundary of the site, concrete alcoves, part of the concrete amphitheatre, public toilets, retaining walls and stairs in the former Bubbles complex and the well structure in the promenade gardens would be demolished.

6.5.86. The removal of existing vegetation would result in a localised change to the townscape baseline of the site and immediate townscape. The presence of construction activities and the partially completed development would occur for the duration of the construction phase and would be a more noticeable change to townscape in its immediate surroundings and along the edge of Morecambe extending northeast. Beyond this construction activity would influence townscape character to a lesser extent due to distance and intervening built-form.

6.5.87. During construction the site would undergo transformation from its present character to the operational development. The main changes would be in the removal or alteration of features and elements of the baseline to facilitate construction of the proposed development. Construction activity would take place across the full extent of the site.

6.5.88. The significance of effect on townscape character at the site and in its immediate surroundings, during construction is judged to be moderate adverse for the short-term.

6.5.89. Where there is inter-visibility between the proposed development and the local townscape, there would be a minor adverse significance of effect on local townscape.

6.5.90. There would be a negligible significance of effect on the character of the wider townscape up to 7km from the site boundary.

Published Conservation Area Character Areas

6.5.91. Construction activity would introduce some localised disturbance to the Morecambe CA. The greatest effects would be within the Central Attraction Area where the introduction of plant and machinery, material stockpiles, welfare facilities, and construction traffic to facilitate the construction of the development would result in a direct impact to the character of the CA. The presence of these elements in the townscape would alter the characteristics of the Central Attraction Area for the short-term. The magnitude of impact would be low negative and the significance of the effect would be **minor adverse**.

6.5.92. Construction activity would have no direct impact on the Victoria Street/Edward Street, Green Street to Euston Road and Poulton CA Character Areas. The introduced tall plant and machinery (including cranes) would be perceived as an incongruous alteration in the context of these CA Character Areas for the short-term but would be seen in conjunction with other structures including The Midland Hotel (up to 3 storeys) and the Winter Gardens. Construction and infrastructure maintenance activities occur periodically in most CAs. The magnitude of impact and the significance of effect on these parts of the Morecambe CA would be **negligible**.

6.5.93. Although the construction activities associated with the proposed development would not occur directly within the West End CA, the temporary introduction of tall plant and machinery (including cranes) would be perceived as an incongruous alteration to its setting. The magnitude of impact would be low negative and the significance of the effect would be **minor adverse**.

Relevant Designations within the Wider Townscape

6.5.94. The site is seen in a very small part of the view from the Heysham Coast KUL, and is not visible from the Torrisholme Barrow KUL to the east or Ashton Memorial and Williamson Park RPG and KUL to the southeast. Construction work, at-height works, would not alter the characteristics of these designations, nor would it materially impinge on characteristic views across Morecambe Bay.

6.5.95. The magnitude of impact and significance of effect on each KUL and RPG assessed would be **negligible**.

Marine and Seascape Character

6.5.96. There would be no physical alterations to the seascape as a result of proposed construction activity. MCA 33: Morecambe Bay is characterised by Morecambe Bay and associated intertidal flats. Construction activity would not affect the key characteristics of the MCA, and the magnitude of impact and significance of effect would be **negligible**.

Areas of Outstanding Natural Beauty and their Setting

6.5.97. The site forms a very minor part of the setting of the Arnside and Silverdale AONB. Construction activity would be barely perceptible from the coastline and elevated ground in parts of the AONB and would not affect the key characteristics of the AONB or its landscape setting. The magnitude of impact and significance of effect would be **negligible**.

6.5.98. Construction activity would be barely perceptible or not distinguishable in the landscape from areas of high ground within the Forest of Bowland AONB and would not affect the key characteristics of the AONB or its landscape setting. The magnitude of impact and significance of effect would be **negligible**.

National Landscape Character Areas

6.5.99. Construction activity would introduce some localised disturbance to NCA 31: Morecambe Coast and Lune Estuary but would not result in the alteration or removal of any landscape elements or features of particular importance to NCA 31. Construction activity would influence townscape character within a very small part of the NCA and would have a very limited influence on wider landscape character, including higher ground within the NCA.

6.5.100. Given these factors the magnitude of impact on NCA 31 would be low negative in a limited geographical area adjacent to the proposed development and negligible for the NCA as a whole. During construction, the effect on NCA 31 overall is judged to be of **minor adverse** significance within a limited geographical area and **negligible** on landscape character of the NCA as a whole.

6.5.101. Construction activity would have no direct impact on NCA 33: Bowland Fringe and Pendle Hill or NCA 20: Morecambe Bay and Limestones. Construction activity would be seen from a very small part of these NCAs and may be discernible as a very minor element in distant views from elevated locations. The magnitude of impact and significance of effect on these NCAs is assessed as being **negligible**.

County Landscape Character Areas

6.5.102. The introduction of plant and machinery, material stockpiles, welfare facilities, and construction traffic to facilitate the construction of the development would result in a direct impact to the Industrial Age ULT, of which the site forms part. The presence of these elements in the townscape would alter the key characteristics of part of the ULT for the short-term. The magnitude of impact on the Industrial Age ULT would be low negative, and the significance of effect **minor adverse**.

6.5.103. For the remaining LCAs identified, while the construction activities may be temporarily perceived in the context of the respective areas, the presence of such ongoing works would not amount to altering their key characteristics and accordingly the magnitude of impact and significance of effect would be **negligible.**

Potential Impact on Townscape, Seascape and Landscape during Operation

6.5.104. The description of the proposed development is provided in Chapter 3 of the ES (Description of the Proposed Development). The principal elements that would have an effect upon townscape, seascape and landscape character during the Operational Phase include the introduction of:

- New built form up to 37.3m AOD; and
- New landscape areas, including planting and hardscaping.

6.5.105. Verified photomontage views for Viewpoints 1, 3, 5, 6, 8, 10 and 11 show the potential impact of the proposed development at the site and as seen from the coastal edge to the southwest and northeast of the site. Viewpoints are shown on **Figures 6.7** and **6.9** at **Volume 4**, and verified photomontages are provided as **Figures 6.12.1** to **6.12.7**.

The Site and Surrounding Townscape

6.5.106. The proposed development would introduce new larger scale development, compared to existing, onto the site.

6.5.107. New built-form would be up to 37.3m AOD in height and would be taller than existing development to the immediate south and west.

6.5.108. The proposed development would become a landmark feature in views from Morecambe Promenade and would be seen in the context of development currently influencing the character of local townscape including The Midland Hotel and the Winter Gardens.

6.5.109. The proposed development would comprise high quality buildings and landscape design proposals that have been designed to be sympathetic and complementary to their location on the edge of Morecambe and Morecambe Bay. The proposed development would enhance the quality and cohesiveness of the townscape at the site and would improve the relationship and permeability of the proposed development with the surrounding townscape. It would bring year-round activity onto the site of the proposed development, where currently the site appears redundant and unused for large parts of the year.

6.5.110. The overarching landscape design concept is to create a bayscape that reflects the distinctive and varied landscapes found in the Morecambe Bay area, through the referencing of natural forms and plant communities in a new and contemporary way. Planting of trees and shrubs throughout the proposed development would provide legibility, progression in scale, shade, visual interest and a sense of tranquillity amid the busy townscape.

6.5.111. There would be beneficial impacts within the site as a result of the replacement of the existing bitumen macadam in various colours with a comprehensive, legible and visually interesting range of hard surface materials.

6.5.112. The proposed development would result in a high positive magnitude of impact on the townscape character of the site and its immediate surroundings. The significance of effect would be **major beneficial**.

6.5.113. The proposed development would result in a moderate positive magnitude of impact on local townscape character (within 1km of the site). The significance of effect on local townscape would be **moderate beneficial**.

6.5.114. Within the wider townscape (up to 7km from the proposed development) the beneficial effect of landscape design proposals on townscape character would become less apparent and the effect on wider townscape character primarily would arise from the introduction of new built form up to 37.7m AOD in height on land currently occupied by low scale development. Where the proposed development is seen from the wider townscape, it would be seen in the context of existing development along the Morecambe seafront including tall residential development (10 storey tower blocks and an apartment block up to 8 storeys high facing Marine Road East). Overall, the magnitude of impact on low sensitivity townscape in the wider area, would be negligible, and the significance of effect would be **negligible**.

Published Conservation Area Character Areas

6.5.115. The Central Attraction Area of Morecambe CA would be most affected by the proposed development. The proposed development would create a positive new identity for this part of Morecambe CA and would enhance the legibility of the Morecambe Promenade as a direct, non-vehicular route by introducing strong human interest in the built form and public realm, including seating, material patterning and soft landscape. There would be a noticeable improvement to this part of the CA. The magnitude of impact would be moderate positive and the significance of effect would be **moderate beneficial**.

6.5.116. New built form would be perceived from parts of the wider CA, including parts of the Victoria Street/Edward Street, Green Street to Euston Road and Poulton CA Character Areas, close to Morecambe Promenade. This would represent a beneficial change by helping to create a positive land use within the setting of these Character Areas. The height and massing of the proposed built form would introduce articulation to the skyline. The massing arrangement would also aid in wayfinding and legibility, while the newly introduced built-form would be of a greater design aesthetic than the low-level structures they replace. On balance, there would be a noticeable improvement to the Morecambe CA.

6.5.117. There would be no direct change to the character of the West End CA as a result of the proposed development, but there would be indirect influence of the proposed built form which would be perceptible from part of the West End CA, at its northern edge and western edge with Morecambe Promenade. This would represent a beneficial change by helping to create a positive high-quality land use in the setting of the CA. Away from the edge of this CA, the proposed development generally would not be perceived due to intervening built form. On balance, there would be a slight improvement in the setting of the West End CA. The magnitude of impact would be low positive and the significance of effect would be **minor beneficial**.

Relevant Designations within the Local and Wider Townscape

6.5.118. There would be distant views towards the completed development from the Heysham Coast KUL, Torrisholme Barrow KUL, and from Ashton Memorial and Williamson Park RPG.

6.5.119. **Viewpoint 9** shows that the proposed development would influence a very small part of the panoramic view across Morecambe Bay towards the distant hills, comprising a distant landmark on the settlement edge in the immediate context of The Midland Hotel. **Viewpoints 13 and 14** shows that the proposed development would not be a readily identifiable new feature in the distant panoramic view towards Morecambe Bay.

6.5.120. The localised magnitude of impact on the character of these designated landscapes would be negligible, and the significance of effect would be **negligible**.

Marine and Seascape Character

6.5.121. The proposed development would not affect the key characteristics of MCA 33 or seascape character overall. The magnitude of impact and significance of effect would be **negligible**.

Areas of Outstanding Natural Beauty and their Setting

6.5.122. The proposed development would not result in the permanent loss of elements or features important to the special qualities of the Arnside and Silverdale AONB. Whilst the proposed development would be seen in panoramic views across Morecambe Bay, which are a key characteristic of the AONB, it would be seen in conjunction with the built-up area of Morecambe and would not materially impinge on the view. The magnitude of impact and significance of effect would be negligible.

6.5.123. The proposed development would be seen in a very small part of the wide panoramic view from areas of higher ground within the Forest of Bowland AONB. The magnitude of impact and significance of effect would be **negligible**.

National Landscape Character Areas

6.5.124. The proposed development would result in a localised change to the townscape of Morecambe. The change would arise primarily from the introduction of new built form on the northern side of Marine Road Central. The key characteristics and features of NCA 31 would not be affected by the proposed development, and the townscape of Morecambe would be positively enhanced in a very small proportion of the NCA. The magnitude of impact and the significance of effect as a result of the proposed development on NCA 31 would be **minor beneficial** within a localised area, and **negligible** overall.

6.5.125. The proposed development have no direct impact on NCA 33: Bowland Fringe and Pendle Hill or NCA 20: Morecambe Bay and Limestones and would not affect the key characteristics of these NCAs. The magnitude of impact and significance of effect on these NCAs is assessed as being **negligible**.

6.5.126. At Year 1 the new built form would fundamentally alter the fabric of part of the Industrial Age ULCT. The proposed development would help to establish a strong local identity, with variations in the arrangement of scale, mass and materiality helping to create visual interest. The description of the Industrial Age ULCT states that public parks, promenades and urban squares have suffered from neglect, vandalism and inadequate management resulting in a utilitarian appearance. The proposed development would enhance external spaces and would result in a low positive magnitude of impact on the ULT. The resulting significance of effect would be **minor beneficial**.

6.5.127. The physical change to townscape at the site resulting from the proposed development would have a negligible effect on the key characteristics and recognisable character of LCAs within the county level LCAs to the south, east and north-east of the proposed development. Viewpoints 12, 13 and 14 show that the proposed development would be barely discernible from these LCAs and would not materially impinge on panoramic views across Morecambe Bay. The significance of effect would be **negligible**.

6.6. SUMMARY OF POTENTIAL IMPACTS AND SIGNIFICANCES OF EFFECT ON TOWNSCAPE, SEASCAPE AND LANDSCAPE DURING CONSTRUCTION AND OPERATION

Table 6.8 Significances of Effect on Townscape, Seascape and Landscape during Construction and Operation

Receptor	Viewpoints	Sensitivity	Development Phase	Magnitude of Impact	Significance of Effect
Townscape Character					
The site and immediate townscape surroundings	1, 2, 3, 4, 5	Medium	Construction	Moderate negative	Moderate adverse
			Year 1	High positive	Major beneficial
			Year 15	High positive	Major beneficial
Local townscape including Morecambe promenade (within 1km of the site)	6, 7, 10	Medium	Construction	Low negative	Minor adverse
			Year 1	Moderate positive	Moderate beneficial
			Year 15	Moderate positive	Moderate beneficial
Wider townscape (within 1 and 7km of the site)	11, 12, 13	Low	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible
Conservation Area Townscape Character					
Morecambe Conservation Area, including: Central Attraction Area	1, 2, 3, 4, 5, 6, 10	Medium	Construction	Low negative	Minor adverse
			Year 1	Moderate positive	Moderate beneficial
			Year 15	Moderate positive	Moderate beneficial

Receptor	Viewpoints	Sensitivity	Development Phase	Magnitude of Impact	Significance of Effect
Victoria Street/Edward Street		Medium	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible
Green Street to Euston Road		Medium	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible
Poulton		Medium	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible
West End Conservation Area	7, 8	Medium	Construction	Localised Low negative	Localised Minor adverse
			Year 1	Localised low positive	Localised minor beneficial
			Year 15	Localised low positive	Localised minor beneficial
Relevant Designations with the Wider Townscape					
Heysham Coast KUL	9	Medium	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible
Torrisholme Barrow KUL	13	Low	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible
Williamson Park RPG and KUL	14	Low	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible
Marine and Seascape Character					
MCA 33: Morecambe Bay	1; 6 to 12; and 16 to 18	Low	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible
Seascape character of Morecambe Bay	1; 6 to 12; and 16 to 18	Low	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible
Areas of Outstanding Natural Beauty and their Setting					
Arnside and Silverdale AONB and its setting LCA H1: Carnforth Coastal Drumlins	16, 17, 18	Medium	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible

Receptor	Viewpoints	Sensitivity	Development Phase	Magnitude of Impact	Significance of Effect
Forest of Bowland AONB and its setting LCAs on the north-western edge of the AONB	15	Medium	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible
National Landscape Character Areas					
NCA 31: Morecambe Coast and Lune Estuary NCA 33: Bowland Fringe and Pendle Hill NCA 20: Morecambe Bay Limestones	1 to 14 15 16, 17, 18	Low	Construction	Localised low negative (NCA 31) Negligible overall	Localised minor adverse (NCA 31) Negligible overall
			Year 1	Localised low beneficial (NCA 31) Negligible overall	Localised minor beneficial (NCA 31) Negligible overall
			Year 15	Localised low beneficial (NCA 31) Negligible overall	Localised minor beneficial (NCA 31) Negligible overall
County Landscape Character Areas					
Industrial Age ULCT	1 to 12	Low	Construction	Low negative	Minor adverse
			Year 1	Low positive	Minor beneficial
			Year 15	Low positive	Minor beneficial
LCAs south of Morecambe	Photograph 6.6 in section 8.4 above.	Low	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible
LCAs east of Lancaster	Photograph 6.7 in section 6.4 above.	Medium	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible
LCAs northeast of Morecambe	11, 12, 13, and Photograph 6.2 in section 6.4 above.	High	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible

Potential Impacts on Views

6.6.1. This visual assessment assesses the sensitivity of the receptors potentially affected, and discusses the magnitude of the impact, and the significance of effect on each view assessed, which would result from the construction and operation of the proposed development.

6.6.2. The magnitude of impact and significance of effect of the proposed development on receptor views, during construction and operation, is summarised in **Table 6.11** below.

6.6.3. The following visual assessment is structured as follows:

- Receptor Sensitivity;
- Potential Impacts on Views during Construction;
- Potential Impacts on Views during Operation; and
- Summary of Potential Impacts and Significances of Effects on Views during Construction and Operation.

Receptor Sensitivity

6.6.4. The assessment of effects on views and visual amenity involves firstly establishing the sensitivity of the visual receptors i.e. people that would experience views of the proposed development and whose visual amenity would be affected.

6.6.5. The sensitivity of visual receptors depends on the susceptibility of the visual receptor to changes in views as a result of the proposed development and the value of the view.

6.6.6. Visual receptor sensitivity is assessed in accordance with the criteria set out in Method Tables 6 to 8 at **Appendix 6.1**, and is presented below.

Table 6.9 Visual Receptor Sensitivity

Visual Receptor	Value of the View	Susceptibility to Change	Sensitivity
Persons on the LCW and on NCR 700 and 69	National (views from national footpaths and cycle routes, in recognition of their wider recreational use (at a national level) and the value likely to be attached to views by visitors); and Regional (views from walks, cycle routes or public open spaces publicised at a county or regional level, in recognition of their wider recreational use and the value likely to be attached to views by visitors from the county or wider region)	High	**High**
Persons on the Morecambe Promenade	Regional (views from walks, cycle routes or public open spaces publicised at a county or regional level, in recognition of their wider recreational use and the value likely to be attached to views by visitors from the county or wider region)	High	**High**
Persons at Public Open Space and Visitor Attractions where surroundings are important to the experience (Heysham Coast; Torrisholme Barrow; Ashton Memorial and Williamson Park)	Local (views from walks, cycle routes or public open spaces publicised at a local or borough level, in recognition of their recreational use and the value likely to be attached to views experienced by visitors from the local area; and views from or within a local designation relating to landscape quality or a conversation interest, such as a KULs and CAs)	High	**Medium**
Persons on PRoW	Community (valued by residents within the community)	High	**Medium**
Residents of residential property and at The Midland Hotel	Local (views with historic value due their location within a CA or within the immediate setting of the CA); and Community (valued by residents within the community)	High	**Medium**

Visual Receptor	Value of the View	Susceptibility to Change	Sensitivity
Persons visiting retail, leisure and entertainment destinations; and Workers	Local (views with historic value due their location within a CA or within the immediate setting of the CA); and Community (valued by residents within the community)	Low	**Low**
Motorists	Local (views with historic value due their location within a CA or within the immediate setting of the CA); and Community (valued by residents within the community)	Low	**Low**

Potential Impacts on Views during Construction

6.6.7. During construction, proposed construction activities would result in negative impacts and adverse significances of effect on views for the short-term.

6.6.8. Existing access east west through the centre of the site, will be closed to the public for the duration of the construction period.

6.6.9. Existing public access along the Morecambe Promenade and on NCR 700, along the eastern and northern edges of the site, will either be closed during the construction phase or will be allowed along a reduced width of the existing Promenade, and separated from the site by temporary hoarding.

6.6.10. Temporary 2.4m high construction hoarding on the site boundary will restrict visibility of construction activity from adjacent footways, including along the promenade along the eastern and northern edges of the site (if accessible during construction); along the northern side of Marine Road Central on the southern edge of the site; and along the site's western boundary. Viewing windows built into the hoarding would allow limited street level views of proposed construction activity. High-level construction activity would be visible above construction hoarding and upper storey views from buildings overlooking the site would include construction activity across the site.

6.6.11. The greatest adverse magnitude of impact (**moderate negative**) and significance of effect during construction (**moderate adverse**) would be on close, predominantly high sensitivity, receptor views where temporary construction activity would affect a large proportion of the view for the short-term. There would be a **moderate adverse** significance of effect on views experienced by:

- Persons on the LCW, running along the southern boundary of the site;
- Persons at the RNLI Morecambe Lifeboat Station (Receptor B);
- Persons at The Midland Hotel overlooking the site (Receptor C); and
- Persons at Morecambe War Memorial (Receptor F).

6.6.12. There would be a **low negative** magnitude of impact and a **minor adverse** significance of effect on views, where a moderate or low proportion of the view would be affected for the short-term, during construction.

6.6.13. Construction activity would result in a **minor adverse** significance of effect on views from:

- Morecambe Promenade and NCR 700 (including within the site if access allowed during construction);
- NCR 69 to the southwest, and where possible from the south;
- A589 Marine Road (including to the immediate south of the site);
- Stone Jetty (Receptor A);

- Morecambe Visitor Centre and Station Building (Receptor D);
- Morecambe Winter Gardens (Receptor E);
- Festival Market, Entertainment Venues, and at Old Station Car Park (Receptor G);
- Large Supermarkets (Receptor H);
- Central Drive to the south; and from
- Northern end of Northumberland Street.

6.6.14. Proposed construction activity, in particular at-height works, would be barely perceptible or would occupy a very small proportion of the more distant view from:

- The wider Morecambe Bay and from the Bay Walk to the north;
- Heysham Coast, and PRoW east of Heysham;
- Torrisholme Barrow;
- Ashton Memorial and Williamson Park RPG;
- PRoW on higher ground to the southeast, in the setting of the Forest of Bowland AONB;
- High ground and the coastal edge within the Arnside and Silverdale AONB; and
- High ground within the Forest of Bowland AONB.

6.6.15. The magnitude of impact and the significance of effect on the above views would be **negligible** during construction.

Potential Impacts on Views during Operation

6.6.16. The following assessment discusses potential impacts on views experienced by receptors identified in section 6.4 above, during operation of the proposed development, and identifies the significance of effect on each receptor view.

6.6.17. On completion, it is assumed that all construction activities would have ceased and the proposed development would be fully operational, and landscape proposals would have been implemented.

6.6.18. During operation, the proposed development would result in both negative and positive impacts on views assessed.

6.6.19. Negative impacts would arise from the introduction of new large-scale built-form into close open views. However, the unique character and high quality design of the proposed development, and the embedded mitigation measures identified at the start of this section of the TSVIA ES Chapter, also would result in positive impacts on views.

6.6.20. The proposed development also would introduce a unique and distinctive landmark into views from the surrounding area, which could result in a positive impact on a view. This positive change is assessed alongside other factors considered when determining the magnitude of impact and the significance of the effect on the receptor view, discussed within the Method provided at **Appendix 6.1.**

6.6.21. Professional judgement is used in the assessment below to determine whether the negative and positive impacts on views would result in an overall adverse, beneficial or neutral significance of effect on the view being assessed.

6.6.22. Verified photomontage views are shown on **Figures 6.12.1** to **6.12.7** at **Volume 4** and are discussed in the table below.

Table 6.10: Visual Assessment (During Operation)

Visual Receptor	Receptor Sensitivity	Relevant Verified Photomontage Viewpoint	Potential Visual Impact	Magnitude of Impact	Significance of Effect
Persons on long distance recreational routes running alongside the site and beyond					
Persons on the coastal edge, extending southwest towards the proposed development, including; walkers on the LCW; cyclists on NCR 700; and persons visiting the Morecambe Promenade	High	VP5, 6, 10, 11	The proposed development would have the same magnitude of impact and significance of effect on views from the LCW, NCR 700, and Morecambe Promenade which run on the same alignment southwest towards the proposed development. Potential impacts on sequential views from these public routes are discussed below, with reference to the closest verified photomontage view first. Close views from the edge of the proposed development At the south-eastern corner of the proposed development, the LCW runs westwards along the northern side of Marine Road Central and along the southern edge of the proposed development; and NCR 700 runs northwards and along the edge of the proposed development, on the Morecambe Promenade, alongside Morecambe Bay. From a viewpoint opposite the south-eastern corner of the proposed development, **photomontage VP5** shows new uncharacteristic built-form introduced into a notable proportion of the view, surrounded by modified landform and new planting, surfacing and boundary treatments. New built-form is seen in the context of The Midland hotel (an existing landmark building) and the Winter Gardens facing the proposed development, both of which would continue to be visible. New tree planting along the southern edge of the proposed development provides some filtering and screening of new-built-form in the view. The material and appearance of the proposed shells, offering varied degrees of transparency or opacity, (which would vary depending on lighting conditions and internal building controls), also contributes to minimising the prominence of new built-form. Overall, the proposed development would have a **moderate positive** magnitude of impact on views from viewpoint 5. The proposed development would be seen in closer views from the LCW than viewpoint 5, and in close views from NCR 700 along the edge of the proposed development to the east, north and west. High-quality landscape proposals would be introduced into close views, including the Rhythm Garden, Northern Coastal Edge and the Tide Garden and the Western space comprising shingle plaza and coastal lawn providing a setting to new high-quality and unique built-form. A large proportion of the view towards the proposed development would be affected, however views from NCR 700 looking across Morecambe Bay would remain as existing. The proposed development would have a **moderate positive** magnitude of impact on views overall from NCR 700. Views from the coastal edge extending southwest towards the proposed development **Photomontage VP6** shows that the proposed development would introduce new and unique built-form into part of the view from this stretch of the Morecambe Promenade, along the coastal settlement edge. New built-form would be seen alongside The Midland hotel, which is an existing landmark building on the coastal edge, more distant in this view. New built-form also would be seen in the immediate context of the Winter Gardens landmark building to the south, (separated from new built-form by proposed landscape areas), and in the context of continuous built-form along the settlement edge, including buildings 4 storeys high. The landscaped edge of the proposed development and the proposed 'dunescape', would provide a naturalistic and green transition between the coastal edge and the proposed 'shells', which would vary in their transparency/opacity. Overall the proposed development would affect a small to moderate proportion of the view from this location, and views would continue to extend out across the Bay. The magnitude of the impact would be **moderate positive**.	VP5 and close views: moderate positive VP6: up to moderate positive VP10: low positive VP11: negligible	VP5 and close views: moderate beneficial VP6: up to moderate beneficial VP10: minor beneficial VP11: negligible

Visual Receptor	Receptor Sensitivity	Relevant Verified Photomontage Viewpoint	Potential Visual Impact	Magnitude of Impact	Significance of Effect
			Photomontage VP10 shows the proposed development in the view southwest from a more distant stretch of the Morecambe Promenade. The proposed development would introduce a new landmark building into the view along the coastal settlement edge, and would screen The Midland hotel beyond. New built-form would be separated from buildings on the existing settlement edge, including the Winter Gardens, by new landscape proposals, which includes tree planting that provides some low level screening of existing built-form. The landscaped edge of the proposed development and the proposed 'dunescape', would provide a naturalistic and green transition between the coastal edge and the proposed 'shells', which would vary in their transparency/opacity. Overall the proposed development would affect a small proportion of the view experienced when travelling along this stretch of the coastline. Views would continue to extend across Morecambe Bay. The magnitude of the impact would be **low positive**. **Photomontage VP11** shows that the proposed development would be introduced into a very small proportion of the distant view and would be seen as an extension of existing built-form on the coastal settlement edge. The proposed development would be barely perceptible beyond continuous built-form and existing tall development on the settlement edge would be more visible in closer views, referring to the 10 storey apartment blocks (at the junction with the B5275 Princes Crescent); and the Broadway One apartment building, up to 8 storeys high, (at the junction with Broadway). Given the distance of the visual receptor and the presence of existing built-form on the coastal settlement edge, partially screening the proposed development in the distance, the magnitude of the impact would be **negligible**.		
Persons on the LCW to the immediate south; and on NCR 69 and LCW to the southwest and south	High	VP3	Landscape proposals across the southern extent of the site, and new large built-form, (beyond new planting and hardscape, and beyond the War Memorial), would be introduced into close views from the LCW along the south of the proposed development. **Photomontage VP3** shows that the proposed development would introduce a new prominent landmark into the view, seen beyond the distinctive Midland hotel. Landscape proposals, including additional pine trees within The Energy Field, (on the approach to the main entrance of the new visitor attraction), and the proposed 'dunescape' surrounding the lower part of new built-form, would integrate the proposed 'shells' into its surroundings. The proposed development would introduce cohesive, unique and high-quality development into the view. Overall, the magnitude of impact on close views would be high positive. The proposed change in the view from the start/end of NCR 69 at the roundabout southwest of VP3, would be similar, although more distant than those described for photomontage viewpoint 3. The magnitude of impact on this localised view would be moderate positive. Views of the proposed development from NCR 69 and the LCW running eastwards into the built-up area of Morecambe would be oblique and obscured by intervening buildings and roadside trees. The magnitude of impact on affected views would be **low positive** or **negligible**, depending on the extent of the proposed 'shell/s' being visible.	Up to high positive (LCW) Up to moderate positive (NCR 69)	Up to major beneficial (LCW) Up to moderate beneficial (NCR 69)
Persons on the Morecambe Promenade running northeast towards the proposed development; persons at the Battery Car Park;	High	VP8	**Photomontage VP8** shows that the proposed development would introduce a new distinctive landmark into the middle distance view, immediately beyond The Midland hotel and backgrounded by distant high ground, including within the Arnside and Silverdale AONB. Proposed built-form would be seen as an extension to existing buildings on the Morecambe coastal settlement edge, and would create a key sky line in combination with rolling high ground beyond.	Low neutral	Minor neutral

Visual Receptor	Receptor Sensitivity	Relevant Verified Photomontage Viewpoint	Potential Visual Impact	Magnitude of Impact	Significance of Effect
and on the northern end of the Sandylands Promenade			In closer views from the Morecambe promenade running northeast towards the proposed development, new built-form would be more prominent in the view, above and between intervening buildings including The Midland hotel. The proposed development would introduce additional built-form into the view, resulting in a greater concentration of development in the view; however the high-quality and distinctive character of the proposed development would result in a positive impact on views. On balance, the magnitude of impact on this view is assessed as low neutral.		
Persons on the A589 Marine Road running alongside the Site and the Seafront, and on the A5101 along the distant coastline					
A589 Marine Road; and the A5101 Coastal Road along the distant coastline, (including car park adjacent to Morecambe Golf Club)	Low	VP11, 10, 6, 5, 3, 8	The proposed development would result in the greatest adverse impact on open close motorists' views from Marine Road Central running along the southern edge of the proposed development. Views would be as described for **photomontage VP5 and 3** above. Overall, the proposed development would result in a **high positive** magnitude of impact on close motorist views. Views northeast of the proposed development also would be similar to those described for **photomontage VP8** above. The proposed development would have a **low neutral** impact on views overall from Marine Road West running northwards, running towards the roundabout with Marine Road Central and Central Drive, where impacts on views become positive. Visibility of the proposed development would vary travelling southwest towards the site of the proposed development along the Coastal Road, and along Marine Road East closer to the site. Existing buildings on the coastal settlement edge would screen or partially screen the proposed development in the distance, seen beyond the road corridor and adjacent promenade and coastline. Where new built-form is seen in transient views from the Coastal Road approaching Morecambe, the proposed development would be perceptible as a distant landmark on the coastline, seen in a very small proportion of the overall view. In closer views, new built-form would be perceptible and occupying in an increasing proportion of the view on the approach to the site of the proposed development. The magnitude of impact on road user views would be **low positive** or **negligible**.	Up to high positive	Up to moderate beneficial
Persons on Central Drive and Northumberland Street	Low	VP5	Visibility of the proposed development would be limited to the northern end of Northumberland Street on the approach to the junction opposite the south-eastern extent of the proposed development. Views comprising the proposed development would be similar to those described for photomontage viewpoint 5 above. The magnitude of impact on this view from the northern end of Northumberland Street would be **moderate positive** on limited views northwest. Views of the proposed development from Central Drive running eastwards into the built-up area of Morecambe would be oblique and obscured by intervening buildings and roadside trees. The magnitude of impact on affected views would be **low positive or negligible**, depending on the extent of the proposed 'shell/s' being visible.	Localised moderate positive (Northumberland Street) Up to low positive (Central Drive)	Localised moderate beneficial (Northumberland Street) Up to minor beneficial (Central Drive)
Persons within the site and in its immediate surroundings					
Persons within the site of the proposed development	High	VP3, 5	On completion of the proposed development, public access across the site would change. Land occupied by the proposed development would become private with permissive access and the Eden North visitor attraction would be accessible beyond a pay boundary. Persons walking through the proposed development and sitting in proposed seating areas would experience close views of the proposed development, which would have a positive impact on close views. The proposed development would result in a **high positive** magnitude of impact on views across the site of the proposed development.	High positive	Major beneficial

Visual Receptor	Receptor Sensitivity	Relevant Verified Photomontage Viewpoint	Potential Visual Impact	Magnitude of Impact	Significance of Effect
Receptor A: Persons at the Stone Jetty	High	VP1	**Photomontage viewpoint 1** shows that the proposed development would be introduced into open views southeast from the Stone Jetty towards Morecambe's coastal settlement edge. New built-form would result in a partial alteration to the existing view and would be prominent in the view, (particularly in close views), which includes existing development along the coastline. New built-form would be seen in the immediate context of the distinctive Midland hotel building which would continue to be visible in views southeast, and would be seen beyond the single storey RNLI lifeboat station. Views across Morecambe Bay and towards the Arnside and Silverdale AONB and the Lake District National Park in the far distance would not be affected by the proposed development. Higher ground within the Forest of Bowland AONB in the far distance beyond Morecambe would be partially screened by new built-form. The proposed development would have a negative impact on the affected view due to the introduction of additional built-development of a larger scale than existing development on this part of Morecambe's coastal settlement edge, which screens the Winter Gardens Listed Building beyond, and partially screens high ground within the Forest of Bowland AONB in the distant view. The unique and high quality design of new built-form proposed would result in a positive impact on the affected view, and new pine trees proposed within The Energy Field would provide filtering and screening of lower quality built-form on the settlement edge to the immediate south of the proposed development. Overall, the proposed development would result in a positive impact on the view southeast. The magnitude of impact would be **moderate positive**.	Moderate positive	Moderate beneficial
Receptor B: Persons at the RNLI Morecambe Lifeboat Station	Low	n/a	Persons accessing the RNLI lifeboat station and visiting the shop would have open close views of the proposed development. High-quality built-form and landscape design proposals introduced into the view would result in a **high positive** magnitude of impact on views across the site of the proposed development.	High positive	Major beneficial
Receptor C: Persons at The Midland hotel	Medium	VP3	**Photomontage VP3** shows the proposed development in the context of The Midland hotel. The proposed development would be introduced into open views. Views across the bay from windows on the convex side of the hotel building would not be affected by new built-form. Oblique views and views from the Rotunda Bar would include high quality landscape design proposals, and new built-form more distant in the view northeast beyond the Tide Gardens. Views northeast from the hotel and car park would extend across the proposed development, and high quality landscape design proposals would separate new built-form from existing buildings on the settlement edge along Marine Road Central. Overall, the magnitude of impact on views would be high positive.	High positive	Major beneficial
Receptor D: Persons at the Morecambe Visitor Centre and Station Building	Medium	VP3	**Photomontage VP3** shows that the proposed development would introduce a new prominent landmark into the view, seen beyond the distinctive Midland hotel. Landscape proposals, including additional pine trees within The Energy Field, (on the approach to the main entrance of the new visitor attraction), and the proposed 'dunescape' surrounding the lower part of new built-form, would integrate the proposed 'shells' into its surroundings. The proposed development would introduce cohesive, unique and high-quality development into the view. Overall, the magnitude of impact on close views is assessed as moderate positive.	Moderate positive	Moderate beneficial

Visual Receptor	Receptor Sensitivity	Relevant Verified Photomontage Viewpoint	Potential Visual Impact	Magnitude of Impact	Significance of Effect
Receptor E: Persons at Morecambe Winter Gardens	High	VP5	The proposed development would be introduced into views northwards, including the view from the upper terrace of the Winter Gardens towards the bay and the distant Lake District hills. Landscape proposals would have a positive impact on views across the site of the proposed development, beyond Marine Road Central and seen as a setting to new built-form introduced into part of the view northeast. The magnitude of impact would be moderate positive.	Moderate positive	Moderate beneficial
Receptor F: Persons at Morecambe War Memorial	High	n/a	The proposed development would introduce large new built-form into views from the War Memorial and seen above hedgerow defining the Memorial gardens. The lion that sits on top of the War Memorial designed to look out to sea, would continue to be seen to be looking out to sea between the two 'shells' directly north of the lion, beyond the planted 'dunescape' that connects the two 'shells'. The magnitude of impact would be moderate positive.	High positive	Major beneficial
Receptor G: Persons at Festival Market, Entertainment Venues, and at Old Station Car Park	Low	n/a	Visibility of the proposed development would vary depending on screening by intervening buildings on the southern side of Marine Road Central. The proposed development would be introduced into a moderate proportion of some views and would be seen as a prominent new landmark. The magnitude of impact would be moderate positive on these views.	Up to moderate positive	Up to moderate beneficial
Receptor H: Shoppers at Large Supermarkets and Persons on Central Drive	Low	n/a	Visibility of the proposed development would vary depending on screening by intervening car park and roadside trees, and by intervening buildings. The proposed development would be introduced into a low or very low proportion of the view northwards. The magnitude of impact would be low positive or negligible on these views.	Up to low positive	Up to minor beneficial
Persons within the local townscape, within 1km of the proposed development					
Residents and businesses along the coastal settlement edge of Morecambe, including along the northern and western edges of West End Conservation Area	Medium	n/a	Visibility of the proposed development from the coastal settlement edge extending northeast would vary depending on the angle of the view towards new built-form and landscape proposals; and depending on screening by intervening built-form. The proposed development would introduce a new feature into a low or very low proportion of the view from the settlement edge. The magnitude of impact would be low positive or negligible on these views. The magnitude of impact would be low neutral on views northwards from the edge of West End Conservation Area, and from the settlement edge southwest of the proposed development. New built-form would result in a concentration of built-form in the view towards The Midland hotel, but would introduce a new landmark into a small part of the view. The magnitude of impact would be low neutral.	Up to low positive (northeast of the site) Up to low neutral (southwest of the site)	Up to minor beneficial (northeast of the site) Up to minor neutral (southwest of the site)
Persons on the Bay Waters and on the Guided Walk Northeast of the Site					
Persons on the Bay waters and on the guided walk northeast of the Site	High	n/a	The proposed development would be introduced in a very small proportion of the view, which includes buildings on the existing settlement edge, and which includes Heysham Nuclear Power Station on the coastline. The magnitude of impact would be negligible.	Negligible	Negligible
Persons within the wider townscape, (between 1 and 7km of the site)					

Visual Receptor	Receptor Sensitivity	Relevant Verified Photomontage Viewpoint	Potential Visual Impact	Magnitude of Impact	Significance of Effect
Hest Bank railway level crossing and café to the northeast, on the coastal edge to the northeast	High	n/a	The proposed development would be introduced in a very small proportion of the distant panoramic view, which includes buildings on the existing settlement edge, and which includes Heysham Nuclear Power Station on the coastline. The magnitude of impact would be negligible.	Negligible	Negligible
Morecambe Lodge Caravan Park (west of Bolton Town End), on the coastal edge to the northeast	High	n/a	The proposed development would be introduced in a very small proportion of the distant panoramic view, which includes buildings on the existing settlement edge, and which includes Heysham Nuclear Power Station on the coastline. The magnitude of impact would be negligible.	Negligible	Negligible
Heysham Coast including St Patrick's Chapel on Chapel Hill, Heysham; and PRoW 1-2 FP 41 to the west	High	n/a	The proposed development would be introduced in a very small proportion of the distant panoramic view, which includes buildings on the existing settlement edge. The proposed development would be seen as part of the existing settlement edge and would not intrude on the promoted view towards Arnside Knott in the far distance. The magnitude of impact would be negligible.	Negligible	Negligible
Torrisholme Barrow	High	n/a	The upper part of the proposed development would be introduced in a very small proportion of the distant panoramic view, which includes intervening development and mature tree screening. The magnitude of impact would be negligible.	Negligible	Negligible
Ashton Memorial at Williamson Park	High	n/a	The upper part of the proposed development would be introduced in a very small proportion of the distant panoramic view, which includes intervening development and the Heysham Nuclear Power Station clearly visible in the view. The magnitude of impact would be negligible.	Negligible	Negligible
Persons on PRoW in the landscape to the south and southeast of the site (within 7km of the site)	Medium	n/a	The upper part of the proposed development would be introduced in a very small proportion of the distant panoramic view, beyond intervening farmland and woodland. The magnitude of impact would be negligible.	Negligible	Negligible
Persons within the Arnside and Silverdale and Forest of Bowland AONB					
Persons within Arnside and Silverdale AONB to the northeast, including on higher ground at Warton Crag and at Arnside Knott Wood; and n the coastal edge at Jenny Brown's Point, and on the PRoW between Park Point and Far Arnside	High	n/a	The proposed development would be introduced in a very small proportion of the distant panoramic view, which includes buildings on the existing settlement edge, and which includes Heysham Nuclear Power Station on the coastline. The magnitude of impact would be negligible.	Negligible	Negligible
Persons at Jubilee Tower in the Forest of Bowland AONB to the southeast	High	n/a	The upper part of the proposed development would be introduced in a very small proportion of the distant panoramic view, which includes intervening development and the Heysham Nuclear Power Station clearly visible in the view. The magnitude of impact would be negligible.	Negligible	Negligible

6.6.30. **Table 6.11** below summarises potential impacts and significances of effect on views during construction and operation of the proposed development. Verified photomontage viewpoints are indicated in red bold text below.

Table 6.11 Significances of Effect on Views during Construction and Operation

Visual Receptor	Viewpoints	Sensitivity	Development Phase	Magnitude of Impact	Significance of Effect
Persons on long distance recreational routes running alongside the site and beyond					
LCW	**3, 5, 6, 10, 11** and 12; and Photographs 6.1, 6.2, 6.3 in section 6.4 above.	High	Construction	Up to moderate negative	Up to moderate adverse
			Year 1	Up to high positive	Up to major beneficial
			Year 15	Up to high positive	Up to major beneficial
NCR 700 (The Bay Cycle Way)	2, **5, 6, 10, 11** and 12; and Photographs 6.1 and 6.2 in section 6.4 above.	High	Construction	Up to low negative (including if access available within the site)	Up to minor adverse (including if access available within the site)
			Year 1	Up to moderate positive	Up to moderate beneficial
			Year 15	Up to moderate positive	Up to moderate beneficial
NCR 69 (Way of the Roses)	**3**	High	Construction	Up to low negative	Up to minor adverse
			Year 1	Up to moderate positive	Up to moderate beneficial
			Year 15	Up to moderate positive	Up to moderate beneficial
Morecambe Promenade	**10, 6,** 2, 7, **8** and Photographs 6.1 and 6.2 in section 6.4 above.	High	Construction	Up to low negative (including if access available within the site)	Up to minor adverse (including if access available within the site)
			Year 1	Up to moderate positive; and low neutral or negligible in views northeast	Up to moderate beneficial; and minor neutral or negligible in views northeast
			Year 15	Up to moderate positive; and low neutral or negligible in views northeast	Up to moderate beneficial; and minor neutral or negligible in views northeast
Persons on the A589 Marine Road running alongside the site and the seafront, and on the A5101 along the distant coastline					
Marine Road Central	**3 and 5** and Photograph 6.3 in section 6.4 above.	Low	Construction	Up to moderate negative	Minor adverse
			Year 1	Up to high positive	Up to moderate beneficial
			Year 15	Up to high positive	Up to moderate beneficial
Marine Road West	7, **8**	Low	Construction	Up to low negative	Up to minor adverse
			Year 1	Up to low neutral	Up to minor neutral

Visual Receptor	Viewpoints	Sensitivity	Development Phase	Magnitude of Impact	Significance of Effect
			Year 15	Up to low neutral	Up to minor neutral
Marine Road East	**10**	Low	Construction	Up to low negative	Up to minor adverse
			Year 1	Up to low positive	Up to minor beneficial
			Year 15	Up to low positive	Up to minor beneficial
Coastal Road	**11**	Low	Construction	Up to low negative	Up to minor adverse
			Year 1	Up to low positive	Up to minor beneficial
			Year 15	Up to low positive	Up to minor beneficial
Persons on Northumberland Street	**5**	Low	Construction	Localised low negative	Localised minor adverse
			Year 1	Localised moderate positive	Localised moderate beneficial
			Year 15	Localised moderate positive	Localised moderate beneficial
Persons within the site and in its immediate surroundings					
Persons within the Site	2 and **5**	High	Construction	n/a	n/a
			Year 1	High positive	Major beneficial
			Year 15	High positive	Major beneficial
Receptor A: Persons at the Stone Jetty	**1**	High	Construction	Up to low negative	Up to minor adverse
			Year 1	Up to moderate positive	Up to moderate beneficial
			Year 15	Up to moderate positive	Up to moderate beneficial
Receptor B: Persons at the RNLI Morecambe Lifeboat Station	**1** and 2	Medium	Construction	Up to moderate negative	Up to moderate adverse
			Year 1	High positive	Major beneficial
			Year 15	High positive	Major beneficial
Receptor C: Persons at The Midland hotel	**1**, 2, **3** and 4	High	Construction	Up to moderate negative	Up to moderate adverse
			Year 1	High positive	Major beneficial
			Year 15	High positive	Major beneficial
Receptor D: Persons at the Morecambe Visitor Centre and Station Building	**3**	Medium	Construction	Up to low negative	Up to minor adverse
			Year 1	Up to moderate positive	Up to moderate beneficial
			Year 15	Up to moderate positive	Up to moderate beneficial
Receptor E: Persons at Morecambe Winter Gardens	**5 and 6**	Medium	Construction	Up to low negative	Up to minor adverse
			Year 1	Up to moderate positive	Up to moderate beneficial
			Year 15	Up to moderate positive	Up to moderate beneficial
Receptor F: Persons at Morecambe War Memorial	**5**	High	Construction	Up to moderate negative	Up to moderate adverse
			Year 1	Up to high positive	Up to major beneficial
			Year 15	Up to high positive	Up to major beneficial
	4		Construction	Up to low negative	Up to minor adverse

Visual Receptor	Viewpoints	Sensitivity	Development Phase	Magnitude of Impact	Significance of Effect
Receptor G: Persons at Festival Market, Entertainment Venues, and at Old Station Car Park		Low (workers) and Medium (visitors)	Year 1	Up to moderate positive	Up to moderate beneficial
			Year 15	Up to moderate positive	Up to moderate beneficial
Receptor H: Shoppers at Large Supermarkets and Persons on Central Drive	n/a	Low	Construction	Up to low negative	Up to minor adverse
			Year 1	Up to low positive	Up to minor beneficial
			Year 15	Up to low positive	Up to minor beneficial
Residents and businesses within the local townscape, within 1km of the proposed development					
Residents and businesses along the coastal settlement edge of Morecambe, including along the northern and western edges of West End Conservation Area.	n/a	Medium and Low	Construction	Up to low negative	Up to minor adverse
			Year 1	Up to low positive	Up to minor beneficial
			Year 15	Up to low positive	Up to minor beneficial
Persons on the Bay Waters and on the Guided Walk northeast of the site					
Persons on the Bay waters	n/a	High	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible
Persons on the Bay Walk (a walk lead by the Queens Guard) north of the site, between Arnside and Kents Bank, over the Kent Estuary.	n/a	High	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible
Persons within the wider townscape, between 1 and 7km of the proposed development					
Hest Bank railway level crossing and café; and Morecambe Lodge Caravan Park (west of Bolton Town End) on the	12	High	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible

Visual Receptor	Viewpoints	Sensitivity	Development Phase	Magnitude of Impact	Significance of Effect
coastal edge to the northeast					
Heysham Coast, including at St Patrick's Chapel on Chapel Hill and on PRoW 1-2 FP 41 to the west	9 and Photograph 6.4 in section 6.4 above.	High	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible
Torrisholme Barrow	13 and Photograph 6.5 in section 6.4 above.	High	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible
Ashton Memorial and Williamson Park RPG	14	High	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible
Persons on PRoW running through the landscape to the south and southeast of the site					
PRoW 1-2-FP27 running east of Heysham and PRoW 1-2-FP28	Photograph 6.6 in section 6.4 above.	Medium	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible
PRoW 1-29 FP4 running northeast southwest between Blea Tarn Road and Langthwaire Road	Photograph 6.7 in section 6.4 above.	Medium	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible
Persons within the Arnside and Silverdale AONB to the northeast					
Warton Crag; Jenny Brown's Point seating area; and Higher ground within Arnside Knott Wood	16, 17, 18	High	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible
Persons at Jubilee Tower in the Forest of Bowland AONB to the southeast					
Jubilee Tower	15	High	Construction	Negligible	Negligible
			Year 1	Negligible	Negligible
			Year 15	Negligible	Negligible

Potential Impacts on Night-time Character and Views

6.6.31. The following paragraphs assess the potential impact of the proposed development on night-time character and views during construction and operation.

6.6.32. The assessment of potential impacts during operation considers the lighting strategy for the proposed development presented in the DAS, and in the separate Lighting Statement.

Potential Impacts on Night-time Townscape, Seascape, Landscape and Views during Construction

6.6.33. Construction works would be undertaken during daylight hours, however there may be periods where supplementary lighting would be required, particularly during the winter months due to the shorter daytime periods.

6.6.34. Lighting will be kept to the minimum necessary for safety and security, and when site operations cease at the end of the working day the lighting will be switched to the minimum required for security purposes.

6.6.35. Artificial lighting would be designed and located to minimise its visibility from the surrounding area, in particular from adjacent visual receptors, including The Midland Hotel, (and to prevent light spill onto ecologically sensitive areas).

6.6.36. Construction lighting effects would be temporary, and experienced for short periods of time, which would limit potential impacts on night-time townscape, seascape, landscape and views. Temporary lighting at the site, (and at the construction compound, if required), would be seen in the context of existing light sources surrounding the site, identified at section 6.4 above.

Potential Impacts on Night-time Townscape, Seascape and Landscape during Operation

6.6.37. The proposed development would be lit after dark. Lighting of new landscaped areas, and other external spaces will vary.

6.6.38. Proposed lighting would form a more noticeable feature in the night-time townscape and seascape, (compared to the daytime townscape and seascape), as lighting luminaires may be perceptible during the night-time, where they are not perceptible during the day.

6.6.39. The greatest change to the night-time townscape and seascape would be experienced in the vicinity of the proposed development. The proposed development would introduce additional sky glow into the night-time townscape and seascape, which is influenced, to varying degrees, by existing lighting associated with the Morecambe townscape and promenade, and influenced by development further afield, including Lancaster southeast of the proposed development, and Heysham Nuclear Power Station on the coastline to the southwest.

6.6.40. Lighting associated with the proposed development is unlikely to impact on rural landscape character beyond Morecambe or introduce a noticeable source of light that would detract from existing levels of illumination currently experienced in the wider landscape.

6.6.41. Overall, the proposed development would become a noticeable feature in the night-time townscape and seascape experienced from the coastal edge of Morecambe, with filtering and screening by intervening built-form and trees inland.

Potential Impacts on Night-time Views during Operation

6.6.42. The greatest impact on views would be experienced in night-time views from the closest receptors where views presently are affected by existing artificial lighting as identified in section 8.4 above.

6.6.43. The greatest impact on night-time views would be experienced persons close to the site and along the Morecambe coastline northeast of the proposed development. There would be a perceptible change to the night-time outlook in these views, where proposed lighting and lit development would be apparent in open close views or part of the oblique view, in addition to existing street lighting along Marine Road Central and the promenade.

6.6.44. The lighting strategy for the proposed development sets out the measures to reduce light spillage and sky glow, and to limit adverse night-time impacts.

6.6.45. Overall, the proposed development and associated lighting would become a noticeable feature in close night-time views. It also would result in some additional sky glow in the context of existing development along this edge of Morecambe, perceptible from the surrounding area, with reduced impact on night-time views with distance.

6.7. IN-COMBINATION EFFECTS

6.7.1. The potential for in-combination effects between different environmental disciplines has been addressed through discussions between project consultants.

6.7.2. The lighting strategy for the site has been designed with consideration to the potential effect of lighting on townscape, seascape and views, in particular to minimise the potential adverse effects on the immediate townscape and seascape setting of the proposed development.

6.7.3. Landscape design proposals discussed above at the start of section 8.5, and described in detail in the DAS, demonstrate how the ecological benefits of new planting have been maximised as part of the proposed development.

6.8. MITIGATION MEASURES

6.8.1. Embedded mitigation is discussed in section 6.5 above as part of the description of the proposed development assessed.

6.8.2. Given the distinctive and unique nature of the proposed built-form it is not possible to further minimise adverse impacts on townscape and seascape character arising from the scale and massing of the proposed built-form beyond what has been incorporated into the design of the proposed development throughout the EIA process. The ongoing establishment, monitoring and maintenance of proposed planting would assist with softening the appearance of the introduced built-form and would assist in integrating the proposed development into the surrounding townscape and seascape.

6.8.3. No additional mitigation is proposed.

6.9. RESIDUAL EFFECTS

6.9.1. The significances of effects during construction and operation of the proposed development, would remain as set out in section 6.5 above, and as summarised in **Tables 6.8** and **6.11**.

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GLOSSARY OF TERMS AND ABBREVIATIONS

AOD - Above Ordnance Datum (meaning above sea level)

Area of Outstanding Natural Beauty (AONB) – Land protected by the Countryside and Rights of Way Act 2000 (CROW Act) to conserve and enhance its natural beauty.

Baseline - The existing environmental conditions of a site or area upon which impacts are predicted against.

Condition - The degree to which a landscape is soundly managed, is fit for purpose or achieves optimum biodiversity.

Conservation Area – Areas of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance.

Conservation Character Area – Identified by amalgamating parts of a Conservation Area with shared common perceptual and other characteristics.

Construction Effects - The effects on the environment resulting from the construction of the Proposed Development.

County Wildlife Site (CWS) - A conservation designation, which despite conferring no statutory protection onto a site, does affirm a site's importance and value for wildlife at the county level.

DAS – Design and Access Statement.

Features – Particularly prominent or eye-catching elements.

GIS - Geographical Information System

GLVIA3 - Guidelines for Landscape and Visual Impact Assessment Third Edition (2013) produced by the Landscape Institute (LI) and IEMA.

Green Infrastructure (GI) - Strategic networks of accessible, multifunctional sites (including parks, woodland, informal open spaces, nature reserves and historic sites) as well as linkages (such as river corridors and floodplains, wildlife corridors and greenways). These contribute to people's well-being, and together comprise a coherent managed resource responsive to evolving conditions.

Key Characteristics - Those combinations of elements which are particularly important to the current character of the landscape and help to give an area its particularly distinctive sense of place**.**

Key Urban Landscape (KUL) – Defined by Lancaster Local Plan (Part One), Policy EN5, as areas within the main urban area which are integral to the built form of the district, providing a setting for important features and/or heritage assets.

Landform - Combinations of slope and elevation, the producer shape and form of the land.

Landscape - Landscape is about the relationship between people and the land, a combination of distinctive and valued natural and cultural elements, which extend to seascapes and the built environment.

Landscape Character - A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.

Landscape Character Area (LCA) – These are single unique areas which are the discrete geographical areas of a particular landscape type. Each would have its own individual character and identity, even though it shares the same generic characteristics with other areas of the same type.

Landscape Character Type (LCT) - These are distinct types of landscape that are relatively homogeneous in character. They are generic in nature in that they may occur in different areas in different parts of the country, but wherever they occur they share broadly similar combinations of geology, topography, drainage patterns, vegetation, historical land use, and settlement pattern.

Landscape Quality or Condition – is based on judgements about the physical state of the landscape, and about its intactness, from visual, functional, and ecological perspectives. It also reflects the state of repair of individual features and elements which make up the character in any one place.

Local Development Framework (LDF) - The Local Development Framework is a non-statutory term used to describe a folder of documents, which includes all the local planning authority's Local Development Documents. An LDF is comprised of Development Plan Documents (which form part of the statutory development plan) and Supplementary Planning Documents.

Marine Character Area (MCA) – An area of marine space has its own individual character and identity.

Mitigation Measures - Measures that are applied to avoid, reduce, remedy or compensate for identified adverse impacts.

National Character Area (NCA) – Areas defined at the national level, which describe the geographical, ecological and historical variations in landscape character that make one area different from another. Their boundaries follow natural lines in the landscape rather than administrative boundaries, making them a good decision-making framework for the natural environment.

Operational Effects - The effects on the environment resulting from the operation of the Proposed Development.

PPG - Planning Practice Guidance.

PRoW - Public Right of Way.

Ramsar Site – Wetlands of international importance that have been designated under the criteria of the Ramsar Convention on Wetlands for containing representative, rare or unique wetland types or for their importance in conserving biological diversity.

Registered Park and Garden (RPG) – A listing and classification system for historic parks and gardens similar to that used for Listed Buildings with the aim of celebrating designed landscapes of note, and encouraging appropriate protection.

Residual Impact/Effect - Those impacts / effects that would remain following the implementation of mitigation measures.

Seascape Character - An area of sea, coastline and land, as perceived by people, whose character results from the activities and interactions of land with sea, by natural and/or human factors.

Sense of Place - The unique experience that arises as a result of being in or walking through a particular locality, generally as a response to the specific characteristics and quality of the area.

Sensitivity - A term applied to specific receptors, combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value related to that receptor**.**

Scheduled Monument (SM) - Nationally important sites and monuments given legal protection by being placed on a list, or 'schedule'.

Site of Special Scientific Interest (SSSI) - Nationally important sites forming a network of the best and most representative examples of our wildlife and geodiversity features. Selected and designated by Natural England and afforded protection under the Wildlife and Countryside Act 1981 (as amended).

Special Area of Conservation (SAC) – Areas designated under European Communities Directive 92/43/EEC, known as the Habitats Directive. This requires the conservation of important, rare or threatened habitats and species across Europe

Special Protection Area (SPA) – Areas designated under the European Communities Directive 79/409/EEC, known as the Birds Directive, to conserve the habitats of certain migratory or rare birds.

Susceptibility - The ability of a defined landscape or visual receptor to accommodate the specific proposed development without undue negative consequences.

TIN – Technical Information Note prepared by the Landscape Institute.

Townscape Character - The character and composition of the built environment including the buildings and the relationships between them, the different types of urban open space, including green spaces, and the relationship between buildings and open spaces.

Verified Photomontage – A visual representation of development proposals that is as accurate as it is possible to be within the limits of the technology used.

Visual Receptors - People that experience views of the site or who are likely to experience views of the proposed development.

7

CULTURAL HERITAGE

PUBLIC

7. CULTURAL HERITAGE

7.1. INTRODUCTION

7.1.1. This chapter comprises an assessment of the built heritage assets potentially affected by the proposed Eden Project North development. The assessment has been undertaken by WSP's Heritage Planning and Placemaking Team.

7.1.2. Site visits to understand the application site and its context and to undertake an assessment of the relevant heritage assets were undertaken on the 20 and 21 May 2021.

SCOPING

7.1.3. Archaeology is scoped out of the assessment. Previous archaeological investigations of the application site found that it does not, or is very unlikely to, contain archaeological evidence of any value. Consequently, there would be no significant effects on the archaeological interest of the site.

7.1.4. Built heritage is scoped into the assessment. The study area for built heritage assets has been set at 500m from the site boundary. However, a flexible approach is being taken with sites within 500m scoped out if appropriate. Sites outside this area (but within 1km) will be scoped in if it is found there may be an impact upon setting. Further details are set out in section 7.3 below.

7.2. CONSULTATION

7.2.1. Table 7-1 below provides a summary of the heritage consultation activities undertaken alongside the preparation of this chapter.

Table 7-1 – Summary of Heritage Consultation Undertaken

Organisation / Individual	Meeting dates and other forms of consultation	Summary of submitted observations
Lancaster Council – David James, Principal Conservation Officer	Site Meeting 20/05/2021. Issue of interim Statement of Significance as part of pre-application pack 21/07/2021. Response to pre-application submission received 17/08/2021.	Views to and from Morecambe's frontage identified as being important to the townscape and setting. Midland Hotel identified as a visual focal point in numerous views. Sequential views to the east of the site identified as being important. Site identified as being in need of enhancement. The proposed new development is a 'creative and contextual design response' which would, 'add another memorable and distinctive component to the visual character of the area'. There would inevitably be some degree of impact on the setting of the Midland Hotel and Winter Gardens. Subject to seeing verified views and photomontages, a slight amendment to the positioning of the new development might be helpful in relation to views of the Midland Hotel looking from the east. Materials and details should reinforce shell-like appearance, so design inspiration informs all aspects of the scheme. Consideration should be given to ease of long-term maintenance and repair. High quality materials and details essential over such a large and prominent scheme.

Organisation / Individual	Meeting dates and other forms of consultation	Summary of submitted observations
		Hoped that a comprehensive scheme for public realm for wider area can improve on current situation. Improvements to landscaping that edges Midland Hotel would be desirable. Sensitive integration with Grade II listed War Memorial and gardens required. Further clarification on interface with public spaces required. Looking to ensure public interface is positive and welcoming. Welcome the positive design of the promenade elevation and trust the walkway/boardwalk is intended as a public route. Larger viewing areas and bench seating against the building edge would enhance the public interaction with the building.
Historic England – Dan Jones, Inspector of Historic Buildings and Areas	Site Meeting 20/05/2021. Issue of interim Statement of Significance as part of pre-application pack on 04/08/2021. Response to pre-application submission received 12/08/2021.	Proposals will undoubtedly have an impact on the character and appearance of this section of the Conservation Area. Sections to the south and east beyond Marine Road Central and the buildings that front onto it will largely be unaffected. Considering the sense of separation from the wider town and history of varied uses on the site Historic England consider that the impact would be limited and add a new contemporary dimension to the character and appearance of the area. Proposals would impact on the contribution the setting makes to the significance of the Grade II* hotel. Viewed from the west the development would create a new backdrop to the Midland. Viewed from the east it will change the way the hotel is framed in views. Midland Hotel was designed to be prominent. Proposal would have an impact on this characteristic. However, the proposed development would also bring benefits to the immediate setting of the hotel via landscaping and public realm works. Proposal would amount to a low level of less than substantial harm to the significance of the Grade II* listed building. Immediate setting of the Winter Gardens would not be affected. However wider setting would be. Field of vision from Winter Gardens would be narrowed affecting inter-visibility with the promenade and areas such as the stone jetty. Landscaping directly in front of the Winter Gardens would make a positive contribution to the wider setting of the asset and would help to reinvigorate the building. Proposal would lead to a low level of less than substantial harm to the significance of the Winter Gardens. Recognises the need for change within Morecambe.

Organisation / Individual	Meeting dates and other forms of consultation	Summary of submitted observations
		Proposals would alter the character and appearance of this section of the Conservation Area as well as impacting to some degree the contribution setting makes to the significance of the Midland Hotel and Winter Gardens. However, consider that the scheme would bring significant benefits to Morecambe, providing a high quality development on a run down and overlooked parcel of land which detracts from the area's special qualities. Broadly content with proposal, recommend continued engagement with local authority officers; careful thought and consideration of how the development will integrate with the wider townscape aesthetically and through landscaping and public realm works; following through with high-quality design, attention to detail and quality of materials seen to date.

7.3. POLICY CONTEXT

7.3.1. This built heritage impact assessment has been undertaken in the context of the legislation, plans, policies and guidance that relate to the historic environment, as set out below.

Legislation

7.3.2. The Planning (Listed Buildings and Conservation Areas) Act 1990 provides the legislative framework for the determination of applications for development that effects a listed building or its setting, or a conservation area.

7.3.3. Section 66(1) states that when considering whether to grant planning permission for a development that would affect a listed building or its setting the local planning authority '*shall have special regard to the desirability of preserving the building or its setting'.*

7.3.4. Section 72(1) states that when considering whether to grant planning permission for a development of buildings, or other land, within a conservation area '*special attention shall be paid to the desirability of preserving or enhancing the character or appearance of that area'.*

National Policy

7.3.5. Chapter 16 of the NPPF (2021) sets out national planning policy on the historic environment. Paragraph 189 states that heritage assets range from buildings of local historic value to those of international significance. Paragraph 197 provides a framework for decision making on proposals that could have an impact on heritage assets setting out that:

"In determining applications, local planning authorities should take account of:

a) the desirability of sustaining and enhancing the significance of heritage assets and putting them to viable uses consistent with their conservation;

b) the positive contribution that conservation of heritage assets can make to sustainable communities including their economic vitality; and

c) the desirability of new development making a positive contribution to local character and distinctiveness."

7.3.6. Heritage Significance is defined by the NPPF as "*the value of a heritage asset to this and future generations because of its heritage interest. The interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also its setting."*

7.3.7. Paragraphs 199 to 203 set out how potential impacts should be considered in the determination of applications. Paragraph 199 requires "*great weight to be given to the (heritage) asset's conservation*" with Paragraph 200 stating that "*any harm to, or loss of, the significance of a designated heritage asset (from its alteration or destruction, or from development within its setting), should require clear and convincing justification*". Paragraph 201 sets out matters to be considered where proposed works would lead to substantial harm. Paragraph 202 states that where proposals would result in less than substantial harm, the harm "*should be weighed against the public benefits of the proposal including, where appropriate, securing its optimum viable use*."

7.3.8. Paragraph 203 requires the effects of proposals on the significance of non-designated heritage assets to be considered and decision makers are required to reach a balanced judgement that takes into account "*the scale of any harm of loss and the significance of the heritage asset."*

Local Policy

7.3.9. The Lancaster District Local Plan Part One: Strategic Policies and Land Allocations Development Plan Document was adopted in July 2020 and sets out the high-level strategic policies for the District. Policy SP7 (Maintain Lancaster Districts Unique Heritage) states that the Local Plan will be used to "*pro-actively manage the historic environment, protect it from inappropriate development and explore opportunities to improve and enhance the significance, character, appearance and archaeological significance of Lancaster's heritage assets and their settings."*

7.3.10. The Lancaster District Local Plan Part Two: Review of the Development Management DPD was adopted in July 2020 and sets out the detailed policy guidance on a wide range of planning matters and will be a material consideration in the determination of planning applications. Chapter 10 covers the historic environment and sets out six detailed policies for the management of applications that affect the historic environment. The relevant policies are set out in paragraphs 7.2.11, 7.2.12 and 7.2.13 below.

7.3.11. Policy DM38 (Development Affecting Conservation Areas) of the Local Plan Part Two states that "*any development proposals / and/or alterations to buildings, features and open spaces in Conservation Areas should preserve or enhance the character and appearance of the Conservation Areas."* The policy then moves on to detail a series of criteria development proposals will be expected to demonstrate to be considered acceptable.

7.3.12. Policy DM39 (The Setting of Designated Heritage Assets) of the Local Plan Part Two states that "*The Council will look for opportunities for new development within the setting of heritage assets to better reveal their significance. Development proposals that preserve those elements of the setting that make a positive contribution to or better reveal the significance of the asset will be treated favourably."*

7.3.13. Policy DM41 (Development Affecting Non-designated Heritage or their Setting) of the Local Plan Part Two states that where a proposed development would affect the setting of a non-designated heritage asset due consideration should be given to its significance to ensure "*that this is protected or enhanced where possible."*

Local Supplementary Planning Guidance

Morecambe Conservation Area Appraisal (2008)

7.3.14. The Morecambe Conservation Area Appraisal was completed in 2008 and is intended to supplement and provide clarity to policies within the adopted Local Plan, particularly policies related to demolition and development within conservation areas. The Appraisal provides a basis on which development proposals within the Conservation Area can be assessed by identifying the elements (buildings, spaces, views, routes) that contribute to the special historic and architectural character and which should be preserved.

7.4. ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

7.4.1. This section sets out the study area, the assessment methodology and significance criteria used.

ASSESSMENT METHODOLOGY

7.4.2. The preparation of the baseline has been informed by material gathered from various sources including:

- National Heritage List for England (NHLE) data;
- Historic Maps;
- Documents produced by Lancashire County Council including the Morecambe Historic Town Assessment Report (2006);
- Documents produced by Lancaster City Council including the Morecambe Conservation Area Appraisal (2008) and adopted Local Plan documents;
- Documentary sources such as Victoria County History; and
- Site visits undertaken on 20 and 21 May 2021

Study Area

7.4.3. The study area for built heritage assets has been set at 500m from the site boundary. However, a flexible approach is being taken with sites within this area scoped out if appropriate and sites outside this area (but within 1km) scoped in if it is found there may be an impact upon setting.

Temporal scope

7.4.4. The assessment considers potential impacts arising from the both the construction and operational phases of the proposed development. Construction and operational effects will be considered separately, and will, if necessary, be considered on a cumulative basis.

SIGNIFICANCE CRITERIA

7.4.5. The value (significance) of each built heritage asset identified has been established using the criteria set out in Table 7.2. For the purposes of this cultural heritage chapter, the value criteria will be described with reference to the terms used in Chapter 16 of NPPF.

Table 7-2 – Criteria for establishing the heritage value of built heritage

Value (significance) of asset	Description
High	Designated heritage assets of the highest significance as identified in Paragraph 200 of the National Planning Policy Framework, buildings and sites of high importance and rarity, buildings/sites of national importance: Scheduled Monuments with standing remains; Grade I and Grade II* Listed Buildings;

Value (significance) of asset	Description
	Grade I and Grade II* Registered Parks and Gardens; Conservation Areas containing very important buildings/sites; Undesignated structures of clear national importance.
Medium	Designated heritage assets of less than the highest significance as identified in Paragraph 200 of the NPPF, building and sites of medium or high importance and rarity, buildings/sites of regional importance: Grade II listed buildings; Grade II Registered Parks and Gardens; Conservation Areas;
Low	Non designated heritage assets of local historic value; buildings or sites of low or medium importance and rarity, buildings/sites of local importance: 'Locally Listed' buildings; Historic (unlisted) buildings of modest quality in their fabric or historical associations; Historic Townscape or built-up areas of limited historic integrity in their buildings or setting.
Negligible	Buildings or sites of very low importance and rarity that do not constitute heritage assets: Buildings of no architectural or historical note; Buildings of an intrusive character.

7.4.6. Once the value (significance) of a built heritage asset has been established, an assessment to identify the level and degree of impact on the asset will be completed. The level and degree of impact is assigned with reference to the scale set out in Table 7-3 below.

Table 7-3 – Criteria for determining the magnitude of impact on built heritage assets

Magnitude of Impact (degree of change)	Description
High	Extensive change to key elements of a historic building, of such an extent that the significance of the asset is totally altered or destroyed. Comprehensive changes to the setting resulting in the serious loss of ability to understand and appreciate the built heritage asset including; • Substantial change in a view affecting a significant sightline or a key designed view; • Severance of the relationship between an asset and its setting.
Medium	Change to many elements of a historic building to the extent that the significance of the asset is affected. Changes to the setting of an historic building that are noticeably different to the extent that significance is affected, resulting in the erosion of the ability to understand and appreciate the built heritage asset including; • Oblique change in a view affecting an axis adjacent to a significant sightline line or key designed view; • Partial severance of the relationship between an asset and its setting.

Magnitude of Impact (degree of change)	Description
Low	Change to some elements of a historic building to the extent that the significance of the asset is slightly altered Change to setting of an historic building resulting in a slight change in the ability to understand and appreciate the built heritage asset including; • Peripheral change in a view affecting a significant sightline or key designed view.; • Minor severance of the relationship between an asset and its setting
Very Low	Minor change to elements of a historic building to the extent that the significance of the asset is hardly affected. Change to the setting of an historic building resulting in a minimal change in the ability to understand and appreciate the asset including; • Minor peripheral change in a view affecting a significant sightline or key designed view; • Very minor severance of the relationship between an asset and its setting.
No impact	No change to fabric or setting.

7.4.7. Table 7.4 below outlines the criteria to be used for determining the significance of effect. An assessment of the level of the significant effect is determined by cross-referencing the value (significance) of the built heritage asset (Table 7.2) and the magnitude of impact (degree of change) (Table 7.3). The level of significant effect can be adverse, beneficial or negligible.

Table 7-4 – Criteria for determining the significance of effect

	Magnitude of impact (degree of change)				
Value	**High**	**Medium**	**Low**	**Very Low**	**No impact**
High	Major	Major	Moderate	Minor	Neutral
Medium	Major	Moderate	Minor	Negligible	Neutral
Low	Moderate	Minor	Minor	Negligible	Neutral
Negligible	Neutral	Neutral	Neutral	Neutral	Neutral

7.4.8. The identification of significant effects in EIA terms will be based on professional judgement, considering the specific circumstance of each proposed development. However, in general, major effects are significant, whilst minor and negligible effects are considered to be not significant. Moderate effects could be significance or not significant depending on the specific circumstances.

7.4.9. The terms used to describe the impact of a proposed development on a heritage asset differ between the NPPF and those normally used in the EIA process. Within the NPPF, impacts on heritage assets are considered in terms of harm. In determining an application there is a requirement to decide if the level of harm is 'substantial' or 'less than substantial'. The Statement of Significance that accompanies the planning application has been prepared using the terms set out in the NPPF.

7.4.10. While there is no direct correlation between EIA terms and those used in the NPPF it can generally be understood that substantial harm to a designated heritage asset would be deemed a significant effect. Less than substantial harm to a non-designated heritage asset would normally (but not necessarily always) be deemed a not significant effect. Where there is less than substantial harm to a designated heritage asset or substantial harm to a non-designated heritage asset, professional judgement will be required to identify a significant effect.

7.5. BASELINE CONDITIONS

7.5.1. The site extends to circa 4.58 ha and comprises land situated to the north and west of Morecambe Town Centre. The main development site is bound by the promenade to the north and east, Marine Road Central to the south and the Grade II* Midland Hotel to the west.

7.5.2. Lancashire County Council have identified three Historic Landscape Character Areas (HLCA) around the site – 'Sand and Mudflats', 'Modern Settlement' and 'Modern Recreation', as per Image 7-1 below.

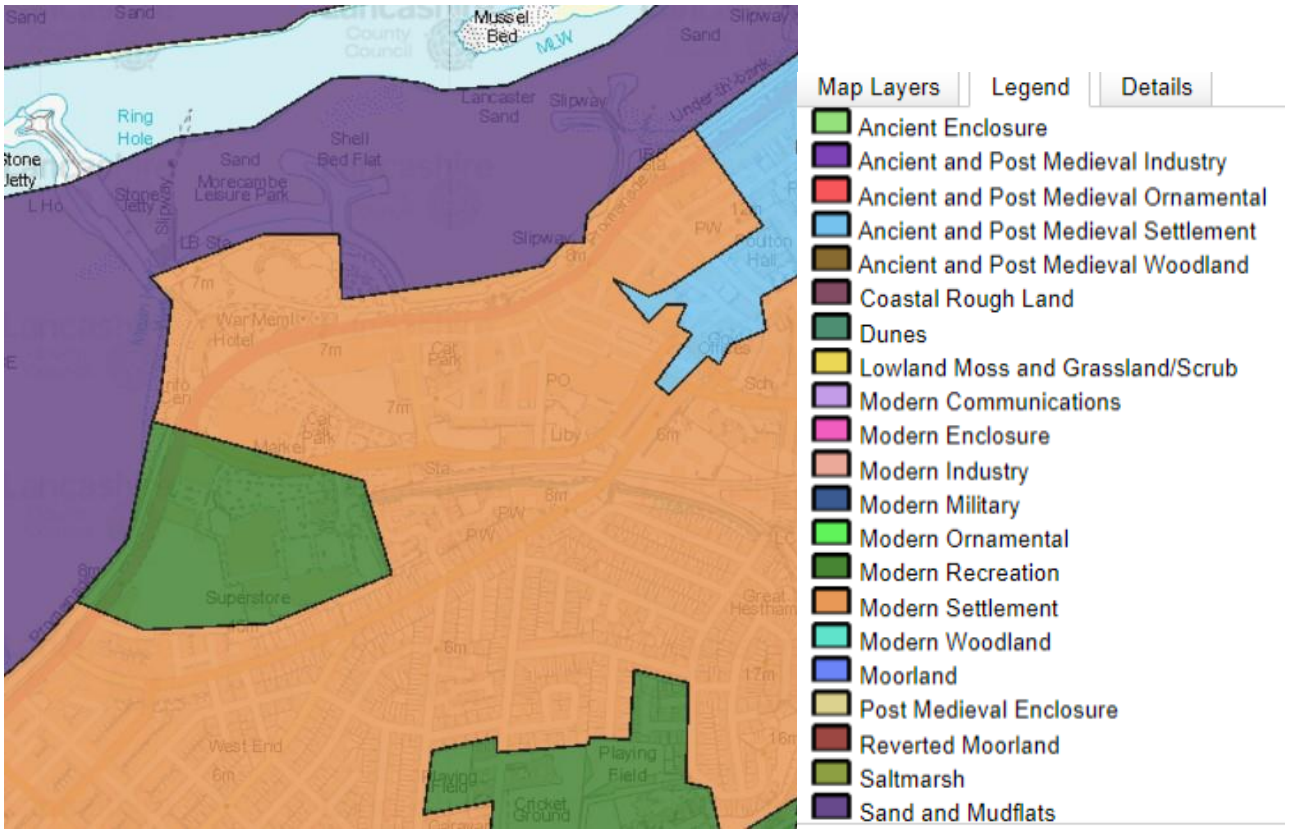


Image 7-1 - Historic Landscape Character Areas[2]

7.5.3. The majority of the application site lies within the 'Modern Settlement' HLCA. Modern Settlement is typically the post-1850 expansion of Ancient & Post-Medieval Settlement, as is the case here with modern Morecambe expanding from the older settlement of Poulton-le-Sands during the late 19th century. Evidence of the previous landscape often survives in the form of road layouts, boundary features and farmstead buildings[3].

[2] Lancashire County Council Maps and Related Information Online (MARIO) http://www.mario.lancashire.gov.uk/agsmario/default.aspx?categ=environment&layeron=Forest%20of%20Bowland%20Landscape%20Character%20Areas#leg_Countryside_environment_waste___16

[3] Lancashire County Council Historic Landscape Character Assessment: https://archaeologydataservice.ac.uk/archives/view/lancashire_hlc_2017/downloads.cfm

7.5.4. The north-east corner of the application site and Stone Jetty to the north fall within the Sand and Mudflats HLCA. This area is characterised by the remnants of structures associated with fishing along with additional features such as piers, jetties, lighthouses, channel walls, trackways and causeways and artificial oyster and mussel beds[4].

7.5.5. A small area of the Modern Recreation HLCA is located to the south-west of the site, within an area formerly used as a fairground[5]. The application site is entirely within the Morecambe Conservation Area. There are no heritage assets within the site boundary, however the Grade II listed War Memorial (NHLE 1292855) is located directly adjacent to the site's southern boundary and Grade II* listed Midland Hotel (NHLE 1208988) is located directly adjacent to the site's western boundary. The Winter Gardens (NHLE 1025280), a Grade II* listed theatre, is located on the southern side of Marine Road Central a short distance from the site's southern boundary. In addition to the Conservation Area and three buildings detailed above, the following relevant Grade II listed buildings have been identified within 500m of the site boundary:

- Former Station Building and Lighthouse (NHLE 1207223)
- The Clock Tower (NHLE 1279837)
- Morecambe Railway Station Main Building (NHLE 1207224);
- 217, 219 and 221 Marine Road Central (NHLE 1207218); and
- Wall and 2 pairs of entrance piers enclosing south-east side of car park of Midland Hotel (NHLE 1292883).

7.5.6. Additional listed buildings are located within 500m of the site boundary; however, all these buildings are set behind Marine Road Central. During the site visits, the interaction of the proposed site with the heritage assets and wider townscape within the study area was assessed. The proposed site does not form part of the setting of any of the listed buildings set behind Marine Road Central, due to the lack of visual relationship and intervening built form. Buildings stand in continuous groups along the southern side of Marine Road Central, with occasional breaks where side roads join the main east/west road. From within the side roads, views out are limited by level changes along the seafront and by the size and positioning of buildings along Marine Road Central, to the area directly in front of the junction. Wider views towards the site are only possible on arrival at the junction. As such, almost none of the buildings/spaces behind Marine Road Central have any visual relationship with the proposed development site.

7.5.7. The West End Conservation Area is located roughly 600m south of the application site. Built form and infrastructure is set between the West End Conservation Area and the application site. Views towards the Midland Hotel and proposed development will be possible from the sea front adjacent to the Conservation Area, but the historic relationship between the sea/seafront and views (which contribute to the significance of the Conservation Area as it was specifically built for the tourist trade) will remain unaffected. It is considered that the proposed development is unlikely to have any impact on the areas significance, therefore it is excluded from further assessment. There are two non-designated heritage assets within 500m of the site boundary:

- Former Woolworths Building, now occupied by B&M
- Former Littlewoods Building, now occupied by CB Warehouse

[4] Lancashire County Council Historic Landscape Character Assessment: https://archaeologydataservice.ac.uk/archives/view/lancashire_hlc_2017/downloads.cfm

[5] Ibid.

Morecambe Conservation Area

7.5.8. Morecambe's Conservation Area was designated in June 2003. The Conservation Area comprises a wide range of historic structures, road layouts and varied streetscapes which tell the story of Morecambe's growth from its origins as a fishing village into a popular seaside resort of the 19th and early 20th century.

7.5.9. The Bay is part of the special character and setting of the Conservation Area and the heritage assets contained within it. The Bay has driven the economy of Morecambe from its origins as a fishing village through to its role as a harbour and more recently as a visitor destination with the backdrop of the Lake District beyond. The setting has influenced the architecture of the Conservation Area with buildings associated with the 19th and 20th century built to look out to sea and take advantage of the spectacular views. The Midland Hotel, built on the shoreline designed to appear as a visiting ocean liner, and the imposing Winter Gardens with terracotta frontage, are key building within the Conservation Area that have remained as key architectural elements but have also had a key role to play in the tourism-related development of the area.

7.5.10. Morecambe's promenade area including the expanse of reclaimed land between Marine Road Central and the shoreline has traditionally provided a space for public recreation for residents and visitors alike. It is an important interface between the town and open views towards the bay and the Lake District beyond.

Midland Hotel

7.5.11. The Midland Hotel is a Grade II* listed building. It was built in 1933 to the designs of Oliver Hill. It is built in the *Streamline Moderne* architectural style and it is constructed of concrete and rendered brickwork, painted white. It is curved in plan with the convex side facing west towards the sea to take full advantage of the sea views. The windows are arranged in broad horizontal bands with steel framed casements with rendered surround. Each storey is articulated through projecting horizontal bands. The entrance is articulated with a tall window of steel casements above the doorway divided by three mullions capped by carved seahorses by Eric Gill. To the right is a single-storey projecting café. The interior has an impressive cantilevered circular open-well staircase above which is the carved ceiling panel by Eric Gill. The Midland Hotel contains a number of carved panels and frescoes. This adds to the interest of the building. In 1998, the Midland Hotel closed its doors. In a state of disrepair, it stood derelict for ten years before Urban Splash bought the building and restored it. It reopened in June 2008.

7.5.12. The Midland Hotel stands as the only substantial building forward of Marine Road Central with uninterrupted views of the Bay and the Lake District beyond. This largely defines its setting.

7.5.13. The significance of the Midland Hotel lies in its architectural interest as a building that rejected the historical styles of previous generations and focused on elegantly streamlined architecture. The interiors and the artwork that adorns it add to the architectural interest. The wider setting of the hotel on the sea front adds to its significance, and to a lesser extent so does the proximity of non-designated heritage assets also dating from the 1930s, namely the former Woolworths and Littlewoods Art Deco buildings, located approximately 120 metres to the east of the hotel. The historic interest of the Midland Hotel lies in its association with the railway, and also its contribution to the town of Morecambe developing as a popular national tourism destination.

Wall and 2 pairs of entrance piers enclosing south-east side of Midland Hotel Car Park

7.5.14. The wall and two pairs of entrance piers that enclose the south-east side of the Midland Hotel car park are Grade II Listed. The entrance piers are capped by ramped spirals. The wall and piers were designed by Oliver Hill as part of the original design of the Midland Hotel site. The materials and white painted render finish match the appearance of the adjacent hotel, and as part of the site's original design, contribute to the significance of the Grade II* hotel building.

7.5.15. The significance of the wall and entrance piers lies in its architectural and historic interest as a surviving, unaltered part of the original design vision for the Midland Hotel site.

Winter Gardens

7.5.16. The Winter Gardens is a Grade II* listed theatre. It was built in 1896 by Mangnall and Littlewood as the Victorian Pavilion Theatre and was originally an extension to the Winter Gardens complex. It sits prominently on the sea front with a principal elevation of ornate red terracotta. The symmetrical composition includes two three-storey corner towers linked by a glazed first floor arcade with balustrade and central projection. It is a prominent and noticeable building on the sea front and distinctly different from any other building within Morecambe.

7.5.17. The Winter Gardens is prominently sited on the sea front with views over the Bay. Its visual relationship and prominence on the sea front adds to the significance of the building.

7.5.18. The significance of the Winter Gardens lies in its architectural and historic interest as one of the most extravagant theatres built at the heyday of the British seaside. It is a highly visible, architecturally striking building in the heart of Morecambe. The theatre originally started out as a sedate winter garden but soon grew into an extravagant complex of entertainment, providing a focus for Morecambe's seaside success.

War Memorial

7.5.19. The War Memorial lies in between the Midland Hotel and the Winter Gardens. It is a Grade II listed memorial and was completed in 1921 to a design by T H Mawson. Constructed of granite and bronze, it is rectangular in plan supporting a bronze lion and with a stepped base inscribed with the names of the fallen.

7.5.20. The War Memorial is set back from the road and sits within stone circular dwarf walls with four access paths leading north, south, east and west. Small remembrance gardens are located to the east and west of the memorial.

7.5.21. The wider setting of the Memorial (busy road, large expanses of hard landscaping of widely varying quality, remnants of various previous buildings) does not contribute positively to the structure's significance.

7.5.22. The significance of the Memorial lies in its historic interest as it stands as an enduring link to those who gave their lives in the two World Wars. The architectural interest lies in its solidity of form symbolising resilience and strength. The lion which lies on top gazes out to sea. Lions are often thought to represent courage. This focus of the lion on the Bay provides the War Memorial with a connection to the sea and is part of its significance.

Former Station Building and Lighthouse

7.5.23. The Former Station Building and Lighthouse is located to the north of the application site at the northern end of Stone Jetty.

7.5.24. The Station Building was built in the early 1850s by the North Western Railway and was originally intended to service the port that ran services from Morecambe Harbour to Northern Ireland and the Isle of Man. The Lighthouse was added shortly after the Station Building was complete. The buildings are in coursed squared sandstone and have a slate roof. The roof overhangs the north-eastern elevation (facing the jetty) to form a canopy. Door and window openings have painted stone surrounds.

7.5.25. The significance of the Former Station Building and Lighthouse lies in its architectural and historic interest. The building's architectural interest is derived from its relatively unaltered, mid-19th century architectural form and the survival of various architectural features and detailing. The buildings historic interest lies in the building's role in the growth of Morecambe as a tourist resort in the 19th century and the record it provides of the historic function of Stone Jetty as a railway terminus and port.

Clock Tower

7.5.26. The Clock Tower is a Grade II listed red brick building with sandstone banding and dressing built in 1905. The building has four identifiable floors. The ground floor has bench seats with lead canopies organised around the cruciform base. Clock faces, located on the 3rd floor beneath a tent roof with a metal finial, are found on all four of the building's elevations.

7.5.27. The significance of the Clock Tower lies in its architectural and historic interest. The building is architecturally interesting with a wide range of carefully designed features located in a prominent, landmark position on the promenade. The building's historic interest lies in its reflection of the ongoing development and growth of Morecambe in the early years of 20th century.

Morecambe Railway Station Main Building

7.5.28. The Morecambe Railway Station Main Building is a Grade II listed former station building located approximately 500m south of the Midland Hotel that is now occupied by a pub and the Morecambe Visitor Information Centre. The Station was built to have a close, functional relationship with the Midland Hotel and Stone Jetty beyond. The building, which re-used stone walling and dressing from the earlier station, is built in squared course sandstone and has sandstone dressings and a steep blue slate roof. Opening in 1907, the station replaced an earlier station on Northumberland Street. The architect is unknown, although it may have been E.G. Paley of the Lancaster practice Paley and Austin.

7.5.29. The setting of the station building has changed considerably since its original function ceased in the mid-90s. Platforms, tracks, sidings and other railway infrastructure were removed shortly after the station closed with car parking, roads and new buildings, including an indoor market and cinema, occupying the area around the station instead. The loss of the original setting and the erection of numerous new structures has harmed the building significant to some extent, although it is still possible to understand its original function and relationship with surrounding buildings and wider town.

7.5.30. The station's significance lies largely in its historic interest as it provides a physical reflection of the significant growth in Morecambe as tourist resort (and town) in the late 19th and early 20th centuries. The station subsequent closure (and relocation) and redevelopment is a further reflection of Morecambe's changing fortunes as the habits of British tourists changed over the course of the second part of the 20th century.

217, 219 and 221 Marine Road Central

7.5.31. 217, 219 and 221 Marine Road Central are Grade II listed early 19th century rendered buildings with slate roofs. The ground floor, which has been entirely altered, is occupied by shops and restaurants.

7.5.32. The building is adjacent to the Grade II* listed Winter Gardens and positioned just to the south of the proposed application site. Built in the early 19th century the building is part of the early growth of Morecambe that took place in the late 18th and early 19th centuries as tourism gradually began to be established in the area.

7.5.33. The building's significance lies in its architectural and historic interest. The upper floors of the building are a good example of largely unaltered early 19th century residential architecture with projecting bay windows to the front elevation and an oriel window to the side of No.221. Window openings appear to be largely unaltered and the original chimney arrangement appears to have been retained. Historically, the buildings provide evidence of the areas increasing popularity and represent the growth of Morecambe from a collection of separate fishing villages and single town and popular tourist destination.

B&M (Woolworths Building) and CB Warehouse (Littlewoods Building), Marine Road Central

7.5.34. The buildings now occupied by B&M and CB Warehouse are pre-war 20th century Art Deco buildings. CB Warehouse was built for Littlewoods and opened in 1939. B&M also dates to the 1930s and was built for Woolworths to design by their in-house architect department. Although neither building is listed, both are identified by the Morecambe Conservation Area Appraisal as being Unlisted Buildings of Merit and important parts of Morecambe's Art Deco heritage. Although looking tired, typical Art Deco architectural features that reference Ancient Egyptian geometric shapes are still clearly visible on both buildings.

7.5.35. Both buildings have a positive visual relationship with the Midland Hotel, forming a small group of modernist 1930s buildings that contrast interestingly with the earlier Georgian and Victorian buildings that characterise much of the townscape. These buildings are a reflection of Morecambe's continued success during the first half of the 20th Century.

Heritage Value

7.5.36. The Heritage Value (significance) of each of the built heritage assets identified above is set out in Table 7.5 below. A map (Figure 7-2) showing the location of each identified built heritage asset can be found at **Figure 7.1 of Volume 4**.

Table 7-5 – Heritage Value of Identified Built Heritage Assets

Map Ref	Built Heritage Asset	Grade/Type	Value
N/A	Morecambe Conservation Area	Conservation Area	Medium
1	Midland Hotel	Grade II*	High
2	Wall and 2 pairs of entrance piers enclosing south-east side of car park of Midland Hotel	Grade II	Medium
3	Winter Gardens	Grade II*	High
4	War Memorial	Grade II	Medium
5	Former Station Building and Lighthouse	Grade II	Medium
6	The Clock Tower	Grade II	Medium
7	Morecambe Railway Station	Grade II	Medium
8	217, 219 and 221 Marine Road Central	Grade II	Medium
9	B&M (Woolworths Building) and CB Warehouse (Littlewoods Building), Marine Road Central	Non-designated Heritage Assets	Low

7.5.37. The following section will consider the likely significant effects the proposed development would have on the built heritage assets identified above.

7.6. IDENTIFICATION AND VALUATION OF KEY IMPACTS (CONSTRUCTION AND OPERATIONAL)

7.6.1. This section assesses the likely significant effects of the proposed development on identified built heritage assets. The assessment will consider the effects of the construction and operational phases of the proposed development.

CONSTRUCTION PHASE

7.6.2. The impact of construction works on built heritage assets are generally regarded as being of less significance due to their short term, temporary nature. Potential effects of the construction phases relate to noise, dust and vibration associated with increases in HGV traffic, site clearance / preparation and construction and indirect affects to the setting of the heritage assets from the presence of construction hoardings, site compounds and offices and construction equipment.

7.6.3. It is estimated that construction phase for the proposed development will last 142 weeks, with enabling works expected to take 16 weeks, main build works taking 110 weeks and final external works and internal fit out taking 16 works. Potential working hours are between 7am and 6pm Monday to Friday and 8am to 4pm on Saturdays.

7.6.4. The construction compound for storing materials would be located within the site boundary. A satellite construction compound may be located off site. Site offices are likely to be located off site, possibly within the car park to the south of the site on the southern site of Marine Road Central (between Rita's Café and the Former Station). On site messing and welfare facilities would be located within one of the areas that will become landscaping. Construction hoarding around the site will be 2.4 m high in either timber or metal.

7.6.5. A Construction Environment Management Plan (CEMP), Traffic Management/Route Plan and Constraints Map would be put in place. The CEMP would include measures to control dust, vibration and to some extent noise. The Traffic Management/Route Plan would control the route HGVs take to the application site along with the number of HGVs that can access the site at any time. The Constraints Map would ensure relevant contractors are aware of the adjacent built heritage assets.

7.6.6. No listed buildings / non-designated heritage assets are within the site boundary. The part of the Morecambe Conservation Area that falls within the site boundary does not include any important features that contribute to the areas value. No built heritage assets will be lost as a result of construction.

7.6.7. The closest heritage asset to the application site boundary is the Grade II listed War Memorial. The War Memorial would experience the effects of construction phase activities in close proximity. Other listed buildings / non-designated heritage assets have greater separation from the application site as a result of existing roads, car parks, public space and other buildings. This separation would reduce the impact of any construction phase activities on these assets.

7.6.8. The impact on the Morecambe Conservation Area would be concentrated within a clearly defined area. The majority of the Conservation Area would be unaffected, particularly the parts of the Conservation Area located some distance from the application site and those areas located to the rear of buildings along the southern side of Marine Road Central.

7.6.9. All construction phase effects are considered to be short-term and temporary.

7.6.10. The predicted impact and effect of the construction phase activities are provided in table 7-6 below

Table 7-6 – Impact and effect of construction phase activities

Built Heritage Asset	Value	Magnitude of Impact	Scale of Effect
Morecambe Conservation Area	Medium	Low	Minor adverse
Midland Hotel	High	Low	Moderate adverse
Wall and 2 pairs of entrance piers enclosing south-east side of car park of Midland Hotel	Medium	Very Low	Negligible
Winter Gardens	High	Low	Moderate adverse
War Memorial	Medium	Medium	Moderate adverse
Former Station Building and Lighthouse	Medium	Low	Minor adverse
The Clock Tower	Medium	Very Low	Negligible
Morecambe Railway Station	Medium	Very Low	Negligible
217, 219 and 221 Marine Road Central	Medium	Low	Minor adverse
B&M (Woolworths Building) and CB Warehouse (Littlewoods Building), Marine Road Central	Low	Low	Minor adverse

7.6.11. Taking into account the short-term temporary nature of the construction phase activities, none of the effects identified would be considered significant.

OPERATIONAL PHASE

7.6.12. The effects of the operational phase of the development have the potential to be significant. Potential effects of the operational phase of the development relate to changes to the setting of the listed buildings and non-designated heritage assets and a change to character and appearance of part of the Morecambe Conservation Area.

7.6.13. The proposed development would have a maximum footprint of 16,838 sqm (GEA) across a group of shell-like buildings. The buildings would have a maximum height of 37.3m AOD. The proposed development is expected to attract an average of 760,000 visitors per year with the site able to accommodate a maximum of 4,000 visitors per day. Core hours of operation would be between 09:00 and 21:00. The 6,000-person capacity outdoor arena would host a maximum of 8 late evening events per year in the summer season between the hours of 18:00 and 00:00.

7.6.14. The completed development would not result in any change to the fabric of any of the identified listed buildings / non-designated heritage assets. No important features that contribute to the value of the Morecambe Conservation Area would not be lost or altered.

7.6.15. The proposed development would alter the character and appearance of part of the Morecambe Conservation Area by introducing large new buildings in a contemporary architectural style that will become prominent, landmark features. However, much of the character and appearance of Morecambe Conservation Area, particularly the area located to the rear of the buildings fronting Marine Road Central, would be unaffected by the proposed development.

7.6.16. Some views from within/adjacent to the application site back towards the townscape would be interrupted by the proposed development, particularly views from Stone Jetty looking south/south-east. Other views from within the proposed site would be retained, with the proposed development providing new framing and interest. The proposed development would also re-frame views into and out of the Morecambe Conservation Area, adding a new sense of drama and bring back vitality to the seafront.

7.6.17. The proposed development will introduce large new buildings within the setting of the Midland Hotel. Any potential harm would be mitigated by the carefully considered design of the new shell-like structures, which would create a positive new composition with the Midland Hotel. The proposed landscaping scheme would enhance setting the Midland Hotel, with a more rational layout and greatly improved approach to paving, lighting and street furniture.

7.6.18. There will be some change to the framing of views of the Midland Hotel, including as one progresses west along the seafront towards the application site, but the sense of the views of the Midland Hotel opening-up in a better-defined way, would not harm the setting of the listed building or the way it is experienced. This is illustrated by photomontage viewpoint 6 (contained at **Figure 6.12.4 of Volume 4**) which shows the view from the area around the Grade II listed Clock Tower. At this point the Midland Hotel is almost entirely visible, further progress along the seafront would full reveal the building. The original intention of its architectural design (to appear as an ocean linear in the harbour) will remain legible and understandable.

7.6.19. Pre-application comments from the Conservation Officer suggested moving the eastern most 'shell' a few meters north to allow the Midland Hotel to be better seen in views along the promenade. The proposal has not been taken forward. The siting of the buildings as currently proposed is considered to the optimum location, with the alternatives considered discounted as not suitable. The proposed design is considered to be the optimum location taking into account site constraints that include; a requirement to keep a 16m clear zone from the sea wall; retaining pubic access to the northern and southern promenades; provision of appropriate vehicular access to, and a turning circle at, the RNLI building; the location of an existing underground culverted watercourse; and the intention to retain existing site features such as the Amphitheatre.

7.6.20. It is considered that the amendment proposed would not alter the magnitude of impact the proposed development would have upon the setting the of Midland Hotel.

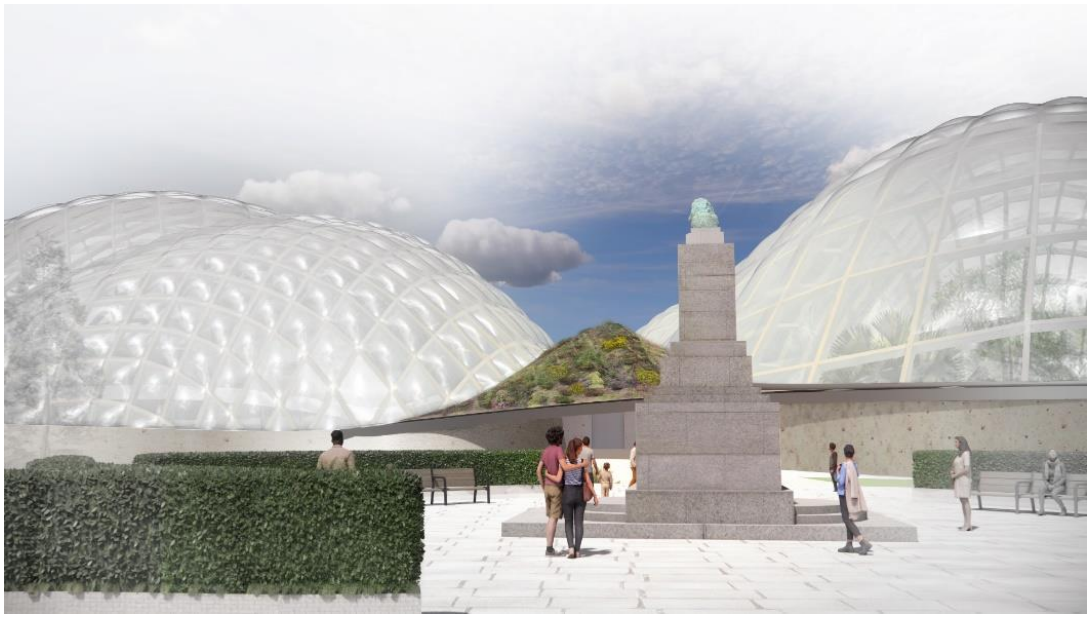
7.6.21. Further, it is considered that the 'shells' as currently positioned help frame a positive view for the Lion on top of the War Memorial which would likely to slightly blocked by moving the eastern most shell.

7.6.22. The immediate setting of the Winter Gardens will not change as a result of the proposed development. The buildings wider setting will experience change. The proposed development would slightly change the sea views from the upper terrace of the Winter Gardens but would not harm out the inter-visibility between the Winter Gardens and the sea, or direct views from the building looking across the bay to the Lake District. The proposed landscaping scheme would make a positive contribution to the wider setting of the Winter Gardens, with a more rational layout and better considered approach to lighting and street furniture

7.6.23. The immediate setting of the War Memorial will remain unaltered, but the wider setting will be enhanced by the proposed developments landscaping scheme. The proposed development will introduce large, new buildings within the wider setting of the War Memorial. These buildings will be a major visitor attraction, drawing large numbers of visitors, who will be passing directly in front of the War Memorial, and as such the status and function of the Memorial will be enhanced.

7.6.24. The relationship between the Memorial and the sea is considered to make a positive contribution to the significance of the War Memorial, with the lion that sits on top of the Memorial designed to look out to sea. The design of the proposed scheme has been developed so that there is a wedge of sky between the two shells directly in front of the lion. The building form between the two shells has been designed to be planted with vegetation, nestled on a 'Dunescape' which will ensure the lion retains a sense of looking out to sea. As illustrated by Image 7.2 below.

Image 7-2 - Indicative view illustrating relationship between War Memorial and the proposed development



7.6.25. The proposed landscaping scheme provides an opportunity to comprehensively improve the wider setting of the War Memorial and the way it is experienced. The landscaping scheme would provide a more rational layout and a better, more considered approach to lighting and street furniture and offers the opportunity to provide an improved space for reflection and remembrance at and around the War Memorial.

7.6.26. The immediate setting of the Clock Tower would not change. The proposed development would become part of the wider setting of the Clock Tower. As a prominent building set in front of Marine Road Central, the Clock Tower is a focal point of views. The proposed development would not interrupt most long-range views towards the Clock Tower when looking east from the seafront and along the promenade.

7.6.27. Morecambe Railway Station Main Building is no longer in its original use and its setting has deteriorated since the mid-90s. The previous changes to the buildings setting (removal of railway infrastructure (including platforms) and creation of new roads, car parking and the erection of various buildings), are considered to have caused harm to the building's significance with the station building now sat within a landscape dominated by road traffic, with little sense of its original function or relationship with the wider town (apart from the relationship with the Midland Hotel) remaining.

7.6.28. The immediate setting of 217, 219 and 221 Maine Road Central would not change. The wider setting of the building would experience change as a result of the proposed development. The proposed landscaping scheme would make a positive contribution to the wider setting of the building, with a more rational layout and better considered approach to lighting and street furniture.

7.6.29. The immediate setting of B&M (Woolworths Building) and CB Warehouse (Littlewoods Building) remain unaltered. The buildings wider setting would experience a larger degree of change. The positive visual relationship with the Midland Hotel will continue. The three buildings would continue to be seen together and would continue to be legible as a group of 1930s buildings. The positive contribution both buildings make to character and appearance of the Morecambe Conservation Area would be retained. The proposed landscaping scheme would make a positive contribution to the wider setting of B&M (Woolworths Building) and CB Warehouse (Littlewoods Building) and their relationship with the Midland Hotel.

7.6.30. The predicted impact and effect of the operational phase are provided in table 7-7 below

Table 7-7 – Impact and effect of the Operational Phase

Built Heritage Asset	Value	Magnitude of Impact	Scale of Effect
Morecambe Conservation Area	Medium	Low	Minor adverse
Midland Hotel	High	Low	Moderate adverse
Wall and 2 pairs of entrance piers enclosing south-east side of car park of Midland Hotel	Medium	Very Low	Negligible
Winter Gardens	High	Low	Moderate adverse
War Memorial	Medium	Low	Minor adverse
Former Station Building and Lighthouse	Medium	Low	Minor adverse
The Clock Tower	Medium	Low	Minor adverse
Morecambe Railway Station	Medium	Very Low	Negligible
217, 219 and 221 Marine Road Central	Medium	Low	Minor adverse
B&M (Woolworths Building) and CB Warehouse (Littlewoods Building), Marine Road Central	Low	Low	Minor adverse

7.6.31. Taking into account the existing context of the site, the design of the proposed development and the extent of change to the setting of the buildings, none of the effects identified are considered to significant.

7.6.32. The scale of effect on the setting of the Midland Hotel and Winter Gardens are considered to be Moderate. This reflects the scale of the proposed development and the significance of the buildings rather than the magnitude of impact. In this instance a moderate scale of effect is not consider a significant effect for the following reasons:

- The wider setting of the buildings has regularly changed and evolved over time, with the application site and the area adjacent to it historically being used for a variety of uses including a shipbreakers yard, Super Swimming Stadium and Bubbles Swimming Complex and temporary fairground. The ever-changing nature of the buildings setting helps to negate any potential visual harm caused by the proposed new development.
- The proposed landscaping scheme would provide a more rational layout and better considered approach to paving, lighting, and street furniture, significantly improving the experience of approaching the buildings. The proposed landscaping would make a positive contribution to the wider setting of the Midland Hotel and Winter Gardens and would also make a positive contribution to the character and appearance of this part of the Conservation Area.

- Some views from within/adjacent to the application site back towards the townscape (including views of the Midland Hotel and Winter Gardens) will be interrupted by the proposed development, particularly those from around Stone Jetty. Other views from within the proposed site will be retained, with the proposed development providing new framing and interest.
- The Midland Hotel was intended to be a landmark building, designed to appear as a ship in port, and deliberately located in a prominent position. While the Midland Hotel will continue to be a landmark building and the design intention will continue to be legible, there will be a reduction in its prominence as a result of the proposed development. These changes to the buildings setting will cause some harm to significance. However, the change to the framing of the views of the Midland Hotel, including as one progresses west along the seafront towards the application site, will create the sense of the views of the Midland Hotel opening-up in a better-defined way, which would limit the harm to the setting of the listed building.

7.7. CUMULATIVE EFFECTS

7.7.1. There are no committed developments within a 500m radius of the site that would be of a scale or significance to warrant cumulative assessment with the proposed development.

7.8. MITIGATION MEASURES

7.8.1. There will be no direct physical effects on built heritage assets as a result of the proposed development. Mitigation for such effects (e.g. Historic Building Recording) is therefore not required.

7.8.2. Measures to reduce the impact of the proposed development on the setting of the identified built heritage assets have been incorporated into the design of the development. Measures incorporated the planning of the site layout to take account of the adjacent listed buildings, designing landscaping to enhance the setting of the adjacent listed buildings and the character and appearance of this part of the conservation area, careful selection of planting and consideration of the siting, height, massing, scale and layout of individual elements of the building. Taken together these measures are considered to have successfully avoided significant adverse effects on built heritage receptors. No additional mitigation measures are proposed.

7.9. RESIDUAL EFFECTS

7.9.1. No additional mitigation measures are proposed. The effects identified in Table 7-6 and discussed in paragraph 7.5.28 and paragraph 7.5.29 will therefore remain.

8

NATURE CONSERVATION AND BIODIVERSITY

PUBLIC

8. NATURE CONSERVATION AND BIODIVERSITY

8.1. INTRODUCTION

8.1.1. This chapter presents the approach and findings of the ecological impact assessment (EcIA) of potential impacts on nature conservation assets arising from the proposed development on Ecology.

8.1.2. The chapter begins by reviewing the legislation and planning policies relevant to Ecology. The study area and methods for the assessment are then outlined. The nature, value and sensitivity of the existing baseline environment are then identified before an assessment is made of the potential effects on Ecology from the proposed development. Mitigation measures have been proposed to avoid, reduce or offset any potential effects and these embedded mitigation measures have been taken into account in the assessment, which are mentioned in Chapter 3. Additional mitigation measures are further outlined in Section 8.7.

8.1.3. The site extends to circa 4.58 hectares and comprises land situated to the north and west of Morecambe Town Centre. The development site is bound by the promenade to the north and east, Marine Road Central to the south and the Grade II* listed Midland Hotel to the west.

8.1.4. This assessment should be read with reference to ecology figures listed below, and provided at the end of this ES chapter:

- Figure 8.1: Ecological Statutory Designations within 5km of the Proposed Development
- Figure 8.2: Ecological Non-Statutory Designations within 2km of the Proposed Development
- Figure 8.3: Extended Phase 1 Habitat Survey
- Figure 8.4: Important Roosting and Feeding Areas for Birds within Wider Area
- Figure 8.5: Winter Bird Survey Area and Compartments

8.1.5. This assessment is accompanied by evidence in technical reports, listed below:

- Appendix 8.1: Ecology Desk-Based Assessment
- Appendix 8.2: Extended Phase 1 Habitat Survey
- Appendix 8.3: Arboricultural Impact Assessment
- Appendix 8.4: Bat Surveys
- Appendix 8.5: Winter Bird Surveys
- Appendix 8.6: Biodiversity Net Gain report
- Appendix 8.7: Habitats Regulations Assessment

8.1.6. The Habitats Regulations Assessment (HRA) (**Appendix 8.7**), contains a detailed assessment of the effect of the proposed development on qualifying features of the Morecambe Bay and Duddon Estuary SPA and Morecambe Bay SAC and Ramsar Sites.

8.2. POLICY CONTEXT

8.2.1. Table 8.1 introduces Ecology legislation and key guidance of relevance to undertaking EcIA.

Table 8.1. Relevant Ecology legislation and key guidance

Legislation / Guidance	Description
International Legislation	
Convention on Biological Diversity 1992 (CBD)	Established a global vision for biodiversity, including a set of strategic goals and targets to drive action. Government subsequently published The Natural Choice ('White Paper') in June 2011 which responds to the global commitments of the CBD, outlining the government's vision for the natural environment, putting greater emphasis on a more integrated landscape-scale approach as opposed to piecemeal conservation action. The White Paper sets out a vision for better valuing the natural environment in decision making to unlock growth in green economy and reconnect people with nature.
Bern Convention on the Conservation of European Wildlife and Natural Habitats 1979	The primary aims are to ensure conservation and protection of wild plant and animal species and their natural habitats, particularly where this requires cooperation between contracting parties. The obligations of the Convention are transposed in the UK into national law by means of the Wildlife and Countryside Act 1981 as amended.
Bonn Convention on the Conservation of Migratory Species of Wild Animals 1979	Pertains to migratory species and those that regularly cross the political boundaries of countries. Appendix I includes critically threatened species (those in danger of extinction). Appendix II lists migratory species whose conservation status is unfavourable and which would benefit from coordinated conservation measures. The obligations of the Convention are transposed in the UK into national law by means of the Wildlife and Countryside Act 1981 as amended, with the Countryside and Rights of Way Act 2000 strengthening the protection of certain species in England and Wales.
Conservation of Populations of European Bats 1991 (EUROBATS)	Legally binding agreement under the Bonn Convention, which came into force in the UK in 1994. It recognises that endangered migratory species can only be properly protected if activities are carried out over the entire migratory range of the species, and it aims to protect all species of bats identified in Europe through legislation, education, conservation measures and international co-operation.
Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971	Intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The Convention has several mechanisms to help Contracting Parties designate their most significant wetlands as Ramsar Sites, and to take the steps necessary to manage them effectively, maintaining their ecological character.
Council Directive 2009/147/EC of 30 November 2009 on the conservation of wild birds.	Referenced by the Conservation of Habitats and Species Regulations 2017 (as amended). Provides a framework for cross-boundary protection of wild birds, their habitats and migratory areas. Provides a list of species and sub-species that are particularly threatened (Annex 1).
Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora	Referenced by the Conservation of Habitats and Species Regulations 2017 (as amended). Provides definitions for factors such as the favourable conservation status of habitats and species. Sets out a framework at Annex III for site selection criteria to be applied for the designation of special areas of conservation, in addition to providing lists of natural habitat types (Annex I) and species (Annex II) for which the designation of special areas of conservation should be prioritised. Also lists species of animals (Annex IV(a)) and plants (Annex IV(b)) species which are in need of strict protection.

Legislation / Guidance	Description
National Legislation	
The Conservation of Habitats and Species Regulations 2017 (as amended) Including by: The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019	Provide for the identification, designation and protection of Natura 2000 (N2k) sites; for the purposes of these provisions, N2k sites include Special Areas of Conservation (SAC); Special Protection Areas (SPA) (and Ramsar sites). The Regulations also convey a statutory requirement for authorities to undertake a Habitats Regulations Assessment (HRA) of the potential impacts of plans and projects, including development proposals, on N2k sites and also convey strict levels of protection to certain species and their habitats or places of shelter. Derogations are afforded for such species through grant of licences, which must satisfy three tests relating to purpose and no satisfactory alternative for the proposed activity and maintaining favourable conservation status (FCS) of the affected species. Under the 2019 Regulations, SACs and SPAs in the UK no longer form part of the EU's N2k ecological network. The 2019 Regulations have created a national site network on land and at sea, including both the inshore and offshore marine areas in the UK.
Wildlife and Countryside Act 1981 as amended (WCA)	The major legal instrument for wildlife protection in the UK, providing varying levels of protection for wild animals, birds and plants, controls for non-native invasive species and protects the important habitats as Sites of Species Scientific Interest.
Countryside and Rights of Way Act 2000 (CROW)	Part III deals specifically with wildlife protection and nature conservation, requiring Government Departments to have regard for the conservation of biodiversity, in accordance with the Convention on Biological Diversity, and that The Secretary of State publishes a list of living organisms and habitat types that are considered to be of principal importance in conserving biodiversity. It also amends and strengthens certain protections afforded by the WCA.
Natural Environment and Rural Communities Act 2006 (NERC)	Imposes a duty on all public bodies to have regard for biodiversity conservation when carrying out their functions. This extends the duty imposed upon Government and Ministers by CROW. Section 41 provides for the establishment of a list of habitat and species that are considered to be of 'principal importance for the for the purpose of conserving biodiversity' for which biodiversity conservation should be prioritised. These are referred to hereafter as habitat of principal importance (HPI) and species of principal importance (SPI).
National Parks and Access to the Countryside Act 1949	Enables the establishment and management of Nature Reserves: -for the purpose of research and study of flora and fauna or geological and physiographical features -for the preservation of such special features. National Nature Reserves (NNR) may be established and declared by the statutory nature conservation agencies and managed by them or an approved body. Local authorities may also establish nature reserves and declare them Local Nature Reserves (LNR), provided the relevant statutory nature conservation agency approves.
Hedgerows Regulations 1997	Protects certain 'important' hedgerows from removal or damage without permission from the local planning authority. Works to important hedgerows are exempt under the Regulations if planning consent is granted which allows their removal.
Key EcIA Guidance	
CIEEM Guidelines for Preliminary Ecological Appraisal	Provides a common framework for preliminary ecological assessment (PEA) to promote better communication, understanding and cooperation between stakeholders.
CIEEM Guidelines for Ecological Impact Assessment	Promotes good practice, a scientifically rigorous and transparent approach to ecological impact assessment (EcIA). Provides a common framework for EcIA to promote better communication and closer cooperation between ecologists

Legislation / Guidance	Description
	undertaking EcIA and provides decision makers with relevant information about the likely ecological effects of a project.
Biodiversity: Code of practice for planning and development	Provides standard recommendations on topics such as professional practices, proportionality, pre-application discussions, ecological surveys scope and method, adequacy of ecological information, reporting and monitoring. Cites CIEEM EcIA Guidelines as the acknowledged reference on EcIA.
Additional guidance on habitats and species to be considered within the assessment	
Lancashire Biodiversity Action Plan	Delivered through the Lancashire Biodiversity Partnership. This focuses on aspects of the local ecology which are in need of protection or conservation
The Birds of Conservation Concern (BoCC)	The 2015 report (Eaton et al., 2015) splits UK birds into three categories of conservation importance – red, amber and green. Red is the highest conservation priority, and includes species that are globally threatened, or have experienced historical UK population decline, a severe decline in UK breeding population, or a severe contraction of UK breeding range. Amber is the next most critical group, followed by green

8.2.2. National and local planning policies are covered in detail in the Planning Statement that accompanies this ES, however, for the purposes of this ES chapter, attention is drawn to National Planning Policy Framework (Chapter 15: Conserving and enhancing the natural environment) and relevant Lancaster City Council policies.

8.3. ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

8.3.1. Reference has been made to national and local policy documents, relevant British Standards, national guidance and other relevant information in determining the assessment methodology and criteria to be used.

8.3.2. The assessment was undertaken in accordance with the following assessment method:

- Describe the baseline conditions relevant to terrestrial ecology and identify important ecological features;
- Identify the important ecological (terrestrial) features which may potentially be affected by the construction or operation of the proposed development, these include:
  - Habitats or species afforded protection under international or national legislation;
  - Habitats of principal importance (HPI) or species of principal importance (SPI) for nature conservation as determined under Section 41 of the NERC Act;
  - Other habitats or species identified as being of regional or local conservation concern (e.g. those for which Biodiversity Action Plans (BAP) have been delivered or which appear on 'Red lists' or other lists identifying conservation concern).
- Evaluate important ecological features in accordance with Guidelines for EcIA (2018);
- Identify and characterise potential effects during construction and operational phases (in respect of biophysical changes and taking account of relevant aspects of ecosystem structure or function);
- Incorporate measures to avoid or reduce these effects;
- Assess the significance of residual effects after mitigation;
- Identify appropriate compensation measures to offset significant residual effects; and
- Identify opportunities for ecological enhancement.

8.3.3. The following baseline ecology surveys were undertaken on land under the control of EPIL as well as third party owned land to establish the existing ecological features on the site.

Desktop Study

8.3.4. A search of existing information relating to protected species, habitats of conservation priority and designated sites was undertaken in 2019. Sources included Lancashire Environment Records Network, Natural England and MAGIC Map websites. The search extended 2km from the site boundary for non-statutory designated sites, protected species and priority species and habitats. Information regarding statutory protected sites within the wider area (up to 10km) was also collected. Relevant local planning policies were also identified to inform the assessment.

8.3.5. The full methodology and results of the desk-based ecology assessment (DBA) is included within the technical report in **Appendix 8.1**.

8.3.6. The potential off-site compound area was viewed using OS mapping and aerial imagery and falls within the desktop search area.

Limitations

8.3.7. No limitations were encountered during the DBA. There are no material changes between 2019 and 2021 that could affect this assessment.

Extended Phase 1 Habitat Survey

8.3.8. An extended Phase 1 habitat survey of the site was carried out by TEP ecologists in May 2019. This was updated in June 2021. The survey was carried out in accordance with the Phase 1 habitat assessment method and Guidelines for Preliminary Ecological Appraisal (CIEEM, 2017). The method records the habitat types present in and immediately surrounding the site, based on the descriptions within the Phase 1 habitat assessment method. Plant species were identified in accordance with Stace (2010) and recorded as target notes using the DAFOR scale of abundance.

8.3.9. The site survey included an extended assessment of the habitats present for their potential to support species of conservation concern, particularly statutorily protected species or species listed under S41. Any signs indicating the presence of these species were recorded.

8.3.10. The full methodology for the extended Phase 1 habitat survey is included within the technical report in **Appendix 8.2**.

Limitations

8.3.11. Both the 2019 and 2021 updated Phase 1 habitat survey were undertaken during the recommended seasonal window (April to October) and therefore no seasonal constraints were encountered. Due to the fairground being in situ on the site during the 2021 Phase 1 habitat update, not all of the site could be accessed, however sufficient views could be obtained to determine that there were no further significant alterations to the habitats recorded during the 2019 survey. Therefore, there are no limitations to the overall assessment of habitats within the site.

Tree Survey

8.3.12. A survey of trees on the site was carried out by TEP arboriculturists in June 2021. The survey was by means of inspection from ground level in accordance with BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations (British Standards Institution, 2012). The Standard provides a categorisation method to "identify the quality and value (in a non-fiscal sense) of the existing tree stock, to allow informed decisions to be made concerning which trees should be removed or retained in the event of development occurring". The method places trees and groups of trees into one of four quality categories and provides guidance on the integration and protection of trees during construction.

8.3.13. The presence of Tree Preservation Orders, Conservation Areas, Ancient Woodland and Veteran Trees was also ascertained.

8.3.14. The full methodology for the arboriculture survey is included within the technical report in **Appendix 8.3**.

Limitations

8.3.15. There were no limitations to the assessment of trees.

Bat Roost Survey - Trees

Ground Based Assessment

8.3.16. Trees within the site were assessed in line with the Bat Conservation Trust (BCT) Guidelines (Collins, 2016) for their potential to support roosting bats. The survey was undertaken by suitably qualified ecologists in May 2019 and updated in June 2021.

8.3.17. The ground-based assessment of the trees involved the surveyor searching from the ground for any Potential Roost Features (PRFs) which may be used by bats, using binoculars. The trees were then categorised in accordance with the criteria set out in the BCT Guidelines.

Limitations

8.3.18. The assessment of the trees was carried out outside of the optimal winter season when foliage is least likely to obscure PRFs, however due to the young age and condition of the trees present this is not a significant constraint.

Bat Roost Survey - Buildings

8.3.19. Three buildings within the site, which are to be demolished, were assessed in line with the BCT Guidelines (Collins, 2016) for their potential to support roosting bats. The survey was undertaken by TEP bat licensed ecologists in July 2019.

8.3.20. The buildings were subject to a daytime external assessment for bat roost suitability, where accessible, to identify any suitable potential roost features (PRFs) for use by bats such as crevices, cracks, holes and any other potential access points into the structures. PRFs were inspected to assess their suitability for use by bats using a torch and binoculars. Inspection of features included determining presence of any signs of bats roosting within the buildings including; droppings, feeding remains and other indicative marks. The buildings were then categorised in accordance with the criteria set out in the BCT Guidelines.

8.3.21. The full methodology for the bat roost survey is included within the technical report in **Appendix 8.4**

Limitations

No significant limitations to the external and internal assessment of the buildings were encountered.

Nocturnal Emergence/ Re-entry Surveys of Buildings 2019

8.3.22. Of the seven buildings identified for demolition, one with moderate roost suitability and one with low roost suitability was identified.

8.3.23. These buildings were then subject to nocturnal roost surveys undertaken within the appropriate season (May to September inclusive) in 2019. Two survey visits (dusk and a dawn) were undertaken at the building with moderate roost potential (B1) and one dusk visit was undertaken to the building with low roost potential (B3). Dusk surveys commenced 15 minutes prior to sunset and finished 90 minutes after sunset and dawn surveys commenced 90 minutes prior to sunrise and finished 15 minutes after sunrise in line with the 2016 BCT Guidance (Collins, 2016). Surveyors used heterodyne detectors (Petterson) and frequency division (Anabat) detectors to record bat calls. Sonogram analysis was undertaken by a licenced bat ecologist trained to Advanced Level 3 Analook Analysis.

8.3.24. The full methodology for the nocturnal emergence/ re-entry surveys is included within the technical report in **Appendix 8.4**.

Limitations

8.3.25. No seasonal constraints were encountered. Very brief drizzle on the 12th July 2019 did not impact bat activity across the survey. It was not always possible to identify bat calls to species level owing to the overlap of call parameters between some species and/or poor quality recordings (e.g. brief and distant passes). In these cases, it is accepted that species are identified to genus level or group level (e.g. *Myotis, Myotis/Plecotus* and *Nyctalus/Eptesicus*) (Russ, 1999).

Wintering Bird Survey

8.3.26. An inter-tidal bird survey was undertaken at the site and wider coastal area surrounding the site. The survey covered the intertidal area within at least 500m of the site and included features of greater importance more than 1km from the site. A total of 14 survey visits were undertaken, with two visits per month between October 2019 and April 2020. Each survey visit started at high tide and ran until low tide or vice versa and covered three two hour survey periods (minimum of 6 hours surveyed during each survey visit). Survey visits were stratified to cover a wide range of conditions.

8.3.27. All waders, wildfowl and other waterbirds were recorded as well as any Schedule 1 (WCA, 1981) raptors. Any significant concentrations (20+) of gulls were also recorded.

8.3.28. Any significant disturbance events that occurred during the survey period were also recorded during the survey, as well as the reaction of the bird.

8.3.29. A range of desk-based resources were also used to inform the assessment of impacts on wintering birds. These included bird records from the Wetland Bird Survey (WeBS), the RSPB, The Morecambe Bay Disturbance and Access Management Report, and localised WeBS counts from local bird recorders.

8.3.30. The full methodology for the wintering bird survey is included within the technical report in **Appendix 8.5.**

Limitations

8.3.31. The wintering bird surveys were undertaken during the recommended seasonal window (September to March) and therefore no seasonal constraints were encountered. No limitations were encountered during the survey.

SENSITIVITY, VALUE OR IMPORTANCE

8.3.32. CIEEM EcIA guidance (CIEEM, 2018) confirms that detailed assessment of ecological features that are 'widespread, unthreatened and resilient to project impacts' is not necessary. It is therefore necessary to determine which ecological features are sufficiently important (and potentially affected by the proposed development). Decisions on relative importance consider quality, extent, rarity (including local rarity) and threats or declines of a feature. Relevant statutory and non-statutory designations, legislation and policies are taken account of, although not all populations of legally protected species show the same rarity or distribution, so contextual information is presented where relevant (for example, while great crested newts are afforded statutory protection at a European level, a small population situated within an optimal geographic location is unlikely to be of ecological value at a European level). Importance could also relate to the supportive function of the ecological feature (i.e. providing a buffer, connections or opportunities for expansion or climate change resilience of a neighbouring feature).

8.3.33. The importance of an ecological feature is identified within a defined geographical context and the scales relevant to the proposed development and its ecological features are presented in Table 8.2. These criteria provide a framework for the assessment but specific site conditions, together with information on the local and wider context, may result in different criteria being applied.

Table 8.2 Geographic Context of Important Ecological Features

Geographic Context	Criteria
International and European	Designated or proposed/candidate Special Areas for Conservation (SAC) and Special Protection Areas (SPA) (now known as National Site Network sites) and Ramsar Sites and their qualifying features, some of which may depend on land outside the designation boundaries. Candidate or proposed designations are treated as of equal value to fully designated sites. Species populations or habitat areas (such as those listed in Annex I, II or IV of the Habitats Directive (Council Directive 92/43/EEC) or Annex I of the Birds Directive (Directive 2009/147/EC) of international importance due to relative size, rarity or quality of the feature.
National	Designated or proposed Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Marine Nature Reserves (MNR) and their qualifying features, some of which may depend on land outside the designation boundaries. A viable area of ancient woodland. Species populations or habitat areas (including legally protected or NERC Section 41 (S41) species or habitats) of national importance due to relative size, rarity or quality of the feature.
County	Designated or proposed Biological Heritage Sites (BHS) and their qualifying features where they occur within the designation boundaries. 'Important' hedgerows (as described under the Hedgerows Regulations 1997) where these occur as an extensive network. Species populations or habitat areas (including legally protected or S41) or Nationally Scarce species or habitats of district or county importance due to relative size, rarity or quality of the feature. Sites should comfortably exceed BHS criteria if these exist, but not meet SSSI selection criteria.
Local	Local Nature Reserves (LNR) and unless also designated at a higher level, and other nature conservation designations (under local planning policies). Green infrastructure designations where these contribute to local landscape connectivity and/or buffer other ecological features valued at least this geographic scale. Species populations or habitat areas (including legally protected or S41 species or habitats) of local importance due to relative size or quality. Features that appreciably enrich the local ecological resource, although these may themselves be common and widespread, such as long-established hedgerows, woodlands and ponds.

CHARACTERISATION OF IMPACT

8.3.34. Although not necessary, it is good practice to describe potential impacts without and with mitigation. The proposed development may result in multiple potential impacts on an important ecological feature. The CIEEM approach requires that only those that are likely to occur and have significant impacts need be assessed, although a precautionary approach to scoping potential impacts is recommended. The following characteristics are used to describe impacts:

- Positive or negative;
- Extent;
- Magnitude;
- Duration;
- Timing;
- Frequency; and
- Reversibility.

SIGNIFICANCE CRITERIA

8.3.35. Once an impact has been characterised it is necessary to determine if the effect is 'significant'. In the context of the CIEEM approach, a significant effect is one that either 'supports or undermines biodiversity conservation objectives for 'important ecological features'. This can include impacts on the structure and function of sites and habitats or the conservation status (i.e. the extent, distribution or abundance) of habitats and species. The decision on significance is made irrespective of the geographical scale at which the ecological feature is valued; if an effect is found not to be significant at the level at which the feature has been valued, it may be significant at a more local level.

8.3.36. At this stage, to provide continuity with other Chapters, it is proposed to transpose the significance derived following CIEEM guidelines into the more traditional levels of significance seen in EIA based on the character of the remaining effects. Table 8.3 shows how this will be achieved. The traditional description of significance will be shown in brackets after the CIEEM description of significance. This is shown at the stage of residual impact assessment (Section 8.8).

Table 8.3 Transposition of Ecological Impact Significance to Traditional Terminology

Scale of Significance following the CIEEM Guidelines	Equivalent Significance using the Matrix Approach
International or national	Major (adverse or beneficial)
County or other Local Authority-wide area	Moderate (adverse or beneficial)
Local	Minor (adverse or beneficial)
Not significant	Neutral

ASSUMPTIONS/LIMITATIONS

8.3.37. The assessment is made on the best available data, based on the information that has been gathered from stakeholders, other data sources and the baseline surveys undertaken. Some limitations to the surveys were identified and have been discussed in the relevant sections above and are identified in the relevant sections of **Appendices 8.1 to 8.5**.

CONSULTATION

8.3.38. A summary of consultation which has been undertaken is included in **Table 8.4** below.

Table 8.4 Consultation

Consultee	Date and Time	Comments	Actions
Natural England	Scoping Response 3rd July 2019	Advised that the potential impact of the proposal upon features of nature conservation interest and opportunities for habitat creation/enhancement should be included within the Environmental Assessment in accordance with appropriate guidance (such as CIEEM and NPPF guidance) The ES should thoroughly assess the potential for the proposal to affect designated sites. A Habitats Regulations Assessment (Appropriate Assessment) is required. The ES should thoroughly assess impacts in locally and nationally designated sites, protected species and habitats and species of principal importance, with mitigation or compensation measures as appropriate.	The ES is carried out according to CIEEM and NPPF guidance, with all impacts on locally and nationally designated sites, protected species and habitats and species of principal importance assessed, and mitigation or compensation measures provided as appropriate. A Habitats Regulations Assessment including an Appropriate Assessment has been undertaken in consultation with Natural England and is provided at Appendix 8.7. This assesses all potential impacts on Internationally designated sites and details mitigation to reduce the impact to not significant as necessary.
Greater Manchester Ecology Unit (GMEU)	Scoping Response 20th June 2019	The scale and type of the proposed development, and the intention to attract very large numbers of visitors to the Eden Project (North), has significant potential to cause harm to the special interest of the designated sites, particularly by causing disturbance to Birds, both during the construction and the operation of the development. To enable the Council to undertake a Habitats Regulations Assessment it is essential that any potentially harmful impacts arising from the development on the nearby European sites are identified in the ES and that comprehensive mitigation proposals for any identified harmful impacts are put forward as part of the EIA Internal and external inspections of all buildings affected by the proposed development for roosting bats should be undertaken to inform the EIA. Surveys of the site for invasive plant species should also be carried out to inform the EIA The scale and type of this planned development is such that it has the potential to contribute to Net Gain. This potential should be fully explored in the EIA	A Habitats Regulations Assessment including an Appropriate Assessment has been undertaken in consultation with Natural England and is provided at Appendix 8.7. This assesses all potential impacts on Internationally designated sites and details mitigation to reduce the impact to not significant as necessary. Internal and external inspections have been undertaken at each of the buildings to be impacted and nocturnal emergence surveys have been undertaken at the buildings identified as holding bat roost potential. During the Extended Phase 1 habitat survey all locations of invasive species were identified and mapped. A Biodiversity Net Gain Assessment has been undertaken and is provided at Appendix 8.6.

Consultee	Date and Time	Comments	Actions
Lancashire Wildlife Trust	Scoping Response 4th July 2019	The principal impacts will arise from the development site's immediate proximity to the Morecambe Bay designated sites. This is most likely to take the form of bird disturbance, given the location and scale of development proposed and projected visitor numbers needing to access the site. This will need to be addressed via a Habitats Regulations Assessment (HRA) alongside the EIA The proposed terrestrial development site is of limited wildlife value but that a precautionary check is required for existing bat usage and the possible presence of Invasive Non-Native Species (INNS) that could be spread by construction works. Japanese Rose has already been identified and should be eradicated. Would expect to see significant Biodiversity Net Gain (BNG) delivered in relation to this Project.	A Habitats Regulations Assessment including an Appropriate Assessment has been undertaken in consultation with Natural England and is provided at Appendix 8.7. This assesses all potential impacts on Internationally designated sites and details mitigation to reduce the impact to not significant as necessary. Internal and external inspections have been undertaken at each of the buildings to be impacted and nocturnal emergence surveys have been undertaken at the buildings identified as holding bat roost potential. During the Extended Phase 1 habitat survey all locations of invasive species were identified and mapped. A Biodiversity Net Gain Assessment has been undertaken and is provided at Appendix 8.6.
Natural England	16th January 2020	After reviewing an interim Winter Bird Report summarising the first three months of the winter bird survey (October to December) Natural England advised to continue the surveys for the remaining winter period to ensure a full, up to date picture was obtained of what is happening around the site, as the results of the bird surveys undertaken showed different peak counts of bird species than what was identified via the desk top study data.	The winter bird survey was continued throughout the winter period up until April 2020.
Lancaster City Council, Natural England, Environment Agency and Greater Manchester Ecology Unit	15th June 2021 10am	Discussion of EIA scope, confirming that baseline surveys from 2019, as refreshed in 2021 remain valid. Discussion of detailed scope of HRA and the range of impacts and pathways to be considered. Agreement that all matters included in the ES Scoping Report remained valid for assessment in this EIA. Noted that the issue of "diffuse recreational pressure" on the Morecambe Bay protected sites arising from overnight visitor stays should be considered in HRA and (if relevant) EIA. Request for information on "Biodiversity Net Gain" arising from the landscape scheme	TEP to provide draft HRA documents to Natural England prior to application, in order to obtain early comment on any matters of concern and/or additional mitigation requirements. TEP to consider "diffuse recreational pressure" in EIA. This was not previously scoped in. TEP to provide a Biodiversity Net Gain assessment as part of the planning submission.

8.3.39. Following the consultation meeting of 15th June 2021, TEP provided a “skeleton” Habitats Regulation Assessment to Natural England and subsequently provided further drafts in response to Natural England’s observations.

8.3.40. Key issues raised by Natural England relating to diffuse recreational pressure are included in the operational impact assessment at section 8.5 below.

8.4. BASELINE CONDITIONS

DESIGNATED SITES

8.4.1. The technical report for the DBA is included in **Appendix 8.1**. Records relating to wintering birds and birds using the intertidal area are provided within **Appendix 8.5**.

8.4.2. The site lies within the Impact Risk Zone for Morecambe Bay SSSI, which is located adjacent to the site and is designated for its coastal habitats and bird assemblages.

8.4.3. There are six statutory designated sites within 5km of the site and these are detailed in **Table 8.5** below. Their location is shown at **Figure 8.1**.

8.4.4. These are taken forward for assessment as important ecological features in accordance with the context outlined in **Table 8.2** above. The HRA (**Appendix 8.7**) considers sites within 20km. As the HRA concludes there would be no likely significant effect, including issues of diffuse recreational pressure, on any sites not noted in **Table 8.5** below, no sites beyond 5km distance are considered further in this Environmental Statement.

Table 8.5: Statutory designated sites within 5km of the site

Statutory Site Name	Distance from Site	Reason for Designation
Morecambe Bay SAC UK0013027	Adjacent to north of site	The largest continuous intertidal area in Britain. The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts a range of coastal habitats listed in Annex I. The site is designated under article 4(4) of the Directive (92/43/EEC) for its population of great crested newt listed in Annex II.d newts.
Morecambe Bay and Duddon Estuary SPA	Adjacent to north of site	Part of a series of west coast estuaries of outstanding importance for numerous species of passage, breeding and wintering water birds. Supports the third largest number of wintering wildfowl in Britain. The site qualifies under article 4.1 of the Directive (79/409/EEC) as it is used regularly by 1% or more of the Great Britain populations of several wintering and breeding species listed in Annex I. The site qualifies under article 4.2 of the Directive (79/409/EEC) as it is used regularly by 1% or more of the biogeographical populations of several regularly occurring migratory species (other than those listed in Annex I) and by over 20,000 waterbirds in the non-breeding season.

Statutory Site Name	Distance from Site	Reason for Designation
Morecambe Bay Ramsar UK11045	Adjacent to north of site	Ramsar criterion 4: This site is a staging area for migratory waterfowl including internationally important numbers of passage ringed plover *Charadrius hiaticula* Ramsar criterion 5: Supports assemblages of international importance for overwintering waterfowl. Ramsar criterion 6: Species/populations of passage and overwintering birds occurring at levels of international importance.
Morecambe Bay SSSI	Adjacent to north of site	Estuarine complex is of international significance for wintering wading birds and of national significance for wintering wildfowl. Provides a vital link in the chain of west coast estuaries used by migrating birds. Nine wading bird species occur at nationally important levels; oystercatcher, dunlin, knot, curlew, redshank, turnstone, bar-tailed godwit, grey plover and ringed plover; the first 6 are recorded at levels of international significance (numbers exceed 1% of the European population). Internationally important numbers of shelduck and pintail. Saltmarsh vegetation supports rare and uncommon plants including saltmarsh flat-sedge *Blysmus rufus* or slender spike-rush *Eleocharis uniglumis*. Supports very large areas of mussel *Mytilus edulis* beds. Shores support diverse terrestrial fauna including nationally scarce species of leaf beetle *Phaedon concinnus*, weevil *Trichosirocalus dawasoni* and moth *Pediasia aridella*. 94.31% is in Favourable condition, 2.40% is in Unfavourable – Recovering condition and 3.29% is in Unfavourable – Declining condition.
Heysham Moss SSSI	3.3km South	Small lowland raised bog dominated by purple moor grass *Molina caerulea* and common cottongrass *Eriophorum angustifolium*. Nationally scarce bog rosemary *Andromeda polifolia* is present. Also includes areas of species-rich grassland, birch woodland, willow scrub and poor fen. 100% in Unfavourable – Recovering condition
Lune Estuary SSSI	3.4km South East	Part of Morecambe Bay, it is a major link in the chain of estuaries along the west coast of Britain used by migrating birds. It is of international importance for the passage and wintering waterfowl it supports. Internationally important numbers of wintering oystercatcher, grey plover, turnstone knot, and pink-footed geese. Nationally important numbers of curlew, redshank and dunlin. Part of the estuary provides a protected roost for wintering pink-footed geese.

Statutory Site Name	Distance from Site	Reason for Designation
		Mudflats are rich in invertebrates and provide extensive feeding grounds for waders, especially the shelduck which depend on the intertidal zone almost entirely for their diet of invertebrates. Significant breeding bird communities of the saltmarsh, in particular a nationally important common tern colony on Colloway Marsh. Sands support two nationally scarce plants, the sand leek *Allium scorodoprasum* and the sea radish *Raphanus maritimus*. 100.00% in Favourable condition.

8.4.5. There is one non-statutory designated site within 2km of the site (see **Table 8.6**). Its location is shown at **Figure 8.2**. This is taken forward for assessment as an important ecological feature in accordance with the context outlined in Table 8.2 above.

Table 8.6: Non-statutory designated sites within 2km of the site

No-Statutory Site Name	Distance from Site	Reason for Designation
Oxcliffe Road Lake Biological Heritage Site (BHS) 46SW06	1.8km south east	Marginal vegetation includes Greater Spearwort, Greater Bird's-foot-trefoil, Yellow Iris, Common Spike-rush, Common Bistort, Branched Bur-Reed, Bulrush and Water Mint. Spiked Water-milfoil, Water Horsetail and Broad-Leaved Pondweed occur in the open water. Fringed Water-Lily and Galingale are established. The Common Darter dragonfly has been recorded.

8.4.6. The technical report for the Phase 1 habitat survey is included in **Appendix 8.2** which includes the Phase 1 habitat map for the site (also at **Figure 8.3**).

8.4.7. The following habitat types are present within, or adjoining, the site.

- Modified neutral grassland (0.26ha);
- Amenity grassland (1.66ha);
- Introduced shrub scrub (0.14ha);
- Ephemeral/short perennial (0.03ha);
- Hardstanding (2.41ha);
- Buildings (0.02ha);
- Flowerbeds (0.06ha); and
- Broad-leaved and coniferous trees (12 individual trees and 7 groups of trees).

8.4.8. The Arboricultural Impact Assessment (**Appendix 8.3**) identifies a number of hedgerows within the site, however these features are classified as “introduced shrub” under phase 1 habitat survey guidelines due to the proportions of introduced species present.

8.4.9. In line with CIEEM (2018) EcIA guidance detailed assessment of ecological features that are ‘widespread, unthreatened and resilient to project impacts’ is not necessary. All of the habitats within the site fall into this category. While some habitats provide shelter and/or foraging for faunal species, to reduce repetition, any impacts on fauna as a result of habitat loss, degradation or fragmentation within the proposed development are described in the relevant faunal section.

8.4.10. The landscape scheme for the proposed development will include species mixes which are similar to coastal priority habitats, with the intention of increasing the botanical and invertebrate value of the site, whilst demonstrating to visitors the dynamic nature of coastal ecosystems. The proposals will result in an increase in tree quality, distribution and species range of trees present (**Appendix 8.3**). Measures, detailed within **Appendix 8.3** will be implemented to ensure that retained trees are protected.

8.4.11. The remediation of the site will include removal of existing invasive species.

8.4.12. Thus whilst loss of existing habitat is not a significant adverse effect, habitat creation has the potential to be a significant beneficial effect. This is assessed under Construction Impacts at section 8.5. A Biodiversity Net Gain report (**Appendix 8.6**) provides more information on the quantification of increased habitat value.

8.4.13. Whilst the location of the contractors compound is yet to be confirmed, one potential option being explored is for the siting of an off-site compound location located inland of the site to the east of Marine Road West comprises a small area of ground with abundant short perennial vegetation and scattered scrub. There are no priority habitats present within this area. The exact contractors compound will be clarified following the construction tender phase and captured as part of a planning condition requiring the submission and approval of a Construction Environmental Management Plan (and any associated planning permission, if required).

FAUNA

Bats

8.4.14. One building within the site (Building B1 within the south of the site) was found to have moderate suitability for summer roosts of low numbers of common species. One building within the western edge of the site (B3) was found to hold low roosting potential for bats and the other building within the site (B2) was found to have negligible suitability for roosting bats due to a lack of potential roost features. No bat roosts were identified during the daytime inspections or nocturnal emergence surveys. There are no trees with suitability for bat roosting within the site. Given the low number of bat passes during these surveys it is not anticipated any roosts of high conservation concern are present within immediately adjacent land. Bats are therefore not taken forward for further assessment.

Breeding Birds

8.4.15. Breeding birds on the site were recorded during the Extended Phase 1 habitat survey visits undertaken in May 2019 and June 2021. Species recorded included the Bird of Conservation Concern species dunnock and house sparrow. Apart from the introduced shrub near to the Midland Hotel and the small numbers of individual trees and tree groups, the site holds very little nesting habitat for birds, and low numbers of birds were recorded. No observations were made of any birds potentially breeding on the adjacent coastline, or within influencing distance of the site.

8.4.16. Potential for indirect impacts associated with the adjacent protected sites which are partly designated for breeding birds are considered further, under impacts on internationally and nationally designated sites. They are also considered in detail within the HRA (**Appendix 8.7**).

Wintering Birds

8.4.17. The site itself does not support any significant numbers of wintering birds. However, the adjacent intertidal habitats are internationally and nationally designated for the wintering bird populations they support and large numbers of wintering birds associated with these protected sites (Morecambe Bay and Duddon Estuary SPA, Morecambe Bay Ramsar and Morecambe Bay SSSI) were recorded during the 2019-2020 winter bird surveys.

8.4.18. Moderate numbers of wader species occasionally roosted on the flood defence structure directly adjacent to the north east of the site at high tide. This included a peak count of 112 turnstone, 320 oystercatcher and 54 redshank. Only low numbers of waders and wildfowl were regularly recorded to use habitat within 250 m of the site, although larger numbers of birds were occasionally flushed into this area through disturbance activities, including 7,200 knot and 920 oystercatcher on one occasion. In the wider area, large groups of feeding and roosting knot were recorded, including peak counts of 7,227 knot in December 2019 and 2,058 oystercatcher in November 2019. Large numbers of roosting waders were consistently recorded at the Regent Road Breakwater and the Battery Breakwater between 700m and 1.2km south west of the site. The locations of important feeding and roosting areas for birds are illustrated at **Figure 8.4** and the survey compartments are shown at **Figure 8.5**.

8.4.19. All potential impacts on wintering birds associated with the nearby internationally designated sites are assessed in detail within the HRA (**Appendix 8.7**). Wintering birds are therefore taken through for further assessment here, with reference given to the HRA as necessary. Impacts on wintering birds potentially associated with other nationally or locally designated sites are also assessed.

8.4.20. The potential off-site compound location located inland of the site to the east of Marine Road West comprises a small area of ground approximately 125m x 175m with abundant short perennial vegetation and scattered scrub. Due to the size of this area, the overlooked nature and the lack of open sightlines present, this area would not be suitable for usage by bird species associated with the SPA, Ramsar or SSSI or by other significant aggregations of wintering birds.

8.5. IDENTIFICATION AND VALUATION OF KEY IMPACTS (CONSTRUCTION AND OPERATIONAL)

8.5.1. The following sections quantify and characterise the potential effects of the proposed development on important ecological features during both the construction and operational phases, with the assumption that embedded mitigation is implemented but in the absence of any additional mitigation measures. The development will be phased but it is not anticipated that the phasing will have any additional implications on ecology beyond those outlined below.

8.5.2. Within this section "the site" refers to land that falls within the application boundaries identified in the Site Location Plan (**Figure1.1**).

EMBEDDED AND PRIMARY MITIGATION

8.5.3. The design process has been iterative throughout. Information derived from ecological surveys and the consultation process has been used, alongside other environmental survey data, to inform the proposals. The final layout, construction design and working methods avoid or (where this is not possible) will minimise effects on important ecological features, including designated wildlife sites, priority habitats and habitats associated with protected species.

8.5.4. In addition to the above design considerations to deliver avoidance measures, a range of measures will be implemented during works to ensure legal and policy compliance and to accord with industry standards and best practice. These measures will be detailed within a Construction Environment Management Plan (CEMP).

8.5.5. The landscape works within the site will provide a range of habitats characteristic of coastal and protected habitats in the wider area. The landscape proposals have been designed to encourage a range of wildlife including birds and invertebrates.

8.5.6. The Eden Project has charitable objectives as an education charity which include a duty to educate people on the environment. For example, Eden is part of a new project called "The Bay: A Blueprint for recovery" which is a partnership between Eden and the Lancashire and Cumbria Wildlife Trusts and will help people connect to and understand the natural marine environment of Morecambe Bay. With a focus on training, Eden Project will lead the traineeships, building links with education establishments and academia and through the Morecambe Bay Curriculum.

8.5.7. The Project's educational mission is to raise awareness of the ecological importance of Morecambe Bay, in partnership with existing nature conservation organisations. Part of the Project's work will be to inform and educate visitors about how their daily lives and activities can benefit nature, including advice on protecting the Bay from pollution and disturbance. This responds to the potential for the increased number of visitors to cause pressure on sensitive areas of the Bay through trampling or disturbance.

CONSTRUCTION

8.5.8. The key activities which will have a potential effect on the ecological features of the site and local vicinity include site clearance, building demolition, bulk earthworks, site levelling, construction of access roads and houses, lighting and landscaping works.

8.5.9. Construction impacts that could lead to potential indirect effects on ecological features such as contamination, dust, vibration and noise are discussed in detail in Chapters 10, 11, 12 and 13.

8.5.10. Potential effects likely to arise during the construction phase will include, but may not be limited to:

- Loss of and/or degradation of designated nature conservation sites and the species they support;
- Killing or injuring of protected species; and
- Disturbance and/or displacement of protected species or those of conservation concern, due to loss of habitat, noise, vibration, light and physical activity.

8.5.11. A detailed narrative of the proposed construction works that could lead to impacts on nearby protected sites is provided within the HRA (**Appendix 8.7**).

8.5.12. The site is predicted to be built over approximately a two-year period, with the development proposed to open in 2024. Working hours are predicted to be 7am to 6pm Monday to Friday and 8am to 4pm on Saturday. Enabling works would be undertaken over a 16-week period, including a 3 week mobilisation period. The main build part of the construction works is predicted to take 110 weeks.

8.5.13. Enabling works would include erecting hoardings, establishing pedestrian diversions, preparation of the main site office, messing and welfare facilities, demolition of a few small buildings and structures across the site, service diversions and earthworks, tree and shrub removal, site strip, levelling and preparation of piling platforms. The perimeter of the construction site will be surrounded by 2.4m hoarding for the duration of the construction period.

8.5.14. A range of measures will be included within the CEMP to reduce any potential air quality impacts. These include on site wheel washing, restrictions on unmade roads, agreements of construction traffic routes, restrictions on stockpile size, targeted road sweeping, minimisation of evaporative emissions, prohibition of intentional on-site fires, control of construction equipment emissions, use of dust suppression devices and dust/particulate monitoring.

8.5.15. Soil and materials will be stored towards the site perimeter within the eastern and western edges of the site. Fuel bowsers stored on site will be double bunded with drip trays. Gases, such as LPG may be required and if so these will be stored within the compound in secure cages. There will also be a hazardous waste quarantine area and hazardous waste skips.

8.5.16. All materials will be re-used on site with the exception of trees, shrubbery, surface materials that cannot be re-used and contaminated materials not suitable for re-use. These will be taken to local tips or recycling centres.

8.5.17. The main contractor will arrange for an electric supply for on-site temporary facilities to be made available as soon as practical from the commencement of the construction stage. There may be a short period of less than 2 months where generators may be required to be operational for 24/7 to service security facilities and emergency lighting until temporary services have been installed and commissioned.

Noise parameters on construction

8.5.18. During construction, mobile task lighting shall be used to illuminate areas under construction during the hours of darkness. Directional luminaires will be used to limit unwanted light spill. These will be directed away from sensitive ecological receptors. Construction site lighting outside normal working hours will be restricted to the minimum required for safety and security.

Morecambe Bay Special Area of Conservation (SAC)

8.5.19. Morecambe Bay SAC is a feature of International Value which lies directly adjacent to the site. A Construction Environmental Management Plan (CEMP) will be implemented to avoid any incidental spills into Morecambe Bay and to avoid dust impacts on nearby habitats. Due to the habitats present within the SAC within 500m of the site (predominantly sand and silt) no direct or indirect impacts resulting from dust, vibration, noise, lighting or waterborne pollution are anticipated on this designation. There is no suitable habitat for great crested newt within the site or within influencing distance of the site. Therefore, there will be no impact on this designated site.

Morecambe Bay and Duddon Estuary Special Protection Area (SPA)

8.5.20. Morecambe Bay and Duddon Estuary SPA is a feature of International Value which lies directly adjacent to the site. A detailed assessment of potential impacts of the project on the SPA is provided within the HRA (**Appendix 8.7**).

8.5.21. Due to the measures to be put in place as part of the CEMP, no impacts resulting from vibration or pollution are anticipated on this designation. Directional luminaires will be used to limit unwanted light spill and any lighting will be directed away from sensitive ecological receptors. There will therefore be no impacts from lighting on this designation.

8.5.22. Noise impacts on the SPA are assessed in detail within Section 4 of the HRA (**Appendix 8.7**). During the construction phase there is potential for noise and visual disturbance impacts to occur on bird species which are qualifying features of the SPA. Locations near to the site which have been recorded to be used by significant numbers of birds associated with the SPA include the flood defence structure to the north east of the site and the area to the west of the Stone Jetty, west of the site, although this location was only used on one occasion by a large group of knot and oystercatcher as a result of wider disturbance. Significant numbers of turnstone were recorded to occasionally use the Bubbles Breakwater - the flood defence structure directly to the north east of the site. Turnstone are an extremely tolerant species of both visual and noise disturbance and habituate rapidly. Oystercatcher are relatively tolerant of noise and visual disturbance, however knot are more sensitive to noise disturbance (Cutts et al., 2013).

8.5.23. Due to existing high levels of visual disturbance at this area of Morecambe Bay from people, dogs and vehicles using the car parks and roads along the seafront, and the known high levels of habituation of birds using this area (Liley et al. 2015) it is highly unlikely that there will be any visual disturbance of birds from construction works.

8.5.24. Activities which could generate high levels of noise include construction vehicle movements and usage of machinery. Piling works will be required, however these will use the Continuous Flight Auger (CFA) method which generates relatively low levels of noise (80dB at 10m). Hoarding of 2.4m height will be erected for environmental health purposes around the site perimeter which will reduce noise levels at the SPA.

8.5.25. The noise assessment (**ES Chapter 12**) determined that the only part of the Bubbles Breakwater (Area A8, **Figure 8.4**) that could have an average noise level increase of 3dBA or more above the current baseline would be the north western tip. Average noise levels (LAeq) immediately to the west of the jetty would also increase by 3dBA or more above the baseline. This would still remain below 50dBA and would therefore be unlikely to result in a disturbance response from birds. Peak noise levels (LAmax) of construction works are predicted to reach up to 60dBA at the nearby locations that SPA birds use, however this is substantially below the peak noise levels currently found in these locations and therefore birds are likely to be habituated to high noise levels and less likely to respond. It is unlikely therefore that noise generated by the construction works would significantly impact non-breeding birds during normal weather conditions.

8.5.26. However, during periods of prolonged cold weather birds become more susceptible to physiological effects of disturbance due to limited food availability and energy reserves. Noise disturbance during prolonged cold periods could therefore result in a temporary negative significant impact to an international level feature.

8.5.27. The only bird species that breed within an influencing distance of the site are herring gull and lesser black-backed gull. These species nest on buildings along Morecambe Seafront, are of very low sensitivity to noise and visual disturbance and will not be affected by the works.

8.5.28. Therefore, in the absence of mitigation, there is the potential during prolonged cold weather, for a **significant adverse effect at International level.** Construction would result in a short-term negative temporary effect. This would be a Significant Adverse impact, reversing over the medium term to become a Non-Significant impact. In response, mitigation measures have been developed to avoid this significant adverse effect. These are described at sections 8.5.3 and 8.7.

Morecambe Bay Ramsar

8.5.29. Morecambe Bay Ramsar is a feature of International Value which lies directly adjacent to the site. A detailed assessment of potential impacts of the project on the SPA is provided within the HRA (**Appendix 8.7**). The features of Morecambe Bay Ramsar that could be affected by the proposed development are the same as those assessed above for Morecambe Bay and Duddon Estuary SPA.

8.5.30. Therefore, due to the potential for noise disturbance to occur to wintering birds during periods of prolonged cold weather, there is the potential for a **significant adverse effect at International level.** Construction would result in a short-term negative temporary effect. This would be a Significant Adverse impact, reversing over the medium term to become a Non-Significant impact. In response, mitigation measures have been developed to avoid this significant adverse effect. These are described at sections 8.5.3 and 8.7.

Morecambe Bay SSSI

8.5.31. Morecambe Bay SSSI is a feature of National Value which lies directly adjacent to the site. The important wintering bird populations for which this site is designated form part of the internationally important bird populations for which the SPA and Ramsar are designated. Potential impacts on the wintering birds associated with the SSSI are therefore assessed under the SPA and Ramsar assessment, further details of which are provided within the HRA (**Appendix 8.7**).

8.5.32. None of the breeding bird species for which the SSSI is designated (oystercatcher, ringed plover, lapwing, dunlin, curlew, redshank, shelduck, snipe, black-headed gull, wheatear, reed bunting, common tern, sedge warbler and linnet) nest within influencing distance of the site and there will be no impact on these nesting species during the construction period.

8.5.33. There is no suitable habitat for invertebrate species associated with the SSSI within influencing distance of the site and there will be no impact these species.

8.5.34. Therefore, due to the potential for noise disturbance to occur to wintering birds during periods of prolonged cold weather, there is the potential for a **significant adverse effect at national level**. Construction would result in a short-term negative temporary effect. This would be a Significant Adverse impact, reversing over the medium term to become a Non-Significant impact. In response, mitigation measures have been developed to avoid this significant adverse effect. These are described at sections 8.5.3 and 8.7.

Heysham Moss SSSI

8.5.35. Heysham Moss SSSI is a feature of National Value. Due to the distance of Heysham Moss SSSI from the site (3.3km), and its separation from the site by urban development, no direct or indirect impacts resulting from vibration, noise, lighting or pollution are anticipated on this designation, nor on the lowland raised bog, species rich grassland and woodland habitats for which it is designated, during the construction phase of the development. Therefore, there will be no impact on this designated site.

Lune Estuary SSSI

8.5.36. Lune Estuary SSSI is a feature of National Value. Due to the distance of Lune Estuary SSSI from the site (3.4km), no direct or indirect impacts resulting from vibration, noise, lighting or pollution are anticipated on this designation during the construction phase of the development.

8.5.37. However, Lune Estuary SSSI forms part of Morecambe Bay and Duddon Estuary SPA and Morecambe Bay Ramsar. The important wintering bird populations for which this site is designated form part of the internationally important bird populations for which the SPA and Ramsar are designated. Potential impacts on the birds associated with the SSSI are therefore assessed under the SPA and Ramsar assessment, further details of which are provided within the HRA (**Appendix 8.7**).

8.5.38. Therefore, due to the potential for noise disturbance to occur to wintering birds during periods of prolonged cold weather, there is the potential for a **significant adverse effect at national level.** Construction would result in a short-term negative temporary effect. This would be a Significant Adverse impact, reversing over the medium term to become a Non-Significant impact. In response, mitigation measures have been developed to avoid this significant adverse effect. These are described at sections 8.5.3 and 8.7.

Oxcliffe Road Lake BHS

8.5.39. Oxcliffe Road Lake BHS is a feature of County Value. Due to the distance of Oxcliffe Road Lake BHS from the site (1.8km), and its separation from the site by urban development, no direct or indirect impacts resulting from vibration, noise, lighting or pollution are anticipated on this designation, nor on the aquatic habitats and species for which it is designated, during the construction phase of the development. Therefore, there will be no impact on this designated site.

Habitats

8.5.40. Habitats currently present within the site are of low intrinsic value, with no priority habitats present. The proposed landscaping for the development will provide a range of habitats characteristic of priority habitats associated with protected landscapes within the wider Lancashire and Cumbria area. Although each individual habitat type created is likely to be fairly small in area, the overall proposed landscaping will enhance the available habitat for a range of invertebrate and bird species throughout the site. The proposals will result in an increase in tree quality, distribution and species range of trees present (**Appendix 8.3**). All invasive species (Japanese rose) present within the site will be eradicated as part of the construction works. The Biodiversity Net Gain Assessment (**Appendix 8.6**) determined that the proposals would result in a substantial increase in biodiversity at the site (41% increase).

8.5.41. Habitats is a feature of Less than Local Value. Construction will result in a short-term negative temporary effect reversing over the long term to become a permanent beneficial impact. This impact will be not significant.

Breeding Birds

8.5.42. Breeding birds at the site are a feature of Less than Local Value. The three buildings to be demolished, along with trees and patches of scrub and introduced shrub which will be lost within the proposals may result in the loss of breeding bird habitat from the site as well as loss of foraging opportunities. Direct impacts may include the disturbance or destruction of active nests, if present. Indirect impacts such as lighting on retained habitats may also impact any nesting birds present within influencing distance of the proposed development. Therefore, there is the potential for a significant adverse effect at Less than Local level (minor adverse) on breeding birds during construction in the short term due to impacts to nests and temporary loss of nesting habitat. As habitats within the landscaped areas mature in the medium to long term, including wetland, scrub and various coastal habitats, there is likely to be an increase in the nesting habitat available within the site for birds.

8.5.43. Breeding Birds is a feature of Less than Local Value. Construction will result in short-term negative permanent effect, reversing over the medium to long term to become a Beneficial impact. This impact will be not significant.

Wintering Birds

8.5.44. Low numbers of birds which are not qualifying features of the above protected sites were recorded within 500m of the site during winter bird surveys. These include species such as grey heron, greater black-backed gull and mute swan (**Appendix 8.5**). None of these bird species were recorded in important numbers. There could be some occasional minor displacement of very low numbers of grey heron and mute swan during construction works, however due to the low numbers of birds involved of low conservation value this impact will not be significant.

Summary

8.5.45. In summary, the only aspect of the construction that could result in a significant adverse effect, in the absence of additional mitigation, is the carrying out of high disturbance activity during cold winter weather.

OPERATION

8.5.46. The key activities which could have a potential effect on the ecological resource of the site and vicinity during operation of the site include lighting of the buildings and landscaped areas, events causing noise and visual disturbance, visitors carrying out recreational activities on locations near to the site, the landscape strategy and traffic movements.

Potential effects likely to arise during the operational phase will include, but may not be limited to:

- Operation of a new lighting regime across the site;
- Bird-strike arising from building heights and glazing;
- Movement of vehicles into, around and out of the site;
- Noise and disturbance associated with events;
- Movement of visitors into, around and out of the site including public open space areas;
- Recreational pressure impacts on nearby designated sites and birds through attracting increased numbers of visitors and dogs to the wider area;
- Maintenance of landscaped areas;
- Pollution of surface waters and litter generated from operation of the site; and
- Air quality impacts associated with vehicle movements.

8.5.47. Prior to making a receptor-specific impact assessment, the following paragraphs describe the relevant characteristics of the development and its operation.

8.5.48. The water and beach will be maintained as a dark corridor (illustrated within HRA (**Appendix 8.7**)). Illumination of external circulation routes directly adjacent the bay shall generally be addressed at low level and light distribution directed towards landside. The external lighting shall not exceed more than 0.5lux above the existing lighting levels present on the water (includes all adjacent SPA, Ramsar and SAC habitat). The lighting design will be further developed and implemented in accordance with statutory requirements. The emission of direct light into the night sky and water are to be mitigated and any undue spill light onto areas adjacent the proposed development's red line boundary will be avoided.

8.5.49. The four main buildings within the site will be a maximum height of 37.3m AOD. The proposals are for four shell-like structures to be created within the site, each being built using a latticed timber frame gridshell which will support a flexible membrane cladding. The membrane will be made out of ETFE (the same material used at the Eden Project Cornwall), however different transparencies will be applied to different parts of the structures, with transparency ranging from opaque (10% transmittance), to translucent (60% transmittance) to transparent (95% transmittance). The majority of the structures will be either opaque or translucent. The examples of proposed transparency variance is detailed within the Design & Access Statement.

8.5.50. The maximum core hours of operation for the main site will be 09:00 – 21:00, with the maximum hours of operation of the main site extending to 00:00 hours during the summer time.

8.5.51. The outdoor arena will have a maximum 6,000 person capacity to host late evening events between 18:00 and 00:00, with music finishing at 23:00. There will be a maximum of 8 concerts per year, all of which will take place during the summer season.

8.5.52. The stage for the events will be located within the south east of the site, with the speakers pointed out into the bay. Noise levels generated by the events are predicted to be greatest in a north-easterly oriented cone shape from the stage, with noise levels in this direct line of sight of the speakers (northeast of the speakers) predicted to be between 55 and 60dBA (LAeq) at 1km, falling below 55dBA further than this.

8.5.53. There will be a maximum visitor numbers of 1 million per annum with an estimated average of 760,000 per annum. There will be timed ticketing to control visitor flows. The proposed development has been designed to accommodate a maximum of 4,000 visitors per day. Feasibility studies indicate an estimated average of 100 days per annum of up to 3,750 visitors; 200 days per annum of up to 2,000 visitors; and 60 days per annum of up to 1,000 visitors. There will be a maximum of 500 visitors per hour accessing the site. Further details of predicted visitor numbers during the year, including predicted duration and location of stay of visitors and predictions regarding future dog usage of the proposals and wider area are provided within the HRA (**Appendix 8.7**).

8.5.54. The landscape strategy within the site will provide a range of habitats characteristic of coastal and protected habitats in the wider area. The landscape proposals have been designed to encourage a range of wildlife including birds and invertebrates.

8.5.55. An allowable discharge rate for sewerage has been agreed with United Utilities for the proposed development (United Utilities, 2020). SuDS will be implemented throughout the site and will adhere to the guidance provided within the CIRIA SuDS Manual. Surface water will be discharged either through existing soakaways located within the rock armour, or through a new connection into an existing culvert. A betterment of the existing flow will be achieved.

Morecambe Bay Special Area of Conservation

8.5.56. Morecambe Bay SAC is a feature of International Value which lies directly adjacent to the site. A detailed assessment of potential operational impacts of the project on the SAC is provided within the HRA (**Appendix 8.7**).

8.5.57. United Utilities has confirmed an allowable discharge rate for the foul water, and that the water treatment infrastructure has capacity to deal with the additional waste associated with the proposals (United Utilities, 2020). There will therefore be no pollution impacts associated with the proposals. It is not predicted that there will be any significant impacts to habitats associated with the SAC as a result of recreational pressure. The only surface water runoff will be from landscaped and roof areas. SuDS will be implemented throughout the site; these will provide some pollution mitigation as set out in the CIRIA SuDS Manual (Woods Ballard et al., 2015). An improved water quality of surface water runoff will be achieved compared to the current situation (Drainage Strategy Report).

8.5.58. The Air Quality Assessment (**ES Chapter 13**) identified a number of locations within 30m of the A525 road along Morecambe Promenade where potentially significant increases in NOx, ammonia and nitrogen deposition could occur (1% criterion exceeded) due to increases in road traffic as a result of the proposals. None of the habitats present at these locations align to those identified by APIS (UK Air Pollution System) for the designated site as being susceptible to nitrogen. In addition, in most cases, nitrogen inputs at marine habitats are likely to be miniscule compared from input from marine and riverine systems and even if it were possible to remove all nitrogen inputs from the atmosphere it may have a negligible effect on nitrogen inputs into marine systems relative to those inputs from other sources (CIEEM, 2021). In addition tidal flushing is much more likely to influence the botanical composition compared to atmospheric nitrogen.

8.5.59. Litter bins to allow source segregation into at least 3 streams (residual, mixed recyclables and organic waste) will be provided across the site (Waste Management Strategy, ES Chapter 3) and the proposed development will educate visitors on the value of the natural environment and the harm that litter can cause within the marine environment. It is therefore considered highly unlikely that littering will increase within the protected site. Therefore, there will be no impact on this designated site.

8.5.60. There will therefore be no pollution impacts associated with the proposals. It is not predicted that there will be any significant impacts to habitats associated with the SAC as a result of recreational pressure.

Morecambe Bay and Duddon Estuary Special Protection Area (SPA)

8.5.61. Morecambe Bay and Duddon Estuary SPA is a feature of International Value which lies directly adjacent to the site. A detailed assessment of potential impacts of the project on the SPA is provided within the HRA (**Appendix 8.7**).

8.5.62. Breeding species associated with the Morecambe Bay and Duddon Estuary SPA and the Morecambe Bay Ramsar include herring gull, lesser black-backed gull, little tern, common tern and sandwich tern. Tern species rarely use the area of Morecambe Bay along Morecambe seafront for foraging, with no terns recorded during WeBS counts within either of the two sectors that cover this area. There is no suitable nesting habitat for any of the breeding qualifying species along the shore or intertidal area along Morecambe seafront.

8.5.63. Herring gull and lesser black backed gull are known to nest on the roofs of buildings within Morecambe (observed during ecology survey work carried out for proposed development). The stage associated with the events will be located within the south east of the site and the speakers will face north east. The speaker location and orientation has been designed to minimise noise disturbance to residents of Morecambe and will also therefore only result in minimal increases in noise at any locations where herring gull and lesser black-backed gull nest. In addition, these gull species are extremely tolerant of disturbance, including noise and no disturbance response would be expected to the events. The gull nesting locations are already in busy urban locations and no visual impacts would be predicted.

8.5.64. Bird lighting impacts on the SPA are assessed within Section 4.0 of the HRA (**Appendix 8.7**). During the operational phase, light emissions could arise from events and festivals, and light spillage could occur from buildings. Due to the measures that will be put in place through the lighting strategy, that include mitigating emission of direct light into the night sky and water, preventing any undue spill light onto areas adjacent the proposed development's red line boundary, and maintaining the beach and water as a dark corridor, with external lighting not exceeding 0.5lux above the existing lighting in these locations, there will be no impact on bird feeding grounds associated with the SPA as a result of lighting. Due to the development being located in Morecambe, which is a busy seaside town, any migrating bird populations using this area are already highly likely to be acclimatised to urban glow and there will not be any impacts on migration flyways.

8.5.65. Bird collision impacts on the SPA are assessed within Section 4.0 of the HRA (**Appendix 8.7**). Bird collision risk is typically associated with tall and glazed buildings with high transparency and/or reflectivity. Modern buildings, particularly where there is a predominance of glass, can and often do represent significant barriers to bird movement. Collisions or bird strike have been attributed to the inability of bird species to detect and avoid glass, and the associated 'beacon' effect of increased artificial lighting at night, whereby flocks or individual birds can become disorientated by well-lit buildings.

8.5.66. The proposals are for four shell-like structures to be created within the site; each being built using a latticed timber frame gridshell which will support a flexible membrane cladding. The membrane will be made out of ETFE with different transparencies applied to different parts of the structures, ranging from opaque to transparent. The majority of the structures will be either opaque or translucent. In the smaller areas where the materials are transparent the timber cladding would provide visual clues to birds, making collision less likely. In addition, the habitats contained within the structures would not provide attractive habitats to waders and wildfowl associated with coastal habitats and would therefore not attract Morecambe Bay SPA/Ramsar species. Due to the shape of the cladding, i.e. multiple cushions, with a curved (bulging) surface it is unlikely that the cladding material would provide reflections of the surrounding sky or adjacent habitats that could confuse birds into colliding with the structures. The surrounding timber frames surrounding each of the cushions would be likely to increase the visibility to birds further. There will therefore be no collision risk impacts on birds.

8.5.67. Recreational pressure impacts on the SPA are assessed within Section 4.0 of the HRA (**Appendix 8.7**). Morecambe seafront, where the proposed development is located, is known to be the most disturbed location of the Morecambe Bay protected site and birds that use this location are currently highly habituated to this disturbance (Liley et al., 2015). Due to the existing natural substrate barrier to people and dogs accessing the most sensitive areas (sand/silt) recreational disturbance to these areas would be highly unlikely to increase as a result of the proposed development. In addition, the development is unlikely to result in significant increases in dog numbers due to access to the buildings being limited to guide dogs. It will also be unlikely to result in any increase in water sports along Morecambe Seafront. Recreation pressure in the wider area would only likely occur from overnight visitors that stay in the nearby area which would only likely form a small part of the overall number of visitors to the proposed development, and the majority of these visits would be outside of the winter period. Sensitive locations around Morecambe Bay are either wardened or are considered too remote to attract large numbers of additional visitors. Water sports are monitored/regulated to prevent further disturbance occurring. However, due to the large numbers of visitors that will be attracted to Morecambe Bay it is considered that without mitigation, disturbance to wintering birds could increase, resulting in a significant adverse effect on this feature of International Value.

8.5.68. Therefore, due to the potential for diffuse recreational disturbance to occur to wintering birds associated with the wider Morecambe Bay and Duddon Estuary SPA, there is the potential for a **significant adverse effect at International level**. Operation might result in a long-term negative permanent effect. This would be a long-term significant adverse impact. Mitigation for the possibility of adverse effects of greater visitor numbers has been considered as part of the Project, as expressed at paragraphs 8.5.6 and 7 above, and further details are given at section 8.7 below.

Morecambe Bay Ramsar

8.5.69. Morecambe Bay Ramsar is a feature of International Value which lies directly adjacent to the site. A detailed assessment of potential impacts of the project on the Ramsar is provided within the HRA (**Appendix 8.7).** The features of Morecambe Bay Ramsar that could be affected by the proposed development are the same as those assessed above for Morecambe Bay and Duddon Estuary SPA.

8.5.70. Therefore, due to the potential for diffuse recreational disturbance to occur to wintering birds associated with the wider Morecambe Bay Ramsar, there is the potential for a **significant adverse effect at International level**. Operation might result in a long-term negative permanent effect. This would be a long-term significant adverse impact. Mitigation for the possibility of adverse effects of greater visitor numbers has been considered as part of the Project, as expressed at paragraphs 8.5.6 and 7 above, and further details are given at section 8.7 below.

Morecambe Bay SSSI

8.5.71. Morecambe Bay SSSI is a feature of National Value which lies directly adjacent to the site. The important wintering bird populations for which this site is designated form part of the internationally important bird populations for which the SPA and Ramsar are designated. Potential impacts on the wintering birds associated with the SSSI are therefore assessed under the SPA and Ramsar assessment, further details of which are provided within the HRA (**Appendix 8.7).**

8.5.72. The nearest area of coastal marsh habitat within the SSSI potentially suitable to support any of the nesting bird species for which it is designated is 3.4km north east of the site. Due to the distance from the site this area would not be affected by noise generated by outdoor events during the summer period.

8.5.73. Surface water pollution will be controlled through SuDS which will be implemented across the site. This will include pollution mitigation as set out in the CIRIA SuDS manual and an improved water quality of surface water runoff will be achieved compared to the current situation. Therefore, there will be no water pollution impacts on the SSSI and no impacts on any invertebrate species for which the SSSI is designated.

8.5.74. The Air Quality Assessment (**ES Chapter 13**) identified a number of locations within 30m of the A525 road along Morecambe Promenade where potentially significant increases in NOx, ammonia and nitrogen deposition could occur (1% criterion exceeded) due to increases in road traffic as a result of the proposals. None of the habitats present at these locations align to those identified by APIS for the designated site as being susceptible to nitrogen. In addition, in most cases, nitrogen inputs at marine habitats are likely to be miniscule compared from input from marine and riverine systems and even if it were possible to remove all nitrogen inputs from the atmosphere it may have a negligible effect on nitrogen inputs into marine systems relative to those inputs from other sources (CIEEM, 2021). In addition tidal flushing is much more likely to influence the botanical composition compared to atmospheric nitrogen.

8.5.75. Therefore, due to the potential for diffuse recreational disturbance to occur to wintering birds associated with the wider Morecambe Bay SSSI, there is the potential for a **significant adverse effect at national level**. Operation would result in a long-term negative permanent effect. Mitigation for the possibility of adverse effects of greater visitor numbers has been considered as part of the Project, as expressed at paragraphs 8.5.6 and 7 above, and further details are given at section 8.7 below.

Heysham Moss SSSI

8.5.76. Heysham Moss SSSI is a feature of National Value. The site does not have public access and therefore there will be no recreational impacts on the site. Therefore, there will be no impact on this designated site.

Lune Estuary SSSI

8.5.77. The Lune Estuary SSSI is a feature of National Value which lies 3.4km from the site. The important wintering bird populations for which this site is designated form part of the internationally important bird populations for which the SPA and Ramsar are designated. Potential impacts on the wintering birds associated with the SSSI are therefore assessed under the SPA and Ramsar assessment, further details of which are provided within the HRA (**Appendix 8.7**).

8.5.78. Therefore, due to the potential for diffuse recreational disturbance to occur to wintering birds associated with the wider Morecambe Bay SSSI, there is the potential for a **significant adverse effect at national level (major adverse)**. Operation would result in a long-term negative permanent effect. Mitigation for the possibility of adverse effects of greater visitor numbers has been considered as part of the Project, as expressed at paragraphs 8.5.6 and 7 above, and further details are given at section 8.7 below.

Oxcliffe Road Lake BHS

8.5.79. Oxcliffe Road Lake BHS is a feature of County Value. Due to the distance of Oxcliffe Road Lake BHS from the site (1.8km), its small size and its location within a residential area to the south of Morecambe, it is highly unlikely that numbers of visitors to this location will significantly increase. Therefore, there will be no impact on this designated site.

Breeding Birds

8.5.80. Breeding Birds is a feature of Local Value. The open-air events which may occur at the site up to eight times during each summer period during the operational phase have potential to cause disturbance to bird species. However, the area of Morecambe Bay adjacent to Morecambe seafront where noise levels could significantly increase during music events is unlikely to be used as nesting habitat. The nearest area of coastal habitat that could be used by significant numbers of breeding birds is located 3.4km north east of the site and would not be affected by increased noise levels. Herring and lesser black-backed gull are known to nest on buildings within the town of Morecambe, but these would be in residential/commercial areas where noise levels caused by these events would be very low (due to speaker orientation). In addition, gulls are highly tolerant of visual and noise disturbance and would therefore not be impacted. Any birds which choose to nest within the site once operational (likely to be small passerine species) would be unlikely to be prevented from nesting due to the infrequency of the events. Therefore, there will be no impact on this feature.

Summary

8.5.81. In summary, the only aspect of the operation that could result in a significant adverse effect, in the absence of project design and mitigation, is increased diffuse recreational pressure on wintering bird roosting and feeding grounds in the wider Morecambe Bay. This issue is considered as part of the project design at section 8.5.6 and 7, with details of implementation at section 8.7.

8.6. CUMULATIVE EFFECTS

8.6.1. Cumulative effects come in two forms. The first relate to the impacts of the proposed development in conjunction with other developments in the area. These developments should be existing, consented or reasonably foreseeable in terms of delivery and should be located within a realistic geographical scope where environmental effects could combine to create a more significant effect on a particular sensitive receptor. These are hereafter referred to as cumulative effects.

8.6.2. **Table 8.7** provides a list of the developments included within the cumulative site's assessment. No overall cumulative effects are anticipated.

Table 8.7: List of the developments included within the cumulative site's assessment

Site Ref.	Application No.	Approx. Distance and Direction from site	Proposal	Scoped In / Scoped Out	Justification
1	18/00365/OUT	9.7km	Outline application for residential development comprising 213 dwellings (Use Class C3) with associated vehicular and cycle/pedestrian access to Scotland Road and cycle/ pedestrian access to Carnforth Brow/Netherbeck, public open space, creation of wetlands, construction of attenuation basins, erection of sub-station, installation of a pumping station and associated earth works and land regrading and landscaping	Scoped out	The proposals are 1.7km from the Morecambe Bay SPA/Ramsar/SAC. The winter bird survey indicated that waders and wildfowl species associated with nearby SPA and Ramsar sites were not regularly using the site. Multiple footpaths and recreational areas will encourage residents to remain within the site. The Ecological Assessment states that it is very unlikely that the proposed development will have an impact on the Morecambe Bay and Duddon Estuary SPA and Ramsar sites.
2	18/00472/FUL	7.1km	Erection of 27 dwellings (C3) with associated access	Scoped out	The proposals are 3.8km from the Morecambe Bay SPA/Ramsar/SAC. The Ecological Assessment did not identify any negative impacts on designated sites or wintering birds.
3	18/01183/FUL	9.3km	Erection of a care home building comprising of 118 bedrooms and communal, staff and services areas with associated internal road layout, car parking and landscaping, creation of a new access and construction of a new retaining wall	Scoped out	The proposals are 1.7km from the Morecambe Bay SPA/Ramsar/SAC. The Ecological Assessment concludes that there are no reasonably foreseeable negative impacts on the SPA/SAC/Ramsar site and no impacts on wintering birds are identified.

Site Ref.	Application No.	Approx. Distance and Direction from site	Proposal	Scoped In / Scoped Out	Justification
4	18/01356/CU	6.1km	Change of use of agricultural land for the siting of 26 static holiday caravans, camping area, erection of a bicycle rack, formation of mini golf course, amenity/dog walking area and associated landscaping and creation of an extension to existing internal access road.	Scoped out	The proposals are 1km from the Morecambe Bay SPA/Ramsar/SAC. The Ecological Assessment does not identify any impacts on designated sites or wintering birds.
5	19/01135/OUT	8km	Outline planning application for the demolition of Low Hill House and the erection of up to 680 dwellings (C3), a single retail unit (A1 - A5) of no more than 280sq m internal floorspace, public open spaces including equipped children's play areas, land re-grading, recreational routes, landscaping and sustainable urban drainage systems and creation of vehicular access from Bailrigg Lane and Hala Hill to the North	Scoped out	The proposals are 2.5km from the Morecambe Bay SPA/Ramsar/SAC. The Shadow Appropriate Assessment for this site stated that no qualifying features of the SPA have been recorded using on-site habitats and potential for use by high numbers of waders or waterfowl is considered to be low. Mitigation for residential impacts to the SPA/Ramsar and SAC included provision of visitor packs to new residents and a scheme design to encourage residents away from the protected sites. A CEMP, SUDS Scheme and SUDS maintenance were to be provided as mitigation to prevent any water quality impacts on protected sites. The AA concluded no adverse effect on integrity of European sites alone or in-combination.
6	19/00332/OUT	7.9km	Outline application for the erection of up to 95 residential dwellings with associated access	Scoped out	The proposals are 2km from the Morecambe Bay SPA/Ramsar/SAC The Shadow HRA and Addendum for this site did not identify any construction disturbance impacts on the protected sites. Homeowner packs will be provided to mitigate recreational

Site Ref.	Application No.	Approx. Distance and Direction from site	Proposal	Scoped In / Scoped Out	Justification
					pressure impacts. In addition the extensive provision of onsite public open space and limited connectivity to the Lune Estuary led to a conclusion of no significant increase in recreational activity and no adverse effect on integrity of European sites.
7	20/00550/FUL	6.6km	Demolition of buildings including William Thompson Tower, William Thompson Offices, Primary Curriculum Building, Estates & Secondary Centre buildings and erection of an 8, 9 and 10 storey building comprising residential student accommodation in cluster flat arrangements with ancillary laundry room, cycle store, refuse store, management office and reception, plant room and associated landscaping, access and service infrastructure	Scoped out	The proposals are 2.8km from the Morecambe Bay SPA/Ramsar/SAC. The Ecological Assessment does not identify any impacts on designated sites or wintering birds.
8	20/00554/FUL	6.6km	Demolition of buildings including Sarah Witham Thompson, Gressingham and Melling Halls, Black Box Theatre, Old Dining Room and the Long Corridor and erection of a 4 storey Extra Care residential building (use class C3), partial demolition, conversion and change of use of the Art Studio from education facility (use class D1) to ancillary space associated with the Extra Care residential building and change of use and conversion of Barbon Hall and Hornby Hall from education facility (use class D1) to provide affordable residential apartments (use	Scoped out	The proposals are 2.8km from the Morecambe Bay SPA/Ramsar/SAC. The Ecological Assessment does not identify any impacts on designated sites or wintering birds.

Site Ref.	Application No.	Approx. Distance and Direction from site	Proposal	Scoped In / Scoped Out	Justification
			class C3) with associated landscaping, parking, access and service infrastructure		
9	21/00566/FUL	7.1km	Erection of 167 dwelling houses, construction of new accesses, regrading of land, creation of open space and installation of an equipped play area and drainage infrastructure	Scoped out	The proposals are 3.8km from the Morecambe Bay SPA/Ramsar/SAC. There are no ecological assessment documents available for this application. Due to the distance and size of the development it is considered highly unlikely that there would be any cumulative impacts with this development.

8.7. MITIGATION MEASURES

8.7.1. Toolbox talks will be provided which will highlight necessary working practices needed to prevent potential visual and noise disturbance on birds throughout the winter period during construction works.

8.7.2. During the winter period best practice guidelines would be followed (in line with JNCC guidance: http://jncc.defra.gov.uk/page-2894). To avoid impacts to wintering birds when they are most sensitive to disturbance, a temporary cap will be placed on high disturbance construction activity (likely to include usage of tippers, dozers and excavators during the earthworks phase) in the event that freezing conditions occur for 7 consecutive days either;

- at 50% of national weather stations (triggering a wildfowling voluntary ban); or
- at the local Morecambe weather station.

8.7.3. The maximum period that high disturbance construction operations will be stopped will be 14 days. It is possible that this 14 day period would be reduced if either (a) the SoS national statutory ban is lifted or (b) if there are four consecutive days of thaw at Morecambe. The temporary cap on works during severe weather conditions will be detailed with in the CEMP.

8.7.4. As an essential part of the proposed development, education will be delivered to all visitors regarding the value of habitats surrounding the development for internationally important numbers of birds, as well as regarding the value of protected sites in the wider area of Morecambe Bay and Duddon Estuary. The landscape scheme within the site will focus on these habitats' characteristic of the wider area protected sites, seeking to educate visitors both on the importance and interest of these habitats and their sensitivities and fragility. The exhibits within the buildings will also build on these themes.

8.7.5. The wording of any information provided by the proposed development will ensure that visitors are not encouraged to visit sensitive areas within Morecambe Bay, and will be a highly useful and immersive method to give a very wide audience a much better understanding and give a greater value to UK coastal habitats.

8.7.6. Eden Project will distribute information to their guests about Morecambe Bay Partnership and will promote places that they can visit the natural world without causing deleterious effects.

8.7.7. Any written information provided to visitors (e.g. information boards etc) will be either written or critically reviewed by an ecologist with in-depth knowledge of the Morecambe Bay area prior to it being made public. The wording will also be shared and agreed with Natural England.

8.7.8. Throughout the life of the development, Eden Project will regularly engage with various local conservation partnerships such as the Morecambe Bay Partnership, to recognise any issues associated with the protected Morecambe Bay sites or their qualifying features and to determine how the project can help educate and raise awareness to address any issues that may arise and result in a benefit in the future. This would include determining the best approach to engage with both visitors and local people to provide the necessary education. This will provide a practical means of implementing the project's objective to avoid disturbance to the sensitive environments of Morecambe Bay and the qualifying features of its international designation.

8.8. RESIDUAL EFFECTS

8.8.1. The assessment of effects of an impact after mitigation measures have been applied is described as the residual impact. Residual impact significance is determined using the same process of characterisation as for the potential impact assessment in Section 8.5. **Table 8.8** details the anticipated residual effects of the proposed development both during the construction and the operational periods on those ecological receptors, where a significant effect was identified prior to mitigation. **Table 8.8** also includes, for the residual effect, a transposition into the standard EIA terminology, as discussed at **Table 8.3**.

Table 8.8: Summary of residual effects

Description of Effect	Potential effect including significance	Mitigation	Residual Effect including significance
Construction			
Morecambe Bay and Duddon Estuary SPA	Significant adverse effect at International level (major adverse) as a result of potential noise disturbance during extreme weather conditions	Measures to be put in place to limit potentially disturbing works during periods of prolonged cold weather. Toolbox talks to be given to contractors to limit noise disturbance.	Not significant (neutral)
Morecambe Bay Ramsar	Significant adverse effect at International level (major adverse)	Measures to be put in place to limit potentially disturbing works during	Not significant (neutral)

Description of Effect	Potential effect including significance	Mitigation	Residual Effect including significance
	as a result of potential noise disturbance during extreme weather conditions	periods of prolonged cold weather. Toolbox talks to be given to contractors to limit noise disturbance.	
Morecambe Bay SSSI	Significant adverse effect at national level (major adverse) as a result of potential noise disturbance during extreme weather conditions	Measures to be put in place to limit potentially disturbing works during periods of prolonged cold weather. Toolbox talks to be given to contractors to limit noise disturbance.	Not significant (neutral)
Lune Estuary SSSI	Significant adverse effect at national level (major adverse) as a result of potential noise disturbance during extreme weather conditions	Measures to be put in place to limit potentially disturbing works during periods of prolonged cold weather. Toolbox talks to be given to contractors to limit noise disturbance.	Not significant (neutral)
Operation			
Morecambe Bay and Duddon Estuary SPA	Significant adverse effect at International level (major adverse) due to diffuse recreational pressure impacts	Education delivered to all visitors on sensitivity/fragility of sites/birds and vulnerability to disturbance. Collaboration with local conservation groups throughout operation to ensure education is targeted appropriately and delivered optimally. Visitors not encouraged to visit sensitive areas of Morecambe Bay.	Not significant (neutral)
Morecambe Bay Ramsar	Significant adverse effect at International level (major adverse) due to diffuse recreational pressure impacts	Education delivered to all visitors on sensitivity/fragility of sites/birds and vulnerability to disturbance. Collaboration with local conservation groups throughout operation to	Not significant (neutral)

Description of Effect	Potential effect including significance	Mitigation	Residual Effect including significance
		ensure education is targeted appropriately and delivered optimally. Visitors not encouraged to visit sensitive areas of Morecambe Bay.	
Morecambe Bay SSSI	Significant adverse effect at national level (major adverse) due to diffuse recreational pressure impacts	Education delivered to all visitors on sensitivity/fragility of sites/birds and vulnerability to disturbance. Collaboration with local conservation groups throughout operation to ensure education is targeted appropriately and delivered optimally. Visitors not encouraged to visit sensitive areas of Morecambe Bay.	Not significant (neutral)
Lune Estuary SSSI	Significant adverse effect at national level (major adverse) due to diffuse recreational pressure impacts	Education delivered to all visitors on sensitivity/fragility of sites/birds and vulnerability to disturbance. Collaboration with local conservation groups throughout operation to ensure education is targeted appropriately and delivered optimally. Visitors not encouraged to visit sensitive areas of Morecambe Bay.	Not significant (neutral)

8.9. CONCLUSIONS

8.9.1. Data searches and baseline surveys identified that the development site contains habitats of low intrinsic value and does not support any protected species. The site contains small numbers of breeding birds and a few stands of the invasive species Japanese Rose. The final layout, construction design and working methods avoid or (where this is not possible) minimise effects on important ecological features, including designated wildlife sites, priority habitats and habitats associated with protected species. A range of measures will be implemented in a CEMP that will ensure legal and policy compliance and to accord to industry standards and best practice during the construction period. These measures will include protection of retained habitats, eradication of Japanese Rose from site and measures to protect nesting birds. Measures detailed within the CEMP will also prevent airborne, waterborne or light pollution impacts during construction.

8.9.2. The proposals will increase the diversity and value of habitats currently present within the site and will achieve a Biodiversity Net Gain of 41%.

8.9.3. The site lies adjacent to three internationally designated sites, two of which (Morecambe Bay and Duddon Estuary SPA and Morecambe Bay Ramsar) are designated for the internationally important numbers of bird they support. The Morecambe Bay SSSI and Lune Estuary SSSI also fall within these designations.

8.9.4. A Habitats Regulations Assessment (HRA) report has been prepared by the applicant, to consider potential effects on the above sites. This is reported at Appendix 8.7.

8.9.5. Winter bird survey and data searches identified large numbers of roosting and feeding waders in the wider area, however these rarely use areas close to the site in significant numbers. Mitigation measures will be put in place to ensure that birds associated with these protected sites are not disturbed by construction works. Mitigation measures will also be put in place to ensure that the proposals do not result in increased disturbance to birds associated with these sites during the operational period due to increases in visitor numbers to Morecambe Bay. These will include education of visitors of the sensitivity of the protected sites and the species they support.

8.9.6. The Environmental Impact Assessment concludes that after mitigation all residual impacts are reduced to neutral. The Habitats Regulations Assessment report concludes that, considering mitigation, there would be no adverse effect on the integrity of the Morecambe Bay and Duddon Estuary SPA and Morecambe Bay Ramsar.

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9

GROUND CONDITIONS AND GEOLOGY

PUBLIC

9. GROUND CONDITIONS AND GEOLOGY

9.1. INTRODUCTION

CHAPTER CONTENT

9.1.1. This chapter presents the baseline ground conditions information and the likely effects on that baseline resulting from construction and operation of the proposed development. This chapter includes relevant information relating to the water environment and reuse of materials.

9.1.2. Baseline ground conditions information is reported within the WSP (June 2020) Contaminated Land Preliminary Risk Assessment report, reference 70058633/11339. Intrusive ground investigation (GI) will be undertaken prior to commencement of development and it is anticipated that a planning condition will be imposed to that effect.

9.1.3. The following potential environmental effects should be considered in relation to ground conditions:

a) Physical effects of the development on land-form and stability;
b) Effects on geology as a future resource: for example, sterilisation of a valuable mineral resource, damage to a regionally important geological site;
c) Effects on soil as a valuable resource; for example, loss or damage to good agricultural soils.
d) Effects associated with ground contamination that may already exist on site; for example, introducing / changing migration pathways and receptors;
e) Effects associated with the potential for polluting substances used during construction / operation to cause new ground contamination; and
f) Effects associated with reuse of excavated soils or use of imported soils.

9.1.4. The local planning authority confirmed in their scoping opinion (dated 30 August 2019) that the following ground-related topics do not apply to the development site and therefore do not need to be included in the Environmental Statement:

(a) Effects on and form and stability, including sea wall structure stability (see below);
(b) Effects on mineral resources or non-statutory sites of geological importance (not applicable to site conditions); and
(c) Effects on agricultural soil quality (not applicable to site conditions).

9.1.5. In relation to (a) Effects on sea wall structure stability, the Local Planning Authority Scoping Opinion states that: '*the site includes significant areas of breakwater coastal defence features and the recently constructed sea wall, and 'the stone jetty and the breakwater rock armour are also navigation markers (so) any potential alterations to these features would also need to take account of the implications for navigation. The LPA is of the opinion that 'the effects of the development on marine navigation does not need to form a separate chapter of the ES but regard should be given to potential effects if the proposal has implications for these features'*. Given that the proposed development does not intend to alter the seal wall, stone jetty or breakwater rock armour, this item has been excluded from the assessment. Further comment is provided in Section 9.7.

9.1.6. The following elements are relevant to the site and the proposed development and are therefore covered by this chapter: (d), (e) & (f) Effects due to existing ground contamination and / or introduction of polluting substances, including re-use or import of materials within the scheme. Examples of potential effects are as follows:

- Temporary liberation of contamination that would otherwise remain inaccessible / immobile during construction (e.g. exposing asbestos in fill material, breaking old drains / pipes) creating new temporary or permanent contaminant linkages.
- Creation of permanent new contaminant migration pathways and associated contaminant linkages – e.g. new pathways for hazardous gas migration or for impacted groundwater to enter the site.
- Importing new contaminant sources, e.g. in contaminated fill materials.

9.1.7. The impacts associated with contamination may be affect the following potential receptors:

- Humans (e.g. construction workers, neighbouring site users, future site users)
- Groundwater quality
- Surface water quality (e.g. coastal waters)

9.1.8. This chapter considers the potential effects on receptors from the construction phase and operational phase of the proposed development. The proposed development will involve the activities described in italics below, with subsequent WSP comment in bullet points:

- *Demolition of existing buildings.*
  - The site largely comprises hardstanding, soft-standing and a few scattered small structures; therefore, demolition will be limited.
- *Construction of a major mixed leisure development including public realm, landscaping, car parking and associated engineering works.*
  - The buildings will be located in the central and northern areas, whilst external landscaped areas will occupy the western, eastern and southern parts of the site.
  - The final level of the proposed development is not intended to extend below the current lowest topographic point on site and will be located entirely within the current sea wall.
  - The construction compound is not yet known at this stage, though a number of potential options are being explored, including on-site and off-site locations intended to be located within the site boundary. The exact location(s) will be confirmed through the Construction Environmental Management Plan (CEMP) which will be required by planning condition.
  - The foundation design and requirement for remediation will be confirmed by intrusive GI and assessment.

9.1.9. The study area for the ground conditions chapter includes the site area and a buffer extending 250m beyond the redline boundary.

COMPETENCE OF AUTHOR

9.1.10. This chapter has been undertaken by Paula Gallagher (MSc, BSc (Hons), Chartered Scientist), who has more than 20 years of experience in the assessment / mitigation of development risks associated with contamination. The report has been technically reviewed by Dr Catriona Woods, (PhD, MSc, BSc (Hons), Chartered Scientist), who has 23 years' experience in land quality / risk assessment, including extensive experience writing and reviewing ES Chapters.

9.2. LAND CONTAMINATION ASSESSMENT LEGISLATION AND PLANNING POLICY CONTEXT

NATIONAL LEGISLATION AND GUIDANCE

Environmental Protection Act (EPA) 1990

9.2.1. Part 2A of the Environmental Protection Act (EPA) 1990 introduced a statutory regime for the identification and remediation of statutory 'Contaminated Land'. It provides a definition of statutory 'Contaminated Land' based on significant harm or the likelihood of significant harm (including risks to human health) or the pollution or likely pollution of controlled waters (all groundwater, inland waters and estuaries, excluding water perched above the zone of saturation).

9.2.2. Local authorities are the primary regulators under the Part 2A regime with a duty to identify whether the land in their area is statutory 'Contaminated Land', although provision is made for consultation and co-ordination with the Environment Agency in situations where pollution of controlled waters is an issue.

DEFRA Contaminated Land Statutory Guidance 2012

9.2.3. The principal objectives of the legislation are described in the DEFRA Contaminated Land Statutory Guidance (paragraph 1.4) (2012), as follows:

- Identify and remove unacceptable risks to human health and the environment.
- Seek to ensure that contaminated land is made suitable for its current use.
- Ensure that the burdens faced by individuals, companies and society as a whole are proportionate, manageable and compatible with the principles of sustainable development.

9.2.4. These three objectives underpin the 'suitable for use' approach to the assessment and remediation of 'land contamination'. This approach recognises that the risks presented by any given level of land contamination will vary greatly according to the use of the land and a wide range of other factors, such as the sensitivity of the underlying geology and the receptors which may be affected. The 'suitable for use' approach consists of three elements:

- Ensuring that land is suitable for its current use.
- Ensuring that land is made suitable for any new use.
- Limiting requirements for remediation to the work necessary to prevent unacceptable risks to human health or the environment in relation to the current use or future use of the land.

NATIONAL PLANNING POLICY AND GUIDANCE

National Planning Policy Framework 2021

9.2.5. Paragraph 183 of the NPPF6 (2021) states that planning policies and decisions should ensure that:

- The site is suitable for its proposed use, taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation).

[6] https://www.gov.uk/government/publications/national-planning-policy-framework--2

- After remediation, as a minimum, land should not be capable of being determined as Contaminated Land, as defined under Part 2A of the EPA 1990 (as amended).
- Adequate site investigation information, prepared by a competent person, is available to inform these assessments.

9.2.6. Paragraph 184 states that where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.

9.2.7. In addition, the UK Government's Planning Practice Guidance titled 'Land Affected by Contamination' 7(2019) provides guiding principles on how the planning process can deal with land affected by contamination. The guidance outlines the interaction of planning with other regimes, such as Part 2A, Building Regulations and the Environmental Permitting Regulations, in order to deal adequately with contamination which may limit or preclude development whilst protecting human health, property and the wider environment.

9.2.8. Improvement and betterment of land condition on brownfield sites or those affected by less harmful levels of contamination is often achieved during redevelopment of sites through the planning regime, via the application of a variety of principles outlined in a large number of guidance documents. Dealing with non-statutory land contamination via the planning regime ensures a developed site is suitable for its new use and prevents unacceptable risks from pollution during and after redevelopment.

REGIONAL / LOCAL POLICIES

Local Plan Part One: Strategic Policies and Land Allocations Development plan document (DPD) adopted July 2020

- Policy SP1: Presumption in favour of sustainable development in line with requirements of NPPF.
- Policy SP3: Development strategy for Lancaster district. Seeks to support effective use of previously developed land and regeneration in sustainable brownfield locations.
- Strategic Objective SO3: Protect and enhance the natural, historic and built environment of the district promotes utilising sustainable brownfield opportunities

Local Plan Part Two: Development Management DPD adopted July 2020.

- Policy DM22: Leisure facilities and attractions. Proposals for major leisure facilities will be permitted where the site is within town centre locations and preferably in a brownfield location.
- Policy EC5: Regeneration priority areas. Central Morecambe is identified as a Priority Area to be reinvented as a visitor destination.

OTHER MECHANISMS

9.2.9. In addition to the planning regime, other mechanisms relevant to the control of contamination in ground and groundwater include:

- Building Regulations, which require that reasonable precautions are taken to avoid risks to health and safety caused by contaminants in ground to be covered by buildings and associated ground.

[7] https://www.gov.uk/guidance/land-affected-by-contamination

- Environmental Permitting Regulations, under which an Environmental Permit from the Environment Agency is normally required to cover the treatment and/or redeposit of contaminated soils if the soils are classified as a 'waste'.

9.2.10. The relevant international and national legislation / guidance, and regional / local guidance for the management of land affected by contamination and prevention of pollution to soil and groundwater are described in Section 9.2.

9.3. ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

PURPOSE

9.3.1. The purpose of this section is to set out the methodology that will be applied in assessing the environmental effects of the proposed development on baseline conditions and to determine the level of significance of those effects. The assessment will:

- Assess the effects of the proposed development on the baseline contamination risk to sensitive receptors during construction and operation of the proposed development; and
- Review how the risks associated with contamination will change during the construction and operational phases and the significance of any changes.

METHODOLOGY FOR ASSESSING RISKS FROM CONTAMINATION

9.3.2. The principles of identifying and assessing potential risks from contamination in soil and groundwater and remediating such contamination are laid out in the Environment Agency's Land Contamination Risk Management guidance[8] (online, last update 21 April 2021). This framework is based on the principles set out in the Environment Agency's now superseded CLR11 document and is well understood in the field of land contamination risk assessment.

9.3.3. The risk assessment process outlined in LCRM underpins contaminated land risk assessment. Central to the guidance is consideration of the potential for viable contaminant linkages, through which a hazardous substance (source) may impact a sensitive receptor via a viable migration pathway. Risks can only occur where there is a viable pathway connecting a hazardous source to a sensitive receptor. A qualitative assessment of potentially complete contaminant linkages is termed a Conceptual Site Model (CSM). Preliminary CSMs are developed using desk-based information and refined as site-specific data on sources and pathways becomes available, typically following intrusive GI and risk assessment. The CSM for the proposed development presented in the baseline report was prepared using desk-based information as the development-specific GI has not been completed at the time of writing.

ASSESSMENT OF EFFECTS AND DEFINING SIGNIFICANCE

9.3.4. Assessing the effects of the proposed development is completed in two stages. First, the risks are assessed for a baseline scenario, assuming the site remains in its current state. The risk assessment is then completed for the construction and operational phases, with changes to the baseline risks identified. Further details on the process are provided below.

Stage 1 – Risk Assessment Process

9.3.5. Potential risks associated with ground contamination are assessed as follows

[8] https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm

- **Preliminary Conceptual Site Model (PCSM)**. The PCSM for the proposed development is included in the baseline report, prepared from a desk-based study. As described earlier, it is an assessment of potentially viable source-pathway-receptor contaminant linkages. All three elements have to be present for a risk to exist.
- **Risk Assessment.** In the absence of development-specific GI data it is not possible to provide a definitive conclusion regarding the presence / absence of contaminant linkages, and therefore a qualitative assessment of risk has been carried out using professional judgement within the context of the existing / proposed use. The calculated risk is a combination of the likelihood / probability of there being a contaminant linkage and the magnitude of the consequence, if that linkage is active. The assessment has been completed following guidance presented in CIRIA C552[9]. The definitions of probability (Table 1), severity of the consequence for various receptors (Tables 2 and 3), and overall risk rating (Table 4) are provided in **Appendix 9.1**.

Stage 2 – Impact Assessment Process

9.3.6. The impact assessment process generates revised risk levels for each potential contaminant linkage (from baseline) for both the construction and the operational phases of the proposed development. The change in risk level of each contaminant linkage from the baseline is then determined. An assessment of the effects of the proposed development on the risk levels can then be made and appropriate mitigation measures specified for each phase.

9.3.7. The changes in risk level are described as either positive, neutral or negative and classified as major, moderate or minor, on the basis of the area over which the effect may occur, duration (short, medium or long term) and whether the effect is permanent or temporary. The classification of effects is based on the criteria defined in **Table 9-1**.

9.3.8. A moderate or major effect (positive or negative) is considered to be a significant effect for the purposes of the ES. Minor and neutral effects are not considered to be significant.

Table 9-1 - Classification of Effects

Classification of Effect	Effect Description
Major adverse	An increase in contamination risk from the existing baseline conditions of 4 or 5 risk levels in the risk matrix, e.g. land that has a very low contamination risk in the baseline becomes a high or very high risk.
Moderate adverse	An increase in contamination risk from the existing baseline conditions of 2 or 3 risk levels in the risk matrix, e.g. land that has a low contamination risk in the baseline becomes a moderate or high risk.
Minor adverse	An increase in contamination risk from the existing baseline conditions of 1 risk level in the risk matrix, e.g. land that has a low contamination risk in the baseline becomes a moderate/low risk.
Neutral	No change in contamination risks.

[9] CIRIA. Contaminated Land Risk Assessment. A Guide to Good Practice. CIRIA C552. 2001.

Minor beneficial	A reduction in contamination risk from the existing baseline conditions of 1 risk level in the risk matrix, e.g. land that has a moderate/low contamination risk in the baseline becomes a low risk.
Moderate beneficial	A reduction in contamination risk from the existing baseline conditions of 2 or 3 risk levels in the risk matrix, e.g. land that has a high contamination risk in the baseline becomes a moderate/low or low risk.
Major beneficial	A reduction in contamination risk from the existing baseline conditions of 4 or 5 risk levels in the risk matrix, e.g. land that has a very high contamination risk in the baseline becomes a low or very low risk.

9.4. BASELINE CONDITIONS

INTRODUCTION

9.4.1. The baseline ground conditions are reported in the WSP Contaminated Land Preliminary Risk Assessment[10], prepared using desk-based data sources assessment. The site boundary used for the baseline report is shown in pink in an extract from the historical map dated 1931 (provided within the baseline report) at **Figure 9.1**. The current site boundary for the proposed development is shown in red.

9.4.2. The baseline report presents the expected ground conditions, the sensitivity of the site setting to contamination, potential sources of contamination, sensitive receptors and potentially complete contaminant linkages. A summary of this information along with any additional information obtained after issue of the PRA is provided below.

SITE SETTING

9.4.3. The site is located between the sea wall (along the northern and eastern boundaries) and the coastal promenade (Marine Road Central to the south) adjacent to Morecambe Bay, which is classified as a Site of Special Scientific Interest (SSSI), Ramsar Site, Special Area of Conservation (SAC) and Special Protection Area (SPA) (a sensitive receptor).

9.4.4. The site is generally flat and low lying at approximately 7m to 8m above Ordnance Datum (AOD). The central portion of the site is approximately 2.5m lower than the perimeter, with terraced areas and grass covered slopes.

9.4.5. The majority of the site area was reclaimed from the sea, with the exception of a narrow strip of land along the southern boundary. The various stages of reclamation are illustrated in **Figure 9.1**. This indicates that several metres of Made Ground / fill materials are likely present across the majority of the site, dating between 1848 (at the earliest) and 2001 (at the latest).

9.4.6. Geological maps indicate natural soil and rock deposits beneath the site comprise:

- Superficial deposits (soils) are absent beneath the site area (north of Marine Road Central) and largely absent to the west of the site.
- An area of Bank Deposits (sediments / shells) is indicated to the east of the site.

[10] WSP. June 2020. Contaminated Land Risk Assessment. Reference 70058633/11339.

- Raised Tidal Flat Deposits are present overlying Glacial Till to the south of the sit (beneath Marine Road Central).
- The solid bedrock geology comprises mudstone, siltstone and sandstone of the Millstone Grit Group (secondary A aquifer).

9.4.7. Drift deposits in the vicinity of the site (where present) are classified as secondary (undifferentiated) aquifers or secondary B aquifers. The Millstone Grit bedrock is a secondary A aquifer.

9.4.8. The Duchy of Lancaster retain mineral rights over parts of the site and into the Bay.

9.4.9. There are no mapped fresh surface water courses present within 250m of the site, although it is believed that a culverted watercourse crosses south-north through the eastern part of the site.

9.4.10. The fresh surface water / groundwater environment is considered to have a relatively low sensitivity to contamination.

SITE HISTORY

9.4.11. As noted above, the majority of the site area was reclaimed from the see as illustrated in **Figure 9.1**. The far western area was reclaimed first and occupied initially by railway lines running onto a jetty. The eastern part of the site was formerly a paddling pool, whilst the western and central parts of the site were occupied by a large swimming pool and spectator stand prior to being redeveloped as Bubbles swimming / leisure complex.

9.4.12. Potentially contaminative historical uses within 250m of the site boundary are identified in **Table 9-2**.

Table 9-2 - Potentially contaminative historical uses within 250m

Dates present on mapping	Use	Distance / Direction	Potential to impact soil and groundwater condition beneath site
1889-91 – 1966-67	Laundry	64m south	Low to moderate
1960-63 only	Works (unspecified)	98m south east	Low
1960-63 - 1994	Garage	107m east	Low
1960-63 only	Garage	109m south west	Low
1960-63 only	Garage	120m east	Low
1889-91 - 1957	Gasworks	166m south east	Low
1960-63 - 1994	Garage	188m east	Low
1960-63 only	Garage	195m south east	Low
1889-91 - 1895	Sawmill	196m east	Low

SOURCES OF CONTAMINATION

9.4.13. The following potential sources of contamination were identified in the baseline assessment:

- No obvious primary sources of contamination (e.g. fuel tanks) on or in the immediate vicinity of the site;
- There is the potential for contamination (e.g. chemical, asbestos) within any Made Ground / fill materials and the potential for likely localised contamination from historical uses as railway land and harbour areas;
- Potential sources of offsite historical contamination (e.g. garages, gasworks, laundry), all considered to have a low potential to impact the ground conditions beneath the site, with the exception of the laundry 64m south;
- If there are significant quantities of degradable Made Ground this could give rise to hazardous ground gases; and
- Radon gas has been identified as a potential source and should be considered further in relation to the proposed development.

SENSITIVE RECEPTORS

9.4.14. If present, contamination could pose potential risks to a range of sensitive receptors via a number of exposure pathways, both during the construction phase and following redevelopment.

Human Health

- Construction workers during redevelopment
- Current site users (public)
- Future site users (staff, public)
- Future maintenance workers

Controlled Waters

- Secondary A, B and Secondary undifferentiated aquifers underlying the site
- Morecambe Bay immediately to the north of the site (SSSI)

Others

- Services such as new water mains
- New foundations and other underground structures

PATHWAYS AND CONTAMINANT LINKAGE ASSESSMENT

9.4.15. If chemical or asbestos-related contamination is present within Made Ground or natural soils beneath the site, construction workers and neighbouring site users could be at risk of exposure during construction, largely via direction contact, ingestion and inhalation of soil dust. If volatile chemicals are present these could pose a potential risk via inhalation of vapours. If such contaminants remained within the future development, future users and maintenance workers could also be impacted via the same exposure pathways.

9.4.16. If hazardous ground gases and preferential migration pathways are present, gases could enter excavations during construction and accumulate in confined spaces within the development, potentially impacting construction workers and future site users and maintenance workers due to inhalation.

9.4.17. Impact to the wider groundwater / surface water environment and the sensitive Morecambe Bay could occur if significant soil / groundwater contamination is present and currently mobile or is mobilised by construction works.

9.4.18. The integrity of new plastic water pipes could be compromised if laid in direct contact with contaminated soils and sub-surface concrete could be affected if in contact with aggressive ground conditions.

9.4.19. If complete contaminant linkages are present, they would likely be broken by undertaking remediation / mitigation works, e.g. removal of hot spots of contamination prior to the construction phase, provision of clean soil cover for soft landscaping and provision of upgraded potable water pipes. These measures would be included in the Embedded Mitigation.

9.4.20. The proposed intrusive Ground Investigation (GI) will confirm if there are any potentially complete contaminant linkages that will require remedial action. The investigation would likely comprise assessment of:

- Ground conditions including Made Ground composition and depth
- The presence / absence of soil / groundwater contaminants in Made Ground and natural soils and associated risks to human health and the groundwater environment.
- The ground gas regime including radon and implications for redevelopment.
- Contamination risks to new water pipelines
- Potential disposal / re-use of excavated soils within the development

9.5. EMBEDDED RISK MITIGATION

9.5.1. Risks from ground and groundwater contamination will be managed at various stages of the proposed development via the planning process. The risk mitigation measures applicable to each phase of the proposed development, which are already embedded in the LPA planning process, are outlined below.

DEVELOPMENT DESIGN

9.5.2. A suitable GI will need to be completed (required as part of the planning process) to enable further assessment of the potential contaminant linkages and associated risks identified in the baseline assessment. The GI will identify unacceptable risks associated with contamination and a remediation strategy will be produced describing remedial measures that will need to be undertaken. The GI and remediation strategy reports will need to be approved by the local authority. The remediation strategy may include remedial works to be applied at various stages of the development, such as:

- Measures to be incorporated into the design of the proposed development (e.g. radon gas protection measures, clean soil cover in soft landscaped areas).

- Onsite remedial measures to be completed in advance of building construction (e.g. excavation and disposal of localised hotspots of contamination).
- Measures to prevent creation of potential risks (e.g. appropriate chemical suitability testing of imported fill materials).

9.5.3. All remedial works will need to be validated according to the validation reporting requirements outlined in the remediation strategy and will be subject to approval by the local authority.

9.5.4. If contamination is identified, a piling risk assessment may be required to demonstrate that the proposed piled foundation type will not introduce contamination migration pathways.

9.5.5. Buried concrete will be designed to withstand aggressive ground conditions, which will be investigated and assessed as part of the GI.

CONSTRUCTION

9.5.6. In relation to the construction phase, the following measures / procedures will be required as part of the planning process to mitigate potential risks from contamination during construction of the proposed development:

- Contamination remediation works (both pre-construction and post-construction) to be performed and validated according to the approved remediation strategy (as described above).
- Work to be undertaken in accordance with an approved Construction Environmental Management Plan (CEMP) to ensure that measures to mitigate potential environmental impacts / risks during construction will be employed during the construction phase. The CEMP will likely include the following elements, along with any others deemed appropriate, based on site conditions:
  - Health and safety risk assessments, method statements and specification of appropriate PPE and personal monitoring protocols for the protection of construction workers.
  - Implementation of appropriate dust suppression measures and controls to prevent migration of contaminated dust as set out in Chapter 11 Air Quality of this ES.
  - Working methods during construction to ensure that there is no surface water run-off from the works or any stockpiles into adjacent surface watercourses in accordance with Pollution Prevention Guideline, Working at Construction and Demolition Sites (Environment Agency, 2012).
  - Specification for fuel / chemical / waste storage areas to prevent / contain leaks and spills. Initial information provided by the contractor in relation to the construction compound is as follows: '*there will be fuel bowsers stored on site for re-fuelling plant. These will be double bunded with drip trays. Gases, such as LPG may be required and if so these will be stored within the compound in secure cages. There will also be a hazardous waste quarantine area and hazardous waste skips*'.
  - Implementation of appropriate pollution incident control, should leaks / spills occur e.g. spill kits.
- Works to be undertaken in accordance with an appropriate plan to demonstrate how the current sea wall / defences will be protected during the construction process to ensure it is not damaged during redevelopment.

- A CL:AIRE code of practice compliant Materials Management Plan covering the re-use of site-won arisings. Working in accordance with an MMP demonstrates that excavated soils are not to be classed as a 'waste' and that materials have been re-used in an environmentally responsible way that does not adversely impact human health or the environment.
- A UK WIR compliant water pipeline risk assessment will be required to determine the most appropriate material for new potable water pipes, based on soil chemical testing results.

OPERATION

9.5.7. It is assumed for the purposes of this assessment that those mitigation measures identified for the design and construction phase will be undertaken and will improve the condition of the study area (with regards to contamination) for the operation phase and future development.

9.5.8. Furthermore, pollution prevention measures incorporated into the proposed development (e.g. chemical storage areas design and drainage design) will further mitigate the risk of future contamination during operation.

9.6. ENVIRONMENTAL IMPACT ASSESSMENT

ASSESSMENT

9.6.1. The assessments demonstrating the effects of the construction and operational phases on baseline risks are presented alongside the baseline PCSM in **Table 9.4 and 9.5** respectively.

9.6.2. **Table 9.4** and **Table 9-5** have been shortened for use in the tables as shown in **Table 9-3**.

Table 9-3 - Short name and description of human health receptors used in impact assessment tables

Short Name	Receptor Description
Site users	Current site users including public and surface maintenance workers. Future site users (workers, public, visitors, surface maintenance)
Neighbours	Neighbouring site users within 250m, including passing pedestrians
Maintenance	Below ground site maintenance workers
Construction	Future construction workers

SUMMARY OF EFFECTS

Construction

9.6.3. The construction phase impact assessment (presented in **Table 9.4**) has been undertaken by comparing the land contamination risks at the baseline stage to those predicted during construction.

9.6.4. With the embedded mitigation described in Section 9.5, risks identified to human, controlled waters and property receptors during construction are assessed as very low.

9.6.5. Compared to the existing baseline, the level of risk to receptors is the same or lower due to the mitigation measures to prevent adverse effects from contamination.

9.6.6. The assessment outcome has identified a neutral effect for all receptors (human health and controlled waters). Therefore, the assessment shows that, with embedded mitigation, the construction of the proposed development will not increase the contamination risk.

9.6.7. An overall neutral effect has been predicted for the construction phase; this is considered not to be significant.

Operation

9.6.8. The operation phase impact assessment (presented in **Table 9-5**) has been undertaken by comparing the land contamination risks at the baseline stage to those predicted during operation.

9.6.9. With the embedded mitigation described in Section 9.5, risks identified to human, controlled waters and property receptors during operation are assessed as very low.

9.6.10. Compared to the existing baseline, the level of risk to receptors is the same or lower due to the mitigation measures to prevent adverse effects from contamination during operation.

9.6.11. The assessment outcome has identified a neutral effect for all receptors (human health and controlled waters). Therefore, the assessment shows that, with embedded mitigation, the operation of the proposed development will not increase the contamination risk.

9.6.12. An overall neutral effect has been predicted for the operation phase; this is considered not to be significant.

9.7. STABILITY IMPACT ASSESSMENT

9.7.1. There will be a requirement for a detailed geotechnical / structural assessment of the sea wall and implementation of stringently enforced embedded mitigation during design and construction to prevent detrimental impacts on the sea wall arising from the construction or operation of the proposed development.

9.7.2. It will need to be clearly demonstrated that the overall effect of the proposed development on the integrity / functionality of the sea wall will be neutral or positive in order for the proposed development to take place.

Table 9-4 - Contamination – Effects on Baseline Risks during Construction Phase

Conceptual Site Model			Baseline Assessment				Construction Phase Assessment (with embedded mitigation)			Impact Assessment	
Source	**Pathway**	**Receptor**	**Probability of Complete Linkage**	**Consequence if Linkage Present**	**Baseline Risk Level**	**Comments**	**Probability of Complete Linkage**	**Consequence if Linkage Present**	**Revised Risk Level**	**Effect on Risk**	**Significance of Effect**
Asbestos (if present) within existing Made Ground / fill materials	Liberation followed by inhalation	Site users	Unlikely	Minor	Very Low Risk	Any asbestos (if present) within fill materials is likely to remain inaccessible under the site's current use. Any maintenance works that involve disturbance of Made Ground / fill materials could result in fibres being released and maintenance workers being exposed; however, low likelihood of appreciable concentrations of airborne fibres being generated in an outdoor setting	Receptor not applicable to Construction Phase			Risk Removed	Neutral
		Neighbours	Unlikely	Minor	Very Low Risk		Unlikely	Minor	Very Low Risk	No change	Neutral
		Maintenance	Low Likelihood	Minor	Low Risk		Receptor not applicable to Construction Phase			Risk Removed	Neutral
		Construction	Receptor not applicable to baseline assessment – classify as Very Low Risk for baseline purposes				Unlikely	Minor	Very Low Risk	No change	Neutral
Chemicals of concern associated with existing Made Ground / fill materials. Chemicals of concern from spills / leaks from historical uses on site / off site Chemicals associated with construction works or operation of the proposed development	Direct contact, ingestion, dust inhalation	Site users	Unlikely	Minor	Very Low Risk	Chemical substances (if present) are likely to remain inaccessible under the site's current use. Any maintenance works that involve disturbance of Made Ground / fill materials could result in contamination being exposed; however, routine safe systems of work would limit exposure.	Receptor not applicable to Construction Phase			Risk Removed	Neutral

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		Neighbours	Unlikely	Minor	Very Low Risk		Unlikely	Minor	Very Low Risk	No change	Neutral
		Maintenance	Low Likelihood	Minor	Low Risk		Receptor not applicable to Construction Phase			Risk Removed	Neutral
		Construction	Receptor not applicable to baseline assessment – classify as Very Low Risk for baseline purposes				Unlikely	Minor	Very Low Risk	No change	Neutral
	Leaching, migration through soils or preferential pathways (e.g. drains)	Morecambe Bay (SSSI)	Low Likelihood	Minor	Very Low Risk	If leachable / mobile chemicals of concern are present they could migrate through granular soils to the water table and/or Morecambe Bay; however the potential for appreciable levels of leachable or mobile contamination is considered very low.	Unlikely	Minor	Very Low Risk	No change	Neutral
		Aquifers	Low Likelihood	Minor	Very Low Risk		Unlikely	Minor	Very Low Risk	No change	Neutral
	Direct Contact	Water Supply pipes	Unlikely	Mild	Very Low Risk	Presence of below ground water supply pipes through site considered unlikely. Presence of appreciable amounts of chemical contamination along pipeline route considered unlikely.	Unlikely	Minor	Very Low Risk	No change	Neutral
Vapours associated with chemical substances of concern in soil / groundwater	Inhalation of vapours	Site users	Unlikely	Minor	Very Low Risk	Presence of appreciable quantities of volatile contamination from previous uses of the site and adjacent areas considered highly unlikely. Low likelihood of appreciable concentrations of being generated in an outdoor setting	Receptor not applicable to Construction Phase			Risk Removed	Neutral
		Neighbours	Unlikely	Minor	Very Low Risk		Unlikely	Minor	Very Low Risk	No change	Neutral
		Maintenance	Unlikely	Minor	Very Low Risk		Receptor not applicable to Construction Phase			Risk Removed	Neutral
		Construction	Receptor not applicable to baseline assessment – classify as Very Low Risk for baseline purposes				Unlikely	Minor	Very Low Risk	No change	Neutral
Hazardous ground gases arising from Made Ground / organic soils	Accumulation in confined spaces followed by inhalation, asphyxiation, explosion	Site users	Unlikely	Minor	Very Low Risk	Organic-rich Made Ground and / or natural organic-rich soils not expected; therefore, viable source of significant ground gas likely to be absent. Appreciable concentrations unlikely to accumulate in external setting.	Receptor not applicable to Construction Phase			Risk Removed	Neutral
		Neighbours	Unlikely	Minor	Very Low Risk		Unlikely	Minor	Very Low Risk	No change	Neutral
		Maintenance	Low Likelihood	Minor	Very Low Risk		Receptor not applicable to Construction Phase			Risk Removed	Neutral
		Construction	Receptor not applicable to baseline assessment – classify as Very Low Risk for baseline purposes				Unlikely	Minor	Very Low Risk	No change	Neutral
Radon Gas	Accumulation in confined spaces followed by inhalation and eventually lung cancer	Site users	Unlikely	Minor	Very Low Risk	Current use is external. No dwellings on site. Neighbouring site users could be affected from radon beneath their properties so additional effects from site area considered insignificant. Appreciable concentrations unlikely to accumulate in external setting.	Receptor not applicable to Construction Phase			Risk Removed	Neutral
		Neighbours	Unlikely	Minor	Very Low Risk		Unlikely	Minor	Very Low Risk	No change	Neutral
		Maintenance	Low Likelihood	Minor	Very Low Risk		Receptor not applicable to Construction Phase			Risk Removed	Neutral
		Construction	Receptor not applicable to baseline assessment – classify as Very Low Risk for baseline purposes				Unlikely	Minor	Very Low Risk	No change	Neutral

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Table 9-5 - Contamination – Effects on Baseline Risks during Operational Phase

Conceptual Site Model			Baseline Assessment				Operational Phase assessment (with embedded mitigation)			Impact Assessment	
Source	**Pathway**	**Receptor**	**Probability of Complete Linkage**	**Consequence if Linkage Present**	**Baseline Risk Level**	**Comments**	**Probability of Complete Linkage**	**Consequence if Linkage Present**	**Revised Risk Level**	**Effect on Risk**	**Significance of Effect**
Asbestos (if present) within existing Made Ground / fill materials	Liberation followed by inhalation	Site users	Unlikely	Minor	Very Low Risk	Any asbestos (if present) within fill materials is likely to remain inaccessible under the site's current use. Any maintenance works that involve disturbance of Made Ground / fill materials could result in fibres being released and maintenance workers being exposed; however, low likelihood of appreciable concentrations of airborne fibres being generated in an outdoor setting	Unlikely	Minor	Very Low Risk	No change	Neutral
		Neighbours	Unlikely	Minor	Very Low Risk		Unlikely	Minor	Very Low Risk	No change	Neutral
		Maintenance	Low Likelihood	Minor	Low Risk		Unlikely	Minor	Very Low Risk	Risk Reduced	Neutral
Chemicals of concern associated with Made Ground / fill materials. Chemicals of concern from spills / leaks from previous historical uses on site Chemicals associated with construction or operation of the proposed development	Direct contact, ingestion, dust inhalation	Site users	Unlikely	Minor	Very Low Risk	Chemical substances (if present) are likely to remain inaccessible under the site's current use. Any maintenance works that involve disturbance of Made Ground / fill materials could result in contamination being exposed; however, routine safe systems of work would limit exposure.	Unlikely	Minor	Very Low Risk	No change	Neutral
		Neighbours	Unlikely	Minor	Very Low Risk		Unlikely	Minor	Very Low Risk	No change	Neutral
		Maintenance	Low Likelihood	Minor	Low Risk		Unlikely	Minor	Very Low Risk	No change	Neutral
	Leaching, migration through soils or preferential pathways (e.g. drains)	Morecambe Bay (SSSI)	Low Likelihood	Minor	Very Low Risk	If leachable / mobile chemicals of concern are present they could migrate through granular soils to the water table and/or Morecambe Bay; however the potential for appreciable levels of leachable or mobile contamination is considered very low.	Unlikely	Minor	Very Low Risk	No change	Neutral
		Aquifers	Low Likelihood	Minor	Very Low Risk		Unlikely	Minor	Very Low Risk	No change	Neutral
	Direct Contact	Water Supply pipes	Unlikely	Mild	Very Low Risk	Presence of below ground water supply pipes through site considered unlikely. Presence of appreciable amounts of chemical contamination along pipeline route considered unlikely.	Unlikely	Minor	Very Low Risk	No change	Neutral
Vapours associated with chemical	Inhalation of vapours	Site users	Unlikely	Minor	Very Low Risk	Presence of appreciable quantities of volatile contamination from previous uses of the site and adjacent areas considered highly unlikely.	Unlikely	Minor	Very Low Risk	No change	Neutral

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Conceptual Site Model			Baseline Assessment				Operational Phase assessment (with embedded mitigation)			Impact Assessment	
Source	**Pathway**	**Receptor**	**Probability of Complete Linkage**	**Consequence if Linkage Present**	**Baseline Risk Level**	**Comments**	**Probability of Complete Linkage**	**Consequence if Linkage Present**	**Revised Risk Level**	**Effect on Risk**	**Significance of Effect**
substances of concern in soil / groundwater		Neighbours	Unlikely	Minor	Very Low Risk	Low likelihood of appreciable concentrations of being generated in an outdoor setting	Unlikely	Minor	Very Low Risk	No change	Neutral
		Maintenance	Unlikely	Minor	Very Low Risk		Unlikely	Minor	Very Low Risk	No change	Neutral
Hazardous ground gases arising from Made Ground / organic soils	Accumulation in confined spaces followed by inhalation, asphyxiation, explosion	Site users	Unlikely	Minor	Very Low Risk	Organic-rich Made Ground and / or natural organic-rich soils not expected; therefore, viable source of significant ground gas likely to be absent. Appreciable concentrations unlikely to accumulate in external setting.	Unlikely	Minor	Very Low Risk	No change	Neutral
		Neighbours	Unlikely	Minor	Very Low Risk		Unlikely	Minor	Very Low Risk	No change	Neutral
		Maintenance	Low Likelihood	Minor	Very Low Risk		Unlikely	Minor	Very Low Risk	No change	Neutral
Radon Gas	Accumulation in confined spaces followed by inhalation, chronic lung damage / cancer	Site users	Unlikely	Minor	Very Low Risk	Current use is external. No dwellings on site. Neighbouring site users could be affected from radon beneath their properties so additional effects from site area considered insignificant. Appreciable concentrations unlikely to accumulate in external setting.	Unlikely	Minor	Very Low Risk	No change	Neutral
		Neighbours	Unlikely	Minor	Very Low Risk		Unlikely	Minor	Very Low Risk	No change	Neutral
		Maintenance	Low Likelihood	Minor	Very Low Risk		Unlikely	Minor	Very Low Risk	No change	Neutral

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9.8. FURTHER MITIGATION

9.8.1. Given the embedded mitigation outlined in Section 9.5, and that the ground conditions and land contamination effects are neutral and not significant, no further mitigation is required.

9.9. RESIDUAL EFFECTS

9.9.1. With no further mitigation, residual effects for construction and operation of the proposed development are as reported within 9.6.

9.10. CUMULATIVE EFFECTS

9.10.1. A cumulative assessment considers the combined effects from the proposed development alongside effects from other development sites within the study area. No cumulative effects have been identified for ground conditions.

9.11. CONCLUSIONS

9.11.1. The assessment for ground conditions, undertaken as described herein, indicates that, on the basis of the information in the baseline study and assumed embedded mitigation during design / construction / operation, there will be no significant effects as a result of ground conditions during either the construction phase or the operation phase of the proposed development.

9.11.2. It should be noted that the baseline risk assessment and impact assessment have been carried out using desk-based information only, i.e. the assessment is for the PCSM and is qualitative (as opposed to quantitative based on actual ground investigation (GI) data). The results of the impact assessment will need to be verified upon receipt and assessment of the GI data.

9.11.3. The assessment has been completed on the basis of a wide range of embedded mitigation to be applied from design through construction and operation. The details of the embedded mitigation are not yet available since they will depend on the findings of the GI, but it is assumed that current standards / guidance / legal restrictions / best practice will apply to all aspects of embedded mitigation.

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HYDROLOGY, DRAINAGE AND FLOOD RISK

PUBLIC

10. HYDROLOGY, DRAINAGE AND FLOOD RISK

10.1. INTRODUCTION

10.1.1. This chapter reports the outcome of the assessment of likely significant effects arising from the proposed development on the surrounding area - with regards to flood risk, surface water and groundwater quality & quantity - in the context of the baseline conditions at and within the vicinity of the site. Where appropriate, this chapter also identifies proposed mitigation measures to prevent, minimise or control likely negative effects arising from the proposed development and the subsequent anticipated residual effects.

10.1.2. The potential effects which may arise during the construction and operational phases include pollution of surface water bodies and drainage systems due to potential increase in physical contamination (sedimentation); pollution from leaks and spillages; the potential increase in risk of flooding; and, the increased demand for potable water supplies.

10.1.3. This chapter describes the assessment methodology, the baseline conditions at the site and in the surrounding area, any mitigation assumed for the purposes of the assessment, a summary of the likely significant effects taking into account national policy and legislation, the further mitigation measures required to prevent, reduce or offset any significant negative effects, and the likely residual effects after these measures have been employed.

10.1.4. This chapter (and its associated appendices) is intended to be read as part of the wider Environmental Statement (ES), with reference to the EIA Scoping Report submitted by WSP and Indigo Planning Consultants in June 2019. This Chapter has also been informed by a Flood Risk Assessment (FRA) prepared by WSP (refer to **Appendix 10.1 of Volume 3**) and a Drainage Strategy covering both surface and foul water prepared by Buro Happold (Report No. EDNN-NHE-XX-XX-RP-C-0001, **Appendix 10.2 of Volume 3**) that accompany the application.

10.2. POLICY CONTEXT

10.2.1. The applicable legislation framework is summarised as follows:

NATIONAL PLANNING POLICY

10.2.2. This chapter has been prepared in accordance with the Government's National Planning Policy Framework and Planning Practice Guidance as follows:

National Planning Policy Framework (NPPF) – (last updated July 2021)

10.2.3. The NPPF requires that a FRA should be undertaken for:

- All developments greater than 1 Hectare (ha) in size in Flood Zone 1;
- All proposals for new development (including minor development and change of use) in Flood Zones 2 and 3;
- Land which has been identified by the Environment Agency as having a critical drainage problem;
- Land identified in a strategic flood risk assessment as being at increased flood risk in the future; or,
- Where proposed development or a change of use (e.g. from commercial to residential) to a more vulnerable class may be subject to other sources of flooding (e.g. surface water drains, reservoirs).

10.2.4. The NPPF requires an FRA to be undertaken to demonstrate that the proposed development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

10.2.5. The NPPF also requires development to be allocated towards areas at lowest risk of flooding (the Sequential Test), and if necessary, the development proposals would be subject to satisfying the requirements of the Exception Test.

National Planning Practice Guidance (PPG) – Flood Risk and Coastal Change (March 2014)

10.2.6. The NPPF is supported by the National Planning Policy Guidance (PPG). The Flood Risk and Coastal Change PPG states that an FRA must outline the following:

- Whether a proposed development is likely to be affected by current or future flooding from any source;
- Whether it will increase flood risk elsewhere; and,
- Whether the measures proposed to deal with these effects and risks are appropriate.

10.2.7. The NPPF PPG states that the lifespan of assembly and leisure developments should be considered as 50 - 60 years. The design life of the Eden development is 50 years and therefore, flood risk and climate change has been considered for this timescale.

10.2.8. Within Table 2 (Flood Risk Vulnerability Classification) of the NPPF and the PPG, the proposed development would likely be classified as 'Less Vulnerable' (i.e. assembly and leisure).

10.2.9. Table 3 (Flood Risk Vulnerability and Flood Zone Compatibility) of the PPG, states that Less Vulnerable development is appropriate in Flood Zone 3a.

LOCAL PLANNING POLICY

Lancaster City Council Core Strategy 2003 – 2021 (July 2008)

10.2.10. The Lancaster City Council Core Strategy document sets out the strategy and policies for the use, development or protection of land and buildings in the area for the period of 2003 to 2021. Central Morecambe is identified as a Regeneration Priority Area which will be re-invented as a visitor destination, with the restoration of the Victoria Pavilion (Winter Gardens).

10.2.11. A number of policies within this document are relevant to the proposed development:

10.2.12. Policy 'SC1: Sustainable Development' states that any development should:

- 'Have an acceptable impact on drainage systems and use Sustainable Drainage Systems (SuDS) where appropriate'

10.2.13. Policy 'SC7: Development and the Risk of Flooding' states that:

- 'Development proposals and allocations will be assessed in line with the search sequence set out in Planning Policy Statement 25 on Development and Flood Risk'; and,
- 'Proposals and Development Control Policies relating to flood defence and flood management should ensure beneficial outcomes for the natural environment. Morecambe Bay is an internationally important wildlife site and proposals should meet the strict tests set out in Regulation 48 and 49 of the Habitat Regulations. Any proposal or policy that cannot demonstrate that it would not have an adverse effect on the European Site will not be supported.'

10.2.14. Policy 'E1: Environmental Capital' states that the Local Authority will 'resist development in places where environmental risks including from flooding cannot be properly managed'.

- A site-specific flood risk assessment demonstrates that the development, including access, will be safe without increasing flooding elsewhere, and where possible, will reduce flood risk overall;
- The scheme incorporates flood protection, flood resilience and resistance measures appropriate to the character and biodiversity of the area and the specific requirements of the site;
- Appropriate flood warning and evacuation plans are in place; and,
- New site drainage systems are designed taking account of events which exceed the normal design standard.

Local Plan for Lancaster District 2011-2031 (September 2015)

10.2.15. The Local Plan for Lancaster District 2011-2031 aims to ensure that the district's environment is protected and enhanced while meeting the needs for housing, economic growth, education, recreation and transport priorities.

Local Plan Part Two: Development Management DPD (July 2020)

10.2.16. Lancaster City Council reviewed the adopted the DPD in July 2020. It sets out a series of generic planning policies that will be used to determine Planning Applications. This document now forms a key part of the new Local Plan for the Lancaster District 2011 – 2031. A number of policies within this document are relevant to the proposed development.

10.2.17. Policy 'DM34: Surface Water Run-Off and Sustainable Drainage' states that developments should use Sustainable Drainage Systems in accordance with the Surface Water Drainage Hierarch'.

10.2.18. Policy 'DM33: Development and Flood Risk' states that proposed development within defined areas of flood risk must ensure the following:

- 'Proposals are supported by a Sequential Test, and where necessary Exception Test in accordance with National Planning Policy;
- That they are supported by an appropriate site-specific Flood Risk Assessment (FRA) which demonstrates that the proposal meets the requirements of National Planning Policy and accompanying practice guidance;
- That safe, suitable and appropriate flood prevention and mitigation measures are agreed, implemented and maintained, including through design and layout, taking Climate Change into account, to ensure that development is appropriately flood resilient and resistant for its lifetime;
- There will be no net increase of flooding beyond the site as a result of development (such as increases in surface water run-off or the reduction in the capacity of flood storage areas);
- There is no adverse effect on the operational functions of any watercourse or existing flood defence infrastructure;
- Sites should be drained on a separate system with foul water draining to the public sewer and surface water draining in the most sustainable way, in accordance with the SuDS hierarchy; and
- All proposals for new development must take account of the Council's most up-to-date Strategic Flood Risk Assessment (or the most up-to-date Council flood risk assessment available) in combination with any other relevant evidence including that of the Lead Local Flood Authority (Lancashire County Council) and the Environment Agency'.

10.2.19. Policy 'DM36: Protecting Water Resources and Infrastructure' states that new development must:

- ‘Not have a detrimental impact on surface water and groundwater quantity and quality caused by water run-off into nearby waterways;
- Not have a detrimental impact on the quality and standard of bathing water in the locality;
- Consider effective and efficient disposal of wastewater; and,
- Seek to increase water availability and protect and improve the quality of rivers or groundwater where possible.’

Lancaster City Council Morecambe Area Action Plan (December 2014)

10.2.20. The Core Strategy prepared by Lancaster City Council identifies Morecambe as the main regeneration priority area within the district. As a result, the Local Authority prepared an area action plan for Morecambe. The Morecambe Area Action Plan (MAAP) forms part of the Local Plan for the Lancaster District.

10.2.21. MAAP Spatial Policy 3 (SP3) relates to the main seafront and promenade at Morecambe. The proposed development falls within this spatial area. It states that ‘*essential works of coastal defence must be complementary with the open character and contribute to people’s use and enjoyment of the seafront and shore*’. Furthermore, the Local Authority will not ‘*permit any proposals that result in a significant adverse impact on the Bay environment and its interest features as a European Site. Specifically, it will require that development proposals make proper consideration of any effects that might arise for this environment, both direct and indirect and including in how any potential adverse effects can be mitigated through appropriate management measures that the Morecambe Bay Partnership and any successor organisations might propose*’.

LOCAL GUIDANCE/BEST PRACTICE

Lancaster City Council Level 1 Strategic Flood Risk Assessment (October 2017)

10.2.22. The Level 1 Strategic Flood Risk Assessment (SFRA) collates all known sources of flooding within the District that may affect existing or future development, delineates areas of ‘low’, ‘medium’ and ‘high’ probability of flooding, and recommends appropriate land uses within flood affected areas. Where flood risk has been identified as a potential constraint to future development, the SFRA recommends possible flood mitigation solutions to minimise the risk to property and life should a flood event occur.

10.2.23. The predominant source of flood risk to Morecambe is from the sea (due to extreme tides / storm surges); the Environment Agency’s Historic Flood Map contains details of tidal flooding within the town. Surface water flooding is prevalent across the District, particularly around Morecambe, due to the terrain beginning to flatten off, allowing surface water to accumulate.

10.2.24. Climate change poses a significant risk to the sub-region. As a result, a precautionary approach to account for climate change should be considered by assuming that Flood Zone 2 will become Flood Zone 3a in 100 years’ time and Flood Zone 3a could become Flood Zone 3b.

Lancashire and Blackpool Local Flood Risk Management Strategy (October 2013)

10.2.25. The ‘Local Flood Risk Management Strategy’ (LFRMS) is an over-arching strategy which is seen as the first step in understanding the flood risk in Lancashire and Blackpool. The aim of the document is to help understand the broad nature and extent of flood risk in the area.

10.2.26. The overall aim of the LFRMS is to produce a plan to reduce and manage flood risk in a way that will benefit people, property and the environment. The LFRMS highlights the wards with the highest risk of flooding.

10.2.27. The site is not mentioned specifically in the LFRMS.

Lancaster City Council Surface Water Drainage, Flood Risk Management and Watercourse Planning Advisory Note 3 (October 2020)

10.2.28. Lancaster City Council has developed a surface water drainage, flood risk management and watercourse Planning Advisory Note. The purpose of the note is to set out how the Local Authority expects developers to manage surface water and flood risk on site.

10.2.29. Lancaster City Council will recommend the implementation of the following methods of managing water on site:

- '*Permeable paving and surfacing on paths, pavements and roads in the development where the expected traffic volumes will not damage this surfacing;*
- *Install water butts / rainwater collections to new premises;*
- *Contour all roads and other impermeable/ hard surfacing towards planted areas / gravel trenches, and other SuDS features;*
- *Plant reeds along flow routes of surface water from surfaces used by vehicles, to filter out pollutants, and improve downstream water quality;*
- *Plant as many shrubs and trees as possible around the development;*
- *Grass verges and planted areas should be lower than the adjacent hard surfacing;*
- *Use amenity areas and open spaces as flood storage areas during significant events;*
- *Use gravel on paths to ensure than runoff is reduced and will reduce the development's impermeable areas;*
- *Keep existing hedges and planting in place, to reduce runoff and minimise impacts; and,*
- *Raise all finished floor levels to at least 150mm above the surrounding ground levels*.'

10.2.30. Additionally, attenuation features should be designed such that:

- '*For soakage structures, the percolation rate must be applied to the sides of the infiltration structure only and the rate for the base must be zero;*
- *The infiltration structure should also drain 50% of its total volume in 24 hours or less for both the 1 in 10 and 1 in 100 years (plus climate change storm events); and,*
- *Any infiltration drainage design must include adequate winter groundwater monitoring data to determine the highest winter groundwater table*.'

10.2.31. The Advisory Note also states that discharge to a watercourse or surface water sewer must be restricted to a betterment of existing run-off rates for brownfield sites. It also states that new outfall structures are limited to one if it is proposed to penetrate a flood defence.

Non-Statutory Sustainable Drainage Technical Standards (March 2015)

10.2.32. The Non-Statutory Sustainable Drainage Technical Standards document sets out the technical standards for sustainable drainage systems (SuDS).

10.2.33. The standards state that for brownfield developments the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event.

10.2.34. For brownfield developments, where reasonably practicable, the runoff volume from the development to any drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be limited to as close as reasonably practicable to the greenfield runoff volume for the same event but should never exceed the runoff volume prior to redevelopment for that event.

10.2.35. The drainage system must be designed so that unless an area is designated to hold and / or convey water as part of the design, flooding does not occur on any part of the site for events up to and including rainfall events with a 3.3% chance of occurring in any given year and flooding does not occur during rainfall events with a 1% chance of occurring in any given year, in any part of a building or utility plant susceptible to water.

10.2.36. The design of the site must ensure that where reasonably practicable flows resulting from a rainfall in excess of a 1% annual probability rainfall event are managed in exceedance routes that minimise risks to people and property.

10.2.37. Pumping should only be used to facilitate drainage for those parts of the site where it is not reasonably practicable to drain water by gravity.

10.2.38. The mode of construction of any communication with an existing sewer or drainage system must be such that the making of the communication would not be prejudicial to the structural integrity and functionality of the system. Any drainage which does occur must be minimised and restricted before the drainage system is classified as complete.

North West England and North Wales Shoreline Management Plan (February 2011)

10.2.39. Halcrow Group Ltd prepared the final 'North West England North Wales Shoreline Management Plan' (SMP). The SMP provides a large-scale assessment of the risks associated with shoreline evolution, coastal flooding and erosion. It presents a policy framework to address these risks to people and the developed historic and natural environment in a sustainable manner.

10.2.40. The coastline is divided up into sub-cells. The Site falls within 'Sub-Cell 11c – Rossall Point to Hodbarrow (including the Wyre, Lune, Kent, Leven and Duddon Estuaries)'.

10.2.41. Sub-cell 11c is characterised by extensive sandflats, which are exposed at low tide. The shorelines of Morecambe Bay are made up of large areas of saltmarsh in more sheltered areas fronting rocky outcrops, low cliffs and low-lying land. The intertidal zone of Morecambe Bay and the estuaries are internationally important environmentally designated areas.

10.2.42. The SMP states a policy of 'hold the line' (until year 2110) which means that defences should be maintained or upgraded to improve the standard of protection provided by the existing defence line. The groynes and breakwaters that also make up Morecambe's defences are helping to manage foreshore levels and control channel movements now. Habitat gains and losses are expected to be balanced in the medium term but there is uncertainty over sediment supply from the outer bay in the long-term. As a result, there will be some coastal squeeze in the long-term of the inter-tidal habitat (between 2060 – 2110).

North West River Basin Management Plan (December 2009)

10.2.43. The North West River Basin Management Plan (RBMB) was produced by the Environment Agency and provides a framework for protecting and enhancing the benefits provided by the water environment. To achieve this, and because water and land resources are closely linked, it also informs decisions on land-use planning.

10.2.44. One of the main purposes of the plan is to prevent waterbodies deteriorating by highlighting areas of land and bodies of water that have specific uses that need special protection and setting out legally binding objectives for each quality element in every waterbody.

10.2.45. The proposed development falls within the Lune catchment which flows out into Morecambe Bay. Morecambe Bay has the largest continuous intertidal area in the whole of the UK.

Lune Catchment Flood Management Plan (December 2009)

10.2.46. The Lune Catchment Flood Management Plan (CFMP) was produced by the Environment Agency to help understand the scale and extent of flooding now and in the future and set policies for managing flood risk within the catchment. CFMPs aim to promote more sustainable approaches to managing flood risk.

10.2.47. The Application Site falls within the 'Lancaster Coastal and Lune Estuary' sub-group for which the policy is Policy Option 3 – Areas of low to moderate flood risk where we are generally managing flood risk effectively. The only significant source of flood risk in this sub-area is associated with coastal processes and as a result the SMP is used to determine flood risk management for this sub-area. However, all fluvial Main River lengths in this sub area are to be regularly inspected for blockages or other problems.

10.3. ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

10.3.1. This Chapter provides a high-level qualitative assessment of the potential effects of the proposed development on hydrology, including impacts to the water environment (water quality, drainage regime and water resource availability). The assessment is based on the 'Design Manual for Roads and Bridges (DMRB) Volume 11.3.10: Road Drainage and the Water Environment'.

SUMMARY OF CONSULTATION

10.3.2. Table 10-1 provides a summary of the consultation activities undertaken in support of the preparation of this Chapter.

Table 10-1 – Summary of Consultation Undertaken to Date

Body / organisation	Contact at body / organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions
Environment Agency	Customers and Engagement Team	15/09/20 Product 4 and abstraction licenses and discharges consents request. 28/04/21 Request for modelling files	08/10/20 Product 4 data received confirming tidal data taken from Lancashire Tidal ABD study in 2014 which was updated in 2020. 30/04/21 Product 7 data received.

Body / organisation	Contact at body / organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions
Environment Agency	Planning Advisor Sustainable Places	12/05/21- Queries on flood risk and drainage issued to the Environment Agency ahead of meeting arranged.	26/05/21 – Meeting to discuss proposed development and flood risk. Environment Agency confirmed flood defences owned and maintained by LCC. Raising levels to protect accesses not an issue. No records of historic flooding. 02/07/21 – Written response provided on queries - the impact of the proposed development needs to be assessed through modelling with no increase in flood risk elsewhere.
Lancashire County Council	Senior Flood Risk Officer	27/04/21 – Request for information on flood risk, historic flooding, buffer requirements	10/06/21 – Response received which confirms County Council advise 8m maintenance buffer, no information for the existing flood defence infrastructure, no records of surface or groundwater abstractions/discharges. 26/07/21 – Meeting held confirming surface water drainage strategy and ordinary watercourse requirements.
Lancaster City Council	Development Control Engineering Team	20/04/21 – Request for information on flood defences, including location, defence types, condition and easement distances. 22/06/21 – Meeting with Engineers at LCC to present proposals at the Site and go through responses to queries.	14/06/21 – Written response provided on queries confirming that the primary sea defence is the rock armour and wall for coastal erosion and flooding. Secondary wall for wave reflection purposes. Easement 8m from any secondary defences but could be relaxed if there is still access for maintenance. No records of flooding on the site itself. 22/06/21 – LCC confirmed secondary defence wall around Bubbles site to be retained if possible. Defences not been overtopped previously. Water levels have not surcharged above ground and there are no surface water flooding issues.
United Utilities	Customer Services	21/09/20 – Request for historic records of flooding and historic sewer records	24/09/20 – Confirmation of a record of sewer flooding within the vicinity of the proposed development.

GEOGRAPHICAL SCOPE

10.3.3. The area of study for the assessment of hydrology, drainage and flood risk encompasses sensitive water receptors within the influence of the proposed development, up to and including 500m from the site. Outside of this distance it is considered unlikely that any direct impacts upon the water environment will be attributable to the proposed development.

TEMPORAL SCOPE

10.3.4. The temporal scope for the ES Hydrology, drainage and flood risk chapter will cover the construction and occupation phases (assumed to be 50 years in line with NPPF guidance) for the proposed development.

METHOD OF BASELINE DATA COLLECTION

Desk Study

10.3.5. To investigate baseline conditions and to consider potential effects of the development with respect to surface water and groundwater quality, drainage and flood risk, a review of available desk-based information has taken place.

10.3.6. This desk-based assessment has included a review of Ordnance Survey (OS) mapping, British Geological Survey (BGS) data, Environment Agency data, United Utilities data, and information received from Lancaster City Council and Lancashire County Council.

10.3.7. The Environment Agency's flood mapping was reviewed for the Study Area to provide information on existing flood risk (extent and source). BGS data and the MAGIC online mapping was reviewed to obtain geological information at the Site. A list of the datasets and reports reviewed is as follows:

- Environment Agency Flood Map for Planning
- Environment Agency Long Term Flood Risk Mapping;
- British Geological Survey (BGS) Geoindex Onshore mapping 1:50,000 scale; and,
- MAGIC online mapping

TOPOGRAPHICAL SURVEY

10.3.8. Survey Operations Limited completed a topographic survey of the Site in August 2019. The survey can be found in Appendix B of the FRA (**Appendix 10.1 of Volume 3**).

ASSESSMENT METHODOLOGY

10.3.9. The assessment utilises the methodology outlined within DMRB LA 113 Road Drainage and the Water Environment.

10.3.10. The assessment has taken account of both the construction and operational phases through:

- Estimation of the importance of the attribute.
- Estimation of the magnitude of the impact.
- Assessment of the significance of effects based on the importance of the attribute and magnitude of the impact.

SIGNIFICANCE CRITERIA

10.3.11. The assessment of potential effects as a result of the proposed development has considered both the construction and operational phases. The construction phase includes enabling works, earthworks and construction activities as set out in **Chapter 3**. The significance level attributed to each effect has been assessed based on the magnitude of change due to the proposed development and the sensitivity of the affected receptor. The sensitivity of the affected receptor is assessed on a scale of very high, high, medium, or low, and the magnitude of change is assessed on a scale of major, moderate, minor, negligible (both adverse and beneficial) or no change.

10.3.12. The criteria used to determine the sensitivity of water resources are shown in **Table 100-2**. This is based on the table in the DMRB Volume 11.3.10 – 'Road Drainage and the Water Environment'.

Table 100-2 – Importance/Sensitivity of Water Environment Attributes

Importance/ Sensitivity	Criteria	Example
Very High	Attribute has a high quality and rarity on regional or national scale.	**Surface Water:** Watercourse having a WFD classification shown in a RBMP and Q95 ≥ 1. 0 m3/s. EC Designated Salmonid/ Cyprinid fishery, WFD Class 'High', Site protected/ designated under EC or UK habitat legislation (SAC, SPA, SSSI, WPZ, Ramsar site, salmonid water)/ Species protected by EC legislation. **Groundwater:** Principal aquifer providing a regionally important resource or supporting site protected under EC and UK habitat legislation, SPZ1. **Flood Risk:** Essential infrastructure or highly vulnerable development.
High	Attribute has a high quality and rarity on local scale.	**Surface Water:** Watercourse having a WFD classification shown in a RBMP and Q95 <1.0m3/s, Major Cyprinid Fishery, Species protected under EC or UK habitat legislation. **Groundwater:** Principal aquifer providing locally important resource or supporting river ecosystem, SPZ2. **Flood Risk:** More vulnerable development.
Medium	Attribute has a medium quality and rarity on local scale.	**Surface Water:** Watercourses not having a WFD classification shown in a RBMP and Q95 >0.001m3/s. **Groundwater:** Aquifer providing water for agricultural or industrial use with limited connection to surface water, SPZ3. **Flood Risk:**

		Less vulnerable development.
Low	Attribute has a low quality and rarity on local scale.	**Surface Water:** Watercourses not having a WFD classification shown in a RBMP and Q95 ≤0.001m3/s. **Groundwater:** Unproductive strata. **Flood Risk:** Water compatible development.

10.3.13. The likely magnitude or extent of an impact (or change) on a receptor is established by assessing the degree of the impact relative to the nature and extent of the proposed development (see **Table 100-3**). Potential effects can be both adverse and beneficial. The derivation of magnitude is carried out independently of the sensitivity of the water resource.

Table 100-3 – Magnitude of an Impact on an Attribute

Magnitude	Criteria	Example
Major adverse	Results in loss of attribute and / or quality and integrity of the attribute.	Surface Water: Failure of both acute-soluble and chronic-sediment related pollutants in HEWRAT and compliance failure with EQS values. Calculated risk of pollution from a spillage >2% annually, loss or extensive change to a fishery, loss or extensive change to a designated Nature Conservation Site. Groundwater: Loss of or extensive change to an aquifer, potential high risk of pollution to groundwater from routine runoff, calculated risk of pollution from spillages >2% annually, loss of or extensive change to groundwater supported designated wetlands. Flood Risk: Increase in peak flood level (1% annual probability) >100 mm.
Moderate adverse	Results in effect on integrity of attribute, or loss of part of attribute.	Surface Water: Failure of both acute-soluble and chronic-sediment related pollutants in HEWRAT but compliance with EQS values. Calculated risk of pollution from spillages >1% annually and <2% annually, partial loss in productivity of a fishery. Groundwater: Partial loss or change to an aquifer, potential medium risk of pollution to groundwater from routine runoff, calculated risk of pollution from spillages >1% annually and <2% annually, partial loss of the integrity of groundwater supported designated wetlands. Flood Risk: Increase in peak flood level (1% annual probability) >50 mm.

Magnitude	Criteria	Example
Minor adverse	Results in some measurable change in attributes quality or vulnerability.	Surface Water: Failure of either acute soluble or chronic sediment related pollutants in HEWRAT. Calculated risk of pollution from spillages >0.5% annually and <1% annually. Groundwater: Potential low risk of pollution to groundwater from routine runoff, calculated risk of pollution from spillages >0.5% annually and <1% annually, minor effects on groundwater supported wetlands. Flood Risk: Increase in peak flood level (1% annual probability) >10mm.
Negligible	Results in effect on attribute, but of insufficient magnitude to affect the use or integrity.	Surface Water: No risk identified by HEWRAT (pass both acute-soluble and chronic-sediment related pollutants). Risk of pollution from spillages <0.5% annually. Groundwater: No measurable impact upon an aquifer and risk of pollution from spillages <0.5%. Flood Risk: Negligible change in peak flood level (1% annual probability) <+/- 10 mm.
Minor beneficial	Results in some beneficial effect on attribute or a reduced risk of negative effect occurring.	Surface Water: HEWRAT assessment of either acute soluble or chronic-sediment related pollutants becomes pass from an existing site where the baseline was a fail condition. Calculated reduction in existing spillage risk by 50% or more (when existing spillage risk is <1% annually). Groundwater: Calculated reduction in existing spillage risk by 50% or more to an aquifer (when existing spillage risk <1% annually). Flood Risk: Creation of flood storage and reduction in peak flood level (1% annual probability) >10 mm.
Moderate beneficial	Results in moderate improvement of attribute quality.	Surface Water: HEWRAT assessment of both acute-soluble and chronic-sediment related pollutants becomes pass from an existing site where the baseline was a fail condition. Calculated reduction in existing spillage by 50% or more (when existing spillage risk >1% annually). Groundwater: Calculated reduction in existing spillage risk by 50% or more (when existing spillage risk is >1% annually).

Magnitude	Criteria	Example
		Flood Risk: Creation of flood storage and reduction in peak flood level (1% annual probability) >50 mm.
Major beneficial	Results in major improvement of attribute quality.	Surface Water: Removal of existing polluting discharge or removing the likelihood of polluting discharges occurring to a watercourse. Improvement in water body WFD classification. Groundwater: Removal of existing polluting discharge to an aquifer or removing the likelihood of polluting discharges occurring, recharge of an aquifer. Flood Risk: Creation of flood storage and reduction in peak flood level (1% annual probability) >100 mm.
No change		No loss or alteration of characteristics, features or elements; no observable impact in either direction.

10.3.14. Once the sensitivity of the water resource (receptor) and the magnitude of the impact / change are both established, the potential effect can then be derived by combining the two assessments in a simple matrix as set out in **Table 100-4**.

Table 100-4 – Significance of Potential Effects

Importance of Receptor	Magnitude of Impact				
	No change	Negligible	Minor	Moderate	Major
Very High	Neutral	Slight	Moderate or large	Large or very large	Very large
High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

DESCRIPTION OF SIGNIFICANCE OF EFFECTS

10.3.15. The following terms have been used to define the effects identified:

- Very large effect: where the proposed development could be expected to have a considerable effect (either positive or negative) on receptors (on flooding, drainage, water quality and/or water resources and associated sensitive receptors);
- Large effect: where the proposed development could be expected to have a noticeable effect (either positive or negative) on receptors (on flooding, drainage, water quality and / or water resources and associated sensitive receptors);
- Moderate effect: where the proposed development could be expected to result in a small effect (either positive or negative) on receptors (on flooding, drainage, water quality and / or water resources and associated sensitive receptors);
- Slight effect: where the proposed development could be expected to result in a slight or have a highly localised effect; and
- Neutral: where no discernible effect is expected as a result of the proposed development on receptors.

ASSUMPTIONS & LIMITATIONS

10.3.16. It is assumed that the mitigation measures listed as part of a Construction Environmental Management Plan (CEMP), which will be prepared by a Contractor in advance of construction, are correctly implemented and best practise is adopted at all times during the construction and operational phases. It is also assumed that the flood mitigation measures described in the FRA and the drainage strategy, both foul and surface water, will be functional and able to successfully mitigate the potential impacts during the construction and operation phases.

10.4. BASELINE CONDITIONS

10.4.1. This section summarises information on the baseline conditions of water resources and related receptors that have the potential to be influenced by the proposed development.

TOPOGRAPHY

10.4.2. Survey Operations Limited completed a topographic survey in August 2019. The survey indicates that the Application Site has an average level of approximately 7.5m AOD. A minimum existing ground level of approximately 4.5m AOD near the centre of the Application Site is associated with the area that makes up the former Bubbles complex (bathing pool). A maximum level of 10.4m AOD is located near the northern site boundary. Levels on the survey have not been independently verified by WSP. The Environment Agency LiDAR 1m Digital Terrain Model (DTM) levels generally agree with those recorded in the topographic survey.

COASTAL WATER FEATURES

10.4.3. Morecambe Bay, a large estuary, is situated directly to the north of the site. In 2019, Morecambe Bay was identified as having a WFD ecological status of 'Moderate' and a chemical status of 'Fail'. The overall waterbody classification for 2019 is 'Moderate'. Morecambe Bay is designated as a Site of Special Scientific Interest (SSSI), a Ramsar site, a Special Protection Area (SPA) and a Special Area of Conservation (SAC. Therefore, the waterbody requires special protection under EU legislation, especially with regards to the 'Conservation of Wild Birds Directive' and 'Habitats and Species Directive'.

10.4.4. The Kent is a small estuary which drains into the Morecambe Bay from the north east. The estuary is of both national and international conservation importance, and forms part of the Morecambe Bay SSSI, SAC, SPA and Ramsar site.

10.4.5. In terms of water quality, Morecambe Bay and the Kent estuary are of **very high** importance.

SURFACE WATER FEATURES

10.4.6. There is a culverted Ordinary Watercourse at the Application Site which flows from the south to the north beneath Marine Road Central through the centre of the site to the left of the War Memorial, where it heads eastwards along the road, before heading north beneath the existing car park and discharges to Morecambe Bay.

10.4.7. The culverted watercourse is of **medium** importance in terms of surface water and flood risk.

10.4.8. There are no other known waterbodies within 500m of the site.

DRAINAGE NETWORK

10.4.9. United Utilities records, provided within the FRA (**Appendix 10.1 of Volume 3**), indicate that there are no assets within the site itself although two combined sewer pipes running parallel (450mm and 300mm diameter) are present under Marine Road Central. The plans indicate that these sewers convey flows from an upstream private combined sewer with the head of the run to the south west of the site.

10.4.10. This receptor is considered to be of **low** importance.

WATER SUPPLY

10.4.11. The Water Resources Management Plan shows that United Utilities supplies water to the Strategic Water Resource Zone (WRZ), in which the site is situated. Consideration of the WRZ is included in this assessment as the maximum number of people visiting the development is predicted to be 4,000 per day (rather than 0 currently) thus potable water usage will increase.

10.4.12. The area supplied by United Utilities covers North West England and extends across Cumbria, Lancashire, Greater Manchester, Merseyside, most of Cheshire and a small area of Derbyshire, serving over seven million customers. The Strategic Resource Zone provides an average supply of water of 1,697 million litres per day.

10.4.13. The majority (over 90%) of United Utilities' own supplies come from rivers and reservoirs, with the remainder from groundwater. This contrasts with England's general trend of an average 60% of water being sourced from rivers and reservoirs.

10.4.14. The future projected demand indicates there will be a surplus over the 20 years from 2020 to 2040, with a very small deficit occurring from 2041 to 2045 which can be mitigated through reduced consumption and leak detection.

10.4.15. United Utilities, through their Water Resources Management Plan, identifies a number of mitigation measures to address the supply demand balance deficit in the Strategic Resource Zone through their proposed leakage reduction plan:

- *'Maintenance of our monitoring equipment which identify leaks within district metered areas; Widespread pressure management to reduce the breakout and flow rate of leaks;*
- *Good quality data and continual review of our leakage management and information systems;*
- *Efficient leakage detection and repair using the latest technologies;*
- *Replacement and refurbishment of poor performing water mains;*
- *Providing free supply pipe repairs for domestic customers; and*
- *Improving customer and community awareness (Leakline campaigns).'*

10.4.16. The importance of this receptor is considered to be **high**.

SURFACE WATER ABSTRACTIONS AND DISCHARGES

10.4.17. There are no known surface water abstractions within 1.5km of the site.

10.4.18. This receptor is therefore considered of **negligible** importance and has not been considered within the assessment.

GROUNDWATER FEATURES

GEOLOGY

10.4.19. British Geological Survey (BGS) mapping indicates that the underlying bedrock geology comprises mudstone, siltstone and sandstone of the Millstone Grit Group.

10.4.20. BGS mapping also indicates that there is a small area of Bank Deposits present in the northern section of the site covering a section of the promenade.

10.4.21. The majority of the Site, except an area to the east, is indicated to comprise of artificial ground according to BGS mapping.

10.4.22. In addition, the mapping shows that Raised Tidal Flat Deposits are present immediately south of the site. Storm Beach Deposits are also located immediately to the east, west as well as north of the site along the Stone Jetty.

10.4.23. Topsoil / subsoil is anticipated to be present within landscaped areas. With reference to the Cranfield Soil and Agrifood Institute Soilscapes database, the soils are classified as Soilscape 23 which are loamy and sandy soils with natural high groundwater and a peaty surface.

HYDROGEOLOGY

10.4.24. The Millstone Grit bedrock is classified as a Secondary A aquifer. The Bank Deposits are classified as Secondary B aquifers. The Raised Tidal Flat Deposits are classified as unproductive strata and the Storm Beach deposits are classified as Secondary A aquifers.

10.4.25. The site is located within the Lune and Wyre Carboniferous Aquifer groundwater body (reference GB41202G102700) which was classified under the Water Framework Directive (WFD) as having good overall status in 2016.

10.4.26. The site is not located within a source protection zone (SPZ).

10.4.27. Based on the above, groundwater is considered to be a water resource of **medium** importance.

GROUNDWATER ABSTRACTIONS AND DISCHARGES

10.4.28. There are no groundwater abstractions within 1.5km of the site.

10.4.29. The importance of this receptor is therefore considered **negligible** and has not been considered within the assessment.

ECOLOGICAL DESIGNATIONS

10.4.30. Morecambe Bay is classified as a Site of Special Scientific Interest (SSSI) and is also a designated Ramsar site. Morecambe Bay and the Application Site are also Special Protection Areas (SPA) which provide protected site condition zones for wild birds. The Application Site is also considered a Special Area of Conservation (SAC).

10.4.31. The importance of these receptors is considered as **very high**.

CULTURAL HERITAGE

10.4.32. There are four listed buildings within a 200m buffer of the Site. These include; a war memorial, the Midland Hotel, the former station building and lighthouse on the Stone Jetty and a wall and two pairs of entrance piers that enclose the south-east of the Midland Hotel car park.

10.4.33. The importance of these receptors is considered as **very high**.

FLOOD RISK AND DRAINAGE

Flood Risk Receptor Value

10.4.34. This section of the Chapter defines the baseline flood risk from all sources as defined under the NPPF and as reported in the FRA for the site.

10.4.35. The importance of receptors relates to the NPPF vulnerability classification for land uses potentially affected by the development. Potential receptors can be occupiers or users of the development, as well as users or occupiers of land outside of the site boundary that could be affected by changes to flood risk as a result of the development.

10.4.36. The development will cover an area of approximately 4.6 ha and, according to the NPPF vulnerability classification, is classified as 'Less Vulnerable' as it will be used for assembly and leisure use. The receptor importance / sensitivity of the receptor in relation to flood risk is classified as **medium**.

10.4.37. Construction workers, local residents, off-site third parties and nearby developments are also sensitive to an increase in flood risk and therefore have been defined as a separate receptor with **medium** importance.

10.4.38. The highest flood risk to the development is from coastal / tidal and pluvial sources, and both are summarised below. The risk of flooding to and from the development in terms of fluvial, groundwater, sewer and drainage infrastructure, and artificial sources is negligible to low (refer to FRA Volume 4 Appendix 13.1).

Coastal / Tidal Flood Risk

10.4.39. The Environment Agency's current Flood Map for Planning shows that the majority of the site is situated within both Flood Zone 1 and Flood Zone 2. Flood Zone 1 is classified as land assessed as having a less than 1 in 1000 annual probability of sea flooding (<1.0%), and Flood Zone 2 is classified as land assessed as having between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year.

10.4.40. Along the northern edge of the site, where it meets Shell Bed Flat beach, the site lies in Flood Zone 3. A section to the south-east along Marine Road Central is also within Flood Zone 3. Flood Zone 3 is classified as having a 1 in 200 or greater annual probability of flooding from the sea (>0.5) in any year.

10.4.41. Hydraulic modelling using outputs from the Environment Agency's coastal modelling is currently being undertaken to better understand the risk of flooding from the coast to the site and determine mitigation requirements.

10.4.42. Based on the information reviewed, the site is partially at risk of coastal / tidal flooding from Morecambe Bay. The risk of flooding from this source to the site is considered to be Low to High across the Application Site.

Pluvial Flood Risk

10.4.43. The Environment Agency's Risk of Flooding from Surface Water Mapping indicates the main risk of flooding from surface water is Very Low. Areas at Very Low risk of surface water flooding have an annual probability of flooding of less than 0.1%.

10.4.44. There are several areas of Medium and Low risk of surface water, however these are localised and likely to be associated with the low-lying areas on the Application Site. Areas at a Low risk of surface water flooding have an annual probability of between 0.1% and 1%. Medium risk areas have an annual probability of surface water flooding ranging from 0.1% to 3.3%.

10.4.45. As a result of this the existing flood risk from Pluvial/Overland flow sources at the Application Site ranges from Very Low to Medium.

Future Baseline

10.4.46. Should the proposed development not proceed, it is considered that the future baseline conditions (in the short-term) in relation to flood risk, drainage (and the water environment) at the site would remain relatively unchanged, provided that other development does not take place in close proximity.

10.4.47. In the medium to long-term, sea levels and wave heights are expected to rise due to climate change, leading to increased coastal flood risk. The volume and intensity of precipitation falling on the site is also predicted to increase due to climate change, leading to increased fluvial and pluvial flood risk, and increased pressures on sewerage infrastructure. An increase in precipitation could also result in higher groundwater levels at the site over time.

Sensitive Receptors

10.4.48. **Table 100-5** summarises the sensitive receptors that have been considered for assessment.

Table 100-5 – Sensitive Receptors

Water Resource Receptor	Importance
Morecambe Bay and the Kent	Very High
Surface Water Features	Medium
United Utilities Drainage Network	Low
Water Supply (Strategic Water Resources Zone)	High
Surface Water Abstractions and Discharges	Negligible
Groundwater Body	Medium
Groundwater Abstractions and Discharges	Negligible
The proposed development (in relation to Flood Risk)	Medium

Water Resource Receptor		Importance
Construction workers, local residents, off-site third parties and nearby developments (in relation to Flood Risk)		Medium
Ecological Designations	Ramsar Site	Very High
	Site of Special Scientific Interest (SSSI)	Very High
	Special Areas of Conservation (SAC)	Very High
	Special Protection Area (SPA) – will bird general licence protected sites conditioned zone).	Very High
	Listed buildings – war memorial, Midland hotel, wall and two pairs of entrance piers enclosing south east side of car park of midland hotel.	Very High

10.5. INHERENT DESIGN MITIGATION

10.5.1. Through the adoption of best practice construction methods, operational management and design of the proposed development, there are several measures that can be considered as embedded mitigation which will reduce the risk and likelihood that some potential effects on water resources or flood risk etc. would occur. The measures will be developed and set out in a Construction Management Plan (CMP) and implemented through a CEMP for the proposed development, which will be prepared by the Contractor in advance of construction.

10.5.2. Best practice recommendations for the prevention of contamination will be outlined in more detail in the CEMP and agreed with relevant statutory consultees prior to the commencement of construction works. This will include measures to comply with relevant legislation and guidance, and best practice measures in line with the Considerate Contractors Scheme and Site Handbook for the Construction of SuDS (CIRIA 698)[11]. It will include an erosion prevention and sediment control plan to reduce the quantity of sediment entrained in runoff and to prevent hydro-morphological changes to Morecambe Bay.

10.5.3. All site and ground works will be undertaken in accordance with the CEMP which will include the following items:

- Programme and phasing details of works;

[11] CIRIA, 2007 'Site handbook for the construction of SUDS' available at https://www.ciria.org/ItemDetail?iProductCode=C698&Category=BOOK [accessed July 2021]

- A broad plan of site preparation and construction works, highlighting the various stages and their context within the project including a full schedule of materials, manpower resources, and plant and equipment schedules;
- Detailed Site layout arrangements, plans for storage, accommodation, vehicular movements, delivery and access;
- Prohibited or restricted operations;
- Details of plant used; and,
- Details of operations that are likely to result in disturbance, with an indication of the expected duration of each phase with key dates.

CONSTRUCTION PHASE

Short Term Increase in Flood Risk due to Construction Activities

10.5.4. The following mitigation measures will be embedded within the CEMP and implemented during the construction phase, to manage flood risk, surface water runoff and foul flows:

- The drainage strategy will be implemented on a phase by phase basis as part of the design solution.
- Movement of materials around the Site will be managed under an appropriate Materials Management Plan to ensure that the placement of materials does not affect flood risk. Materials will not be stockpiled in the floodplain or in such a way that will increase flood risk off-Site.
- It is anticipated that surface water run-off from the various construction areas within the Site would be managed by the use of temporary bunding and settlement ponds to protect the receiving water environment from excess water, sediment load and contaminants. Settlement ponds allow for isolation and onsite treatment of sediment laden or chemically contaminated surface water runoff prior to discharge, following agreement with the appropriate authority, or use of other appropriate means of disposal.
- Best practice construction measures will be adopted in line with the Considerate Contractors Scheme and ‘Site handbook for the construction of SUDS’ (CIRIA C698) to minimise the risk of flooding during construction.

Short Term Alterations to Groundwater Flow and Quality

10.5.5. The following mitigation measures should be embedded within the CEMP and implemented during the construction phase, to manage the risk of alterations to groundwater flow and quality during construction:

- Pile casing during piling and isolation of the area around the piling from surface water until piling is complete;
- If perched groundwater is encountered within the made ground or superficial deposits at the site, during the establishment of foundations, dewatering may be required. The most appropriate method of dewatering will be chosen at this stage, which may include the enclosure of the excavation by sheet piling. Piezometers could be used outside of the sheet-pile to monitor groundwater levels;
- If ground contamination is encountered during construction works, work will stop immediately and measures will be taken to prevent disturbance and mobilisation of contaminants, until the contamination has been treated in-situ or removed for off-site treatment;

- Water arising from excavations will require disposal into the local sewer network, if uncontaminated. The removal of silts will be conducted by settlement ponds, implemented as part of the temporary drainage strategy; and,
- Damp proof membranes will be incorporated during construction, to prevent the ingress of shallow groundwater.

Short Term Effects on the Quality of Water Resources through Leaks and Spills.

10.5.6. The following mitigation measures should be embedded within the CEMP and implemented during the construction phase to manage the risk of chemical and biological contamination (primarily associated with leaks and spillages) entering the water environment onsite. These spillages could potentially lead to degradation of water quality, which is particularly relevant as Morecambe Bay is designated as a Ramsar Site, a Site of Special Scientific Interest and a Special Area of Conservation. The mitigation measures are:

- Preparation of incident response plans, prior to construction, which should be present on-site throughout construction to inform contractors of required actions in the event of a pollution incident;
- Spillages and leaks will be immediately contained in line with the incident response plan;
- On-site availability of oil spill clean-up equipment including absorbent material and inflatable booms for use in the event of an oil spill or leak;
- Wherever possible, plant and machinery will be kept away from the drainage system and watercourses;
- Use of drip trays under mobile plant;
- Construction materials brought to the site should be free of any contaminated material, so as to avoid any possible contamination of watercourses; and,
- Wet cement should not come into contact with surface water (including the culverted watercourse), or near the coastal waterbodies. Cement should be poured in dry conditions and consideration should be given to use of fast drying cement. Weather and tidal conditions should be monitored prior to the pouring of any cement.

Short Term Increase in Physical Contamination (i.e. Sedimentation) entering Surface and / or Coastal Waterbodies.

10.5.7. The following mitigation measures should be embedded within the CEMP and will be implemented during the construction phase to manage the risk of physical contamination (sedimentation) of the water environment onsite:

- Working areas shall be clearly defined to ensure the disturbance of soils is minimised, where possible;
- A Phase II Site Investigation will be commissioned to assess the risk of contaminated soils and groundwater at the site;
- Haul routes and accesses shall be clearly defined to minimise risk of accidents;
- The cleaning of vehicles wheels prior to leaving site;
- If stock piling and plant and vehicle washing occur in close proximity to a waterbody they should be separated from the watercourse with barriers (e.g. sediment fences) to prevent surface runoff from these sites entering the waterbody;

- It is anticipated that surface water run-off from the various construction areas within the site could be managed by the use of temporary bunding and settlement ponds to protect the receiving water environment from excess water, sediment load and contaminants;
- Controlled and covered waste storage areas;
- Works will be undertaken in the dry and away from the surface water and coastal waterbodies as much as practically possible to minimise the release of sediment into them;
- Dust Management Plan (i.e. damping down);
- Installation of systems such as silt traps / fences and swales designed to trap silty water including adequate maintenance and monitoring of these to ensure effectiveness, particularly after adverse weather conditions;
- Provision of environmental awareness training for Site workers; and
- Use of inert, uncontaminated material during construction.

10.5.8. The inclusion of the above mitigation measures will ensure that the significance of effects during the construction stage is **neutral** for the considered sensitive receptors.

OPERATIONAL PHASE

10.5.9. The following elements are primary mitigation measures that have been 'designed in' during the design process and are considered to be best practice.

Potential Increase In On and Off-Site Risk

10.5.10. To manage surface water flood risk and the proposed foul flows at the proposed development, a Drainage Strategy has been prepared covering both elements (**Appendix 10.2 of Volume 3**). The strategy will be delivered in accordance with relevant national and local policy to ensure surface water flood risk is not increased by the proposed development.

10.5.11. The key elements of the Surface Water Drainage Strategy (SWDS) are summarised below:

- A blue roof system is envisaged to capture rainfall from the roof areas of the main 'shells' and this will be retained for reuse.
- Surface water captured in the public realm area will be conveyed where possible to the proposed SuDS features including detention ponds, enhanced swale and rain gardens.
- There are two options presented for surface water disposal which require further investigation. Both options will be designed to accommodate the 1% AEP + 40% climate change scenario.
    - The first option is to reuse two existing soakaways to the north of the site, into which discharge rates will be restricted by the incoming pipework.
    - The second option is to discharge surface water to the existing culvert crossing the site. The discharge rate will be limited to the estimated greenfield runoff rate. A below ground storage tank will be required for this option due to the additional volume required to be stored.

10.5.12. In terms of the Foul Water Drainage Strategy (FWDS), United Utilities confirms foul flows from the site will be allowed to drain into the public foul water/combined sewer system and the proposed foul connection with a maximum pass forward flow of 5 l/s is acceptable in principle. Further liaison with United Utilities will be required as the design progresses, and the foul flow rate is refined, however, this should be confirmed at detailed design stage.

10.5.13. As part of the flood risk assessment hydraulic modelling (including wave overtopping) is being carried out for the baseline (existing) and post development (incl. proposed development) scenarios using output from the Environment Agency's coastal modelling. The modelling will assess the effect of the proposed development on flood risk and be used to designed measures to be incorporated into the development to ensure that it is safe up to and including the 0.5% AEP plus climate change scenario, and that flood risk to other people and property will not be increased as a result of the proposed development.

10.5.14. Part of the mitigation currently proposed for the development includes flood gates at two service entries to the north of the shell complex which will protect the ground floor and lower levels in the event of tidal flooding. The final suite of measures will be confirmed on completion of the modelling and confirmed with the relevant stakeholders.

Potential Increase in Contamination of Surface / Coastal Water Bodies

10.5.15. During the operational phase, routine runoff from impermeable areas will be conveyed into the surface water drainage system. The quality of surface water run-off from the impermeable areas would be managed through the implementation of the drainage design including regular maintenance of the proposed SuDS features. The drainage design will consist of the following, in line with the requirements detailed in the SuDS Manual (C753), as outlined in the SWDS (**Appendix 10.2 of Volume 3**):

- Swale: includes regular management of vegetation including grass cutting, inspections of inlets, for silt accumulation and outlets, and removal of litter.
- Pond: includes regular inspections of outlets and inlets, removal of litter and management of vegetation.
- Filter Drain: includes regular removal of litter and debris from filter drain surface, inspections of inlets and outlets, inspections for sediment accumulation.
- Storage Tank: includes regular inspection to identify any areas not operating correctly, removal of debris from catchment surface and sediment from pre-treatment structures.

10.6. POTENTIAL ENVIRONMENTAL IMPACTS & EFFECTS

CONSTRUCTION IMPACTS AND EFFECTS

10.6.1. With the embedded mitigation put in place in the CMP and the CEMP, it is concluded that there would be no remaining potential effects on the water environment during the construction phase.

Temporary Increased Demand on Potable Water Supplies associated with Construction Activities

10.6.2. Processes during the construction phase of the proposed development which may require significant volumes of supply include mixing (particularly concrete), supply for washing down and potable water for sanitary facilities for Site staff. The most intensive use of water, mixing concrete, would be carried out off-Site where possible and therefore would have a limited effect on the water supply of the Site.

10.6.3. During the initial planting stage, it is anticipated that an additional volume of water would be required whilst the plants are being bedded in.

10.6.4. Water supply to the site during construction and this bedding in period, is expected to be provided by United Utilities, subject to an application to use the existing water supply for building (and other, if required) purposes. The increased demand in water supply during this phase is considered to be negligible. Mitigation is therefore not considered necessary during this phase.

10.6.5. The sensitivity of the Strategic WRZ is considered to be high, and the magnitude of change, is considered to be negligible. Subsequently the significance of effect is **slight**.

Temporary Increased Pressure on Existing Infrastructure from increased Wastewater Flows

10.6.6. Wastewater generation on construction sites include effluent from; sanitary facilities provided on-Site, washing down and wheel wash facilities. It is expected that foul water generated at the Site will be drained via existing United Utilities foul sewers in the surrounding area, following treatment if required. If dewatering is required during excavations for foundation preparations, then abstracted water may be discharged into the United Utilities network, following sediment removal.

10.6.7. The increase in foul flows during this phase is considered to be negligible. Mitigation is therefore not considered necessary during this phase.

The sensitivity of the United Utilities Drainage Network is considered to be low and the magnitude of change is considered to be negligible. Subsequently the significance of effect is **slight**.

OPERATIONAL IMPACTS AND EFFECTS

10.6.8. Through the embedded mitigation put in place in the CEMP and the drainage strategy, it is concluded that the only remaining potential effects on the water environment during the operational phase comprises the potential permanent increased demand on potable water supplies.

Potential Permanent Increased Demand on Potable Water Supplies

10.6.9. This operational impact links directly to the Strategic WRZ. The proposed water demand volumes have been calculated for leisure uses taking into account the maximum number of daily visitors (4,000) to the proposed development.

Table 10.6: Water Usage and Demand: Leisure Uses

Leisure	Average consumption per person (l/day)	Max. number of people per day	Proposed Demand (m^3/day)
	10*	4,000	40

* Worst case maximum daily total water consumption for places of assembly from BSRIA Rules of Thumb, Guidelines for building services (5th Edition).

10.6.10. There will also be a water demand for irrigation purposes, and this is expected to be approximately 15m^3/day from October to March and 28m^3/day from April to September. This number is expected to be refined through the detailed design, however, rainwater harvesting will be utilised throughout the proposed development as far as practically possible to meet the irrigation demand.

10.6.11. The existing site is a vacant brownfield site, therefore the current water demand is 0 m^3/day. The proposed development will therefore result in an increased water demand of up to 68 m^3/day.

10.6.12. Under best practice guidance, it is recommended that the proposed development considers implementing sustainable measures to reduce consumption and to encourage the re-use and conservation of water to reduce the negative effects of an increased water demand.

10.6.13. United Utilities, through their Water Resources Management Plan, stated that the WRZ was in surplus from 2020 to 2040, with a very small deficit occurring from 2041 to 2045 which United Utilities confirmed can be addressed through their mitigation measures.

10.6.14. The sensitivity of the WRZ to this impact is high, and the magnitude of impact is considered to be negligible due to the mitigation measures implemented within United Utilities WRMP and the proposed reuse of water on site for irrigation purposes. Subsequently, the significance of the effect is considered to be **slight**.

10.7. ASSESSMENT OF EFFECTS, MITIGATION AND RESIDUAL EFFECTS

CONSTRUCTION PHASE

10.7.1. Effects arising, as a result of the construction stage, are considered to be neutral to slight, as detailed in Section 10.6 of this Chapter. Therefore, further mitigation is not considered necessary.

10.7.2. The appropriate consents will be obtained from Lancashire County Council, as Lead Local Flood Authority (LLFA), for any works or activities affecting the culverted watercourse. The appropriate consents will be obtained from Lancaster City Council for any works or activities affecting the flood defences. The works which form part of the consents should be detailed through an appropriate method statement and the CEMP.

OPERATIONAL PHASE

10.7.3. Effects arising, as a result of the operational stage, are considered to be neutral to slight, as detailed in Section 10.6 of this Chapter. Therefore, further mitigation is not considered necessary, however elements of the operational phase will have a residual risk which will need to be managed.

Potential Increase in On and Off-Site Flood Risk

10.7.4. The site is likely to be at risk of tidal inundation during a breach scenario of the coastal flood defences. Therefore, regular inspections should be carried out of the primary and secondary flood defences to ensure this residual risk is managed.

10.7.5. A Flood Management Plan will be required to be in place to manage the safety of users of the development during a flood event. This should include flood warning and an evacuation plan, as well as details of the operation and maintenance schedule of the flood mitigation measures such as the flood gates.

10.7.6. A pump system will be installed in the basement areas to deal with tidal flooding and this system will also deal with any surface water exceedance events that reach the lower site areas.

10.7.7. The elements proposed in the drainage strategy will be installed and maintained in accordance with manufacturer's recommendations. Regular inspection and maintenance is required to ensure the effective long-term operation of SuDS; these requirements are detailed in the SuDS Manual (C753).

Potential Increase in Contamination of Surface / Coastal Water Bodies

10.7.8. As stated above, regular inspection and maintenance of the SuDS features is required to ensure long-term effective water quality treatment as detailed in the SuDS Manual (C753).

10.8. CUMULATIVE EFFECTS

10.8.1. This section reports the assessments of the proposed development in combination with potential effects of other proposed developments as there is a likelihood that other developments could be constructed at the same time as the proposed development.

10.8.2. The information on Lancaster City Council's website indicates that within the last 2 years there have been no other major developments which have been consented within the study area of this assessment. However, other applications could potentially come forward and therefore the cumulative effects have still been considered below.

Cumulative effects during the construction phase

10.8.3. Cumulative effects on water resources during the construction phase are associated with:

- The effects on water quality of water resources, due to accidental leaks and spillages (including the potential leakage of wet cement); and,
- The increase in physical contamination (i.e. sedimentation) of surface / coastal water bodies, due to ground disturbance.

10.8.4. The measures that should be implemented to manage and control these effects and reduce the magnitude and significance of these effects to a minimum are stated in the pre-mitigation scenario. These measures form part of the CEMP for the site which should also be adopted at other construction sites, as best practice.

10.8.5. Assuming these are successfully implemented and are appropriately monitored by the Local Planning Authority, the cumulative effects during the construction phase for the proposed development and other consented developments is considered negligible.

Cumulative effects during the operation phase

10.8.6. Cumulative effects on water resources during the operation phase are associated with:

- Potential increase in on and off-site flood risk; and,
- Potential increase in contamination (i.e. Sedimentation) of surface / coastal water bodies.

10.8.7. The measures that should be implemented to manage and control these effects and reduce the magnitude and significance of these effects to minimum are stated in the pre-mitigation scenario. These measures include the implementation of a drainage strategy covering both foul and surface water elements as well as the coastal flood mitigation measures and those that may be incorporated following completion of the modelling.

10.8.8. The proposed development will also result in an increased pressure on potable water resources and foul drainage infrastructure, due to the proposed leisure facilities. The United Utilities WRMP has undertaken an assessment on the effect of the projected population and development within the Strategic WRZ, in which the proposed development is situated. It is considered that the plan has made sufficient provision in its short, intermediate and long-term plans to accommodate the projected growth in the region and the cumulative effects of the sites.

10.8.9. Regarding foul drainage, as with this site, other potential developments in the area will be seeking connection to the United Utilities sewer network. It is expected that each site undertakes liaison with United Utilities as the sewerage undertaker, to ensure there is sufficient capacity within the existing network to account for the additional foul flows, as is per standard practice. If the capacity is found to be insufficient for any of the potential developments, sewer upgrades will be required and managed within each site. However, as United Utilities have agreed in principle to the foul flows from the site into the combined sewer it is assumed that there is sufficient capacity. As a result, it is considered that the cumulative effects resulting from increased pressure on potable water resources and foul drainage infrastructure are **slight**.

10.9. SUMMARY

10.9.1. This chapter reports the outcome of the assessment of likely significant effects arising from the proposed development on water resources, flood risk and drainage. The assessment has identified sensitive receptors that are most likely to be affected by changes in the water environment as a result of the proposed development. The potential impacts on the sensitive receptors during the construction and operation phases, and the significance of the impacts have been assessed in line with DMRB guidance.

10.9.2. The sensitive water receptors identified within 500m of the site are Morecambe Bay and the Kent coastal waterbodies, the culverted watercourse, the United Utilities Drainage Network, the Strategic Water Resource Zone and the groundwater bodies in the bedrock and superficial deposits.

10.9.3. The proposed development itself has been defined as a receptor based on the type of development in accordance with the NPPF vulnerability classification.

10.9.4. Mitigation measures have been considered to address the effects of the proposed development on local surface and coastal water bodies. The effects which have been assessed include the potential impacts from flooding for both construction and operational phase, the potential effect on water quality resources, potential physical contamination (sedimentation), and potential alterations to groundwater flow.

10.9.5. Provided that the proposed embedded mitigation measures are implemented, it is considered that the proposed development will have a neutral to slight effect on the sensitive receptors during both the construction and operational phases. Refer to **Table 107** below for a Summary Assessment Table.

Table 100-7 – Summary of Effects for the Water Environment

Effects	Receptor	Significance and nature of effects prior to mitigation / enhancement	Summary of mitigation / enhancement	Significance and nature of effects following mitigation / enhancement (residual)
Construction Phase				
Short Term Increase in Flood Risk due to Construction Activities - Measures detailed in the CEMP.	The proposed development Construction workers, local residents, off-site third parties and nearby developments	D / T / ST / - / ○	No further mitigation or enhancement is proposed.	N/A
Short Term Alterations to Groundwater Flow - Measures detailed in the CEMP.	Groundwater Bodies	D / T / ST / - / ○	No further mitigation or enhancement is proposed.	N/A
Short Term Effects on the Quality of Water Resources through leaks and spills - Measures detailed in the CEMP.	Morecambe Bay and the Kent Groundwater Bodies Surface Water Features	D / T / ST / - / ○	No further mitigation or enhancement is proposed.	N/A
Short Term Increase in Physical Contamination of Surface and/or Coastal Waterbodies - Measures detailed in the CEMP.	Morecambe Bay and the Kent Surface Water Features	D / T / ST / - / ○	No further mitigation or enhancement is proposed.	N/A
Temporary Increased Demand on Potable Water Supplies associated with Construction Activities	Strategic WRZ	D / T / ST / - / ●	No further mitigation or enhancement is proposed.	N/A
Temporary Increased Pressure on Existing Infrastructure from increased Wastewater Flows	United Utilities Drainage Network	D / T / ST / - / ●	No further mitigation or enhancement is proposed.	N/A
Operational Phase				
Potential Increase in On and Off-site Flood Risk– mitigation measures embedded in drainage strategy and FRA	The proposed development Construction workers, local residents, off-site third parties and nearby developments	D / P / LT / - / ○	No further mitigation or enhancement is proposed.	N/A
Potential Increase in Contamination of Surface / Coastal Waterbodies – mitigation measures embedded in surface water drainage strategy	Morecambe Bay and the Kent Surface Water Features	D / P / LT / - / ○	No further mitigation or enhancement is proposed.	N/A
Potential Permanent Increased Demand on Potable Water Supplies – mitigation measures embedded through rainwater harvesting to reduce consumption	Strategic WRZ	D / P / LT / - / ●	No further mitigation or enhancement is proposed.	N/A

Key to table:

● Very Large significance, ● Large significance, ● Moderate significance, ● Slight significance, ○ Neutral significance

+ / - = Beneficial or Adverse P / T = Permanent or Temporary, D / I = Direct or Indirect, ST / MT / LT = Short Term, Medium Term or Long Term N/A = Not Applicable

11

TRAFFIC, TRANSPORT AND ACCESS

PUBLIC

11. TRAFFIC, TRANSPORT AND ACCESS

11.1. INTRODUCTION

11.1.1. This section of the Environmental Statement (ES) has been prepared by WSP and examines the environmental impact of the traffic and wider transport modes that will be *'attracted'* by the proposed development. This section is based upon the Eden Transport Strategy, and the Transport Assessment (TA) and Interim Travel Plan (ITP) that have been produced to accompany the planning application. Both documents can be found at **Appendix 11.1 and 11.2 of Volume 3** of this ES.

11.1.2. A comprehensive process of statutory and non-statutory stakeholder engagement has been undertaken by WSP over the last 28 months, including:

- Lancashire County Council (Highways, Traffic, Infrastructure, Parking and Public Transport teams);
- Lancaster City Council (Parking, Economic Growth and Regeneration and Planning teams);
- Highways England;
- Sustrans;
- Network Rail;
- Northern Railway;
- Avanti West Coast;
- SLC Rail (Lancaster CC rail consultants);
- Stagecoach;
- The Long Distance Walkers Association;
- Genecon (authors of the Outline Business Case);
- Planning Solutions Consulting Limited (Leisure Consultant);
- Trivandi (Project Manager);
- Grimshaw (Architect),
- TEP (Landscape Architect);
- Buro Happold (Civil Engineering); and
- WSP (multiple disciplines).

11.1.3. WSP have progressed several workstreams and drawn upon several documents to inform the production of this ES chapter, as set out below:

- Environmental Impact Assessment Transport Scope (June 2019);
- Initial Visitor and Employees Trip Generation and Distribution Technical Note (August 2019);
- Transport Group Meeting where the proposed methodology was presented. This was held on 12/09/2019 and the following stakeholders attended:
  - Lancashire County Council (Highways, Traffic, Infrastructure, Parking and Public Transport teams);
  - Lancaster City Council (Parking, Economic Growth and Regeneration and Planning teams);
  - Highways England;
  - Atkins (Highways England consultant)
  - Network Rail;
  - Northern Railway (invited, did not attend this first meeting);
  - SLC Rail (Lancaster CC rail consultants);

- Stagecoach;

- Engagement with Lancashire CC (Highways, Traffic, Infrastructure, Parking and Public Transport teams);
- Engagement with Lancaster CC (Parking, Economic Growth and Regeneration and Planning teams);
- Two-day site visit to Eden Cornwall to understand existing transport strategy and logistic operations (February 2020);
- Engagement with multiple stakeholders as summarised above;
- Support to the Outline Business Case;
- Transport Assessment Scope (April 2021);
- Developed the EPN Transport Strategy; and
- Developed the EPN Parking Strategy;

11.2. POLICY CONTEXT

Introduction

11.2.1. The Guidelines for the Environmental Assessment of Road Traffic (IEMA) 1993 has been referenced in this ES chapter. IEMA have confirmed that the 1993 Guidance remains the most current version and has not been superseded by a complete replacement document.

11.2.2. The TA sets out the key national, regional and local traffic and transport policies that are relevant to the proposed development and demonstrates how the proposals accord with these policies.

National Planning Policy Framework, July 2021

11.2.3. The National Planning Policy Framework (NPPF) has a core focus on streamlining the overall development process. It maintains that plans and decisions should apply a presumption in favour of sustainable development.

11.2.4. The NPPF states (para 110) that *"In assessing sites that may be allocated for development in plans, or specific applications for development it should be ensured that:*

a) appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;

b) safe and suitable access to the site can be achieved for all users;

c) the design of streets, parking areas, other transport elements and the content of associated standards reflects current national guidance, including the National Design Guide and the National Mode Design Code; and

d) any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree."

11.2.5. The NPPF states that development *"should only be prevented or refused on transport grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts of development are severe."* (para 111).

11.2.6. The NPPF states (para 112) that applications for new development should:

"a) give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second – so far as possible – to facilitating access to high quality public transport, with layouts that maximise the catchment area for bus or other public transport services, and appropriate facilities that encourage public transport use;

b) address the needs of people with disabilities and reduced mobility in relation to all modes of transport;

c) create places that are safe, secure and attractive – which minimise the scope for conflicts between pedestrians, cyclists and vehicles, avoid unnecessary street clutter, and respond to local character and design standards;

d) allow for the efficient delivery of goods, and access by service and emergency vehicles; and

e) be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations."

11.2.7. In the assessment of development proposals, it should be ensured that:

"a) appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;

b) safe and suitable access to the site can be achieved for all users; and

c) any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree."

11.2.8. Furthermore, the NPPF states:

"All developments that will generate significant amounts of movement should be required to provide a Travel Plan, and the application should be supported by a transport statement or transport assessment so that the likely impacts of the proposal can be assessed." (para 113)

Planning Practice Guidance

11.2.9. The Government's Planning Practice Guidance (PPG) supplements the NPPF. PPG includes a section clarifying the over-arching principles on Travel Plans, Transport Assessments and Transport Statements. It also includes sections advising further on each of these three documents.

11.2.10. The guidance on Transport Assessments and Statements re-iterates the circumstances in which either document would usually be required. It is clear that a development of the size and nature of this development requires a full Transport Assessment. The guidance also clarifies the process for establishing a scope for the assessment, and what the assessment should contain. The PPG has been considered in the production of the TA.

Local Transport Plan 2011 – 2021

11.2.11. The Local Transport Plan recognises that *"by 2021 particular problems of traffic congestion and road capacity that have previously limited economic growth in key areas will have been resolved or mitigated."* And *"work with public transport operators will have provided better connections and links with areas inside and outside Lancashire. This work will support regeneration efforts across Lancashire including in our coastal resorts"*.

11.2.12. To achieve this, the following seven transport priorities are set out:

- *"Improving access into areas of economic growth and regeneration;*
- *Providing better access to education and employment;*
- *Improving people's quality of life and wellbeing;*
- *Improving safety of our streets for our most vulnerable residents;*
- *Providing safe, reliable, convenient and affordable transport alternatives to the car;*

- *Maintaining our assets; and*
- *Reducing carbon emissions and its effects."*

Lancaster District Highways and Transport Masterplan (2016)

11.2.13. The Lancaster District Highways and Transport Masterplan outlines ambitious new plans to transform Lancaster District travel patterns. The plan contains a range of improvements within Lancaster District up to 2031. These are;

- *"Position Caton Road as the main gateway into the city from the M6, from both north and south;*
- *Reconfigure M6 Junction 33 to support the development of South Lancaster around Lancaster University;*
- *Develop the 'Lancaster Reach' bus rapid network, incorporating the Park and Ride service from M6 Junction 34 to Lancaster city centre to create a 'Y'-shaped network of two routes, one linking Heysham and Morecambe to South Lancaster via the city centre, the other linking M6 Junction 34 to Lancaster University;*
- *Work with Lancaster City Council to put in place the transport elements needed to make the Morecambe Area Action Plan a reality;*
- *Carry out a Morecambe Bay Connectivity Study to explore the business case for better connection around the whole bay area for all modes of transport; and*
- *A comprehensive plan to develop an integrated multi-use/cycling network for the district, which will support the wider Cycling and Walking Strategy for Lancashire."*

11.2.14. Paragraph 3.9 recognises that *"There are a number of key sectors that are important to Lancashire as target sectors for future development which will require better mans of travel, both strategic connectivity from the rest of the UK and local travel opportunities."* This includes *"a greater role for tourism and Lancashire's significant visitor economy based around increasing the attractiveness of the traditional seaside resort of Blackpool and Morecambe and developing rural tourism."*

Lancashire Climate Change Strategy 2009 - 2020

11.2.15. The Lancashire Climate Change Strategy 2009-2020 recognises that road transport in Lancashire accounts for 24% of carbon dioxide emissions (compared with 26% across the UK). However, road transport also affects quality of life in other ways. Therefore, three objectives are set out:

- *"Develop and maintain an integrated, efficient and sustainable transport system;*
- *Increase the use of public transport, walking and cycling; and*
- *Promote the use of more efficient vehicles and alternative transport fuels, including sustainable bio-fuels."*

Lancaster District Local Plan 2011 - 2031

11.2.16. The Local Plan for Lancaster District 2011 – 2031 provides a new planning framework for the area adopted in July 2008.

11.2.17. Policy NPPF1: Presumption in Favour of Sustainable Development states that *"the council will take a positive approach that reflects the presumption in favour of sustainable development contained within the NPPF. It will always work proactively with applicants to jointly find solutions which means that proposals can be approved wherever possible, and secure development that improves the economic, social and environmental conditions in the area."*

11.2.18. Policy SP10: Improving Transport Connectivity acknowledges that *"New development will be expected to be sited in sustainable locations that ensure a range of transport options and seek to reduce the need to travel."*

11.2.19. Policy TC4: Central Morecambe states that *"The Council is committed to achieving the Morecambe Area Action Plan aims through supporting new development that positively contributes to the town centre and seeks to regenerate derelict and underused land within the Central Morecambe area.*

11.2.20. In transport terms, Policy T1: Lancaster Park and Ride identifies *"two sites that will be protected for the purposes of Park and Ride".* These being the existing M6 Junction 34 Caton Road Park and Ride, and the land at M6 Junction 33 proposals.

11.2.21. Policy T2: Cycling and Walking Network acknowledges that *"The Council are committed to supporting and promoting the role of cycling and walking in the district, building on previous successes of Lancaster's role as a Cycling Demonstration Town providing safe and secure facilities."*

11.2.22. Policy T4: Public Transport Corridors states that the Council has identified the *"Lancaster Road / Morecambe Road between Lancaster city and Morecambe town centre as a key public transport corridor within the district where frequent and regular public transport services will be provided."*

Morecambe Area Action Plan

11.2.23. The Morecambe Area Action Plan (MAAP) is a spatial plan for central Morecambe, the priority area for regeneration within Lancaster District. The MAAP was adopted in 2014 as a Development Plan Document, part of the new Local Plan for Lancaster District. The MAAP provides a framework for the investment, development and change required to regenerate the central Morecambe.

11.2.24. Spatial Policy 3 (SP3). Morecambe Main Seafront and Promenade identifies this area as *"open space for peoples' informal recreation and enjoyment. The Council will protect this main seafront and promenade from development other than that which will demonstrably enhance the open character or is reasonably required to provide or improve opportunities for appropriate informal recreation and enjoyment and will not otherwise harm the open character."*

11.2.25. Development Opportunity Policy DO2 Strategic Leisure – Seafront Headland, Central Promenade identifies the proposed site for the Eden Project North as a *"strategic opportunity for leisure investment and development. The Council will support development proposals for a visitor / education centre."* The Council will further require that any development:

- *"Contributes to improving public realm within the Main Seafront and Promenade; and*
- *Provides for vehicle access, servicing and parking in ways not adverse to public amenity and pedestrian circulation on the Main Seafront, and improves public amenity and safety for pedestrian crossings and reduce the perceived and real severance effect of the highway with the town landward."*

11.2.26. In relation to Marine Road Central, Action Set 5 of the MAAP mentions the Central Seafront and Main Beach and the intention *to "Introduce shared surfaces on Marine Road Central via phased works overtime."* The focus is on improving connectivity between the Seafront and the town centre, with safe and convenient crossings of Marine Road Central.

Lancaster Climate Emergency Declaration (2019)

11.2.27. In 2019 the Council declared a Climate Emergency which set out a commitment to becoming net zero by 2030 and undertaking a Climate Emergency Local Plan Review, *"carefully considering the Local Plan and how we can best develop the District and address climate adaption, mitigation and resilience."*

11.2.28. The Climate Emergency Local Plan Review is one of the areas of the adopted Local Plan that will be reviewed. The Review will focus on modal shift opportunities, particularly on urban areas. It will also focus on an update to parking standards in new developments to encourage reductions in car usage and increased uptake of electric vehicles.

11.3. ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

11.3.1. The detailed assessment methodology is set out in the TA.

Scope of the Assessment

11.3.2. The methodology and scope of assessment was first proposed in the ES Scoping Report and has been developed and refined following consultation with statutory and non-statutory stakeholders and feedback received within the Scoping Opinion.

Insignificant Effects

Operational Phase

- Changes to the existing pedestrian and cycle network and provision of new links within the proposed development;
- Servicing strategy and service vehicle movements, on the basis that these will replace the existing 24-hour Bay Arena Car Park (78 spaces) and hence represent a reduction in movements in this immediate area;
- Traffic generated by the proposed development on the local and strategic road network, on the basis that the proposals use existing underutilised and consented car parks rather than seeking to provide any new car parking.

Potentially Significant Effects

Site Preparation, Earthworks and Construction Phase

- Increase in construction traffic on all users of the local highway network (pedestrians, cyclists, public transport and vehicular traffic) due to the levels of construction traffic; and
- Reduction in road safety from construction vehicles on all users of the local highway network (pedestrians, cyclists, public transport and vehicular traffic).

11.4. BASELINE CONDITIONS

Study Area

11.4.1. Chapter 2 of the TA provides a detailed overview of the study area and the existing conditions, including existing walking, cycling, public transport and highway provision. It also includes a detailed review of Personal Injury Accident (PIAs) occurred in the study area over the past five years.

11.4.2. The proposed development comprises land situated to the north and west of Morecambe Town Centre.

11.4.3. There are no adopted highways nor Public Rights of Way within the proposed development red line boundary.

Pedestrian and Cycle

11.4.4. The proposed development is located at the heart of the Morecambe promenade, a well-patronised traffic free corridor connecting Heysham and Hest Bank. This corridor forms part of the Lancashire Coastal Way, a long-distance footpath following the coast of Lancashire and the Morecambe Bay.

11.4.5. Vehicular movements within the site are currently only allowed for emergency vehicles, RNLI access, the Stone Jetty (servicing) and the Bay Arena Car Park.

11.4.6. The traffic free areas of the existing site allow for cycling, a key activity along the Promenade. Sustrans Routes 69 (Way of the Roses) and 700 travel across the site. These routes connect Morecambe with Lancaster via a segregated traffic free route along the River Lune.

Public Transport

11.4.7. Morecambe Railway Station is located just 300 metres to the south of the proposed development. It provides regular services to Lancaster and Leeds. Wider regional and national services are available from Lancaster.

11.4.8. Both Morecambe and Lancaster Railway Stations have good walking (Morecambe) and cycling (Lancaster) connectivity with the proposed development, with traffic free and segregated walking and cycling routes.

11.4.9. Morecambe Bus Station is located on Central Drive next to the railway station, effectively forming a transport hub in the town centre. Local bus services connect Morecambe with Kendal, Lancaster, Preston and multiple local and regional destinations.

11.4.10. Furthermore, a series of bus stops for local services are located across Marine Road Central, all of which provide sheltered waiting facilities.

11.4.11. The Caton Road Park and Ride located at the M6 Junction 34 provides 650 car spaces for Park and Ride into Lancaster. Lancashire CC data suggests that this location does not only cater for Park and Ride users, as it also acts as a facility for car sharing into / out of Lancaster.

Road Safety

11.4.12. There has been one fatal, six serious and 44 slight accidents in the study area between 2016 and 2020. This give a total of 51 accidents over a 5-year period, which equates to 10 accidents per year. However, when segregating the local highways PIAs and the SRN PIAs, over a 5-year period there have been five accidents per year on the urban environment adjacent to the proposed development, and five accidents per year on the highway's environment of the M6 Junction 34.

11.4.13. Given the high proportion of slight accidents (86%), the low number of accidents at any given specific location over the five-year period and the high level of traffic flows across the study area, it is considered that there is no unusual pre-existing road safety issue in the vicinity of the proposed development nor at the M6 J34.

11.4.14. In summary, no significant correlations have been identified to suggest that highway condition, layout or design were significant contributory factors in any of the collisions within the study area. Furthermore, the frequency and severity of the accidents is not considered to be unusual for a town centre and motorway junction location.

11.5. IDENTIFICATION AND VALUATION OF KEY IMPACTS (CONSTRUCTION AND OPERATIONAL)

11.5.1. The assessment of potential effects as a result of the proposed development has taken into account both the site preparation, earthworks and construction phase and the operational phase. The significance level attributed to each effect has been assessed based on the magnitude of change due to the proposed development and the sensitivity of the affected receptor/receiving environment to change, as well as a number of other factors that are outlined in more detail in **Chapter 5 – Approach to EIA**. Magnitude of change and the sensitivity of the affected receptor/receiving environment are both assessed on a scale of high, medium, low and negligible (as shown in **Chapter 5 – Approach to EIA**).

11.5.2. The following terms have been used to define the significance of the effects identified. For the purposes of the below, the transport network considers pedestrians, cyclists, public transport and vehicular traffic:

- Negligible: Effects which are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error;
- Minor effect: These effects may be raised as local issues but are unlikely to be of importance in the decision-making process. Nevertheless, they are of relevance in the detailed design of the project.;
- Moderate effect: These effects, if adverse, while important at a local scale, are not likely to be key decision-making issues. Nevertheless, the cumulative effect of such issues may lead to an increase in the overall effects on a particular area or on a particular resource;
- Major effect: These effects are likely to be important considerations at a regional or district scale but, if adverse, are potential concerns to the project, depending upon the relative importance attached to the issue during the decision-making process; and
- Extreme: These effects represent key factors in the decision-making process. They are generally, but not exclusively associated with sites and features of national importance and resources/features which are unique and which, if lost, cannot be replaced or relocated.

11.6. CUMULATIVE EFFECTS

11.6.1. Cumulative effects are assessed during the construction and operational phases of the proposed development.

Construction Effects

11.6.2. Chapter 12 of the TA covers in detail the construction effects.

11.6.3. A temporary closure of the northern Promenade will be required for the full duration of the construction stage, as this would provide the optimum access for the contractor and safest solution, avoiding the possibility of public access in the vicinity of the construction works. The structural elements of the proposed development are located on the northern edge of the red line boundary.

11.6.4. This will also provide certainty of the public access for the full construction duration, and a safe and convenient construction access that will assist with site logistics and ultimately provide cost and programme benefits.

11.6.5. The footpath at the southern boundary of the site, to the north of Marine Road Central, will be operational throughout the construction stage.

11.6.6. It is essential to maintain vehicular access during all construction stages to the Midland Hotel, the Stone Jetty and the RNLI. This will occur via the existing route to the northwest of the Midland Hotel.

11.6.7. It is proposed that there will be a single vehicular access gate for all incoming and outgoing construction vehicles located at the eastern boundary of the site, using the existing access to the Bay Arena Car Park. This forms a signalised crossroad junction with Marine Road Central and Northumberland Street.

11.6.8. One of a number of options being considered for the construction compound is the potential for an off site logistics hub approximately 400 metres to the south of the proposed development, on an existing vacated plot of land located on Marine Road West, and immediately south of the Aldi Supermarket. However, the exact location will not be known until the construction tender process is complete, with the details provided through the submission of a Construction Environmental Management Plan (CEMP).

11.6.9. This site could also act as construction staff car parking. However, further analysis is required. Alternatively, existing car parks across Morecambe Town Centre are underutilised and provide enough capacity throughout the year to accommodate construction staff parking. The contractor will be encouraged to explore shuttle bus alternatives, with associated off-site parking provision. This could be at the M6 Junction 34 Caton Road Park and Ride.

11.6.10. The number of construction vehicle movements will vary across the project depending on the activities taking place.

11.6.11. The most severe stage of the project in terms of frequency of deliveries will be during the Piling, Groundworks & Concrete frame activities which will require large numbers of daily concrete deliveries over a period of seven months. At the peak this will be in the region of 30 deliveries in a given day during large concrete pours. This number will drop to 16 once the bulk of the concrete work is complete and the timber frame commences.

11.6.12. Although infrequent, during the timber frame erection this period will see the largest sized articulated vehicles allowed on the local roads being delivered into site. The frequency of deliveries will increase again once the internal fit out works commence whilst the roof and envelope works are still in progress.

11.6.13. As the main build reaches completion the numbers will drop to less than 12 per day until project completion.

11.6.14. The overall sensitivity of users of the highway network (pedestrians, cyclists, public transport users and vehicle drivers) is high and taking into account the design solutions and assumptions the magnitude of change will be low. There is therefore likely to be a direct, temporary, medium-term effect on the users of the highway network of **minor to moderate negative** significance prior to the implementation of mitigation measures.

Operational Effects

11.6.15. The TA and ITP explore in detail the multi-modal operational impacts arising from the proposed development and its associated effects.

11.6.16. The Eden Transport Vision shared on April 2019 presented the ten core principles of the transport strategy. The very first point stated that “Eden Project North aims to work with the existing infrastructure where possible.”

11.6.17. EPN has identified three different visitor seasons (Peak, Inter Peak and Off Peak), as different visitors per day are predicted for each season. This principle underpins the financial model which has been shared with HM Government.

- The Peak season comprises 100 days: bank holidays, some weekends, school and summer holidays;
- The Inter Peak season comprises 200 days: most weekdays and some weekends;
- The Off-Peak season comprises 60 days: most January and November weekdays, with some early February and early December weekdays.

11.6.18. The Transport Principles outline the importance of the time controlled and advance booking system. Using this system, visitors would be allocated an arrival slot based on their origin and method of travel (amongst other parameters). This allows EPN to understand, manage and influence how visitors would travel to EPN on any given hour of any given day.

11.6.19. The latest EPN arrivals and departures profile suggests a predicted maximum of 600 visitors per hour on a peak day, and 500 on an inter peak day. However, as a worst-case scenario, the number of visitors per hour used on the trip generation and distribution model has been dictated by the maximum building capacity (750).

11.6.20. Similarly, the arrivals and departures profile has been manually adjusted to reflect a more condensed worst-case profile, with more trips per hour than predicted by EPN.

Pedestrian and Cycle

11.6.21. All existing pedestrian and cycling movements around the site will be retained. The public realm area will be available for permissive access all year to all users, regardless of being a ticket holder, a local resident or a Morecambe visitor.

11.6.22. The overall sensitivity of pedestrians and cyclists is high, and the magnitude of change is low. Therefore, there is likely to be a direct, permanent, long-term effect on pedestrians and cyclists of **minor negative** significance prior to the implementation of mitigation measures.

Public Transport

11.6.23. As highlighted in the Transport Vision and the Transport Strategy, visitors arriving to the site by public transport will have certain benefits over car visitors (e.g. ticket discounts, vouchers etc).

11.6.24. Visitors using public transport will have the possibility of having integrated ticketing (which will continue to be investigated further after the submission of this planning application).

11.6.25. The overall sensitivity of public transport users is high, and the magnitude of change is low. Therefore, there is likely to be a direct, permanent, long-term effect on public transport users of **minor negative** significance prior to the implementation of mitigation measures.

Road Safety

11.6.26. The overall increase in traffic levels on the road network, together with additional pedestrian and cycle movement, will result in a rise in potential conflicts between users of the highway network.

11.6.27. To understand this effect, an analysis of existing accident patterns has been undertaken within the TA. Given the prevailing traffic levels, the rate and pattern of occurrences of accidents is generally not considered to be unusual, and whilst any accident is to be regretted, it is not considered the additional development traffic will materially worsen the highway safety situation.

11.6.28. In relation to highway improvements arising from the proposed development, these will be subject to the standard safety audit process at all stages of the design, to ensure that an appropriate and safe design is achieved for all improvements.

11.6.29. The accident analysis undertaken in the TA has concluded that the additional development traffic will not materially worsen any pre-existing highway safety issues.

11.6.30. In addition, all highway improvements will be subject to the standard safety audit process.

11.6.31. The sensitivity of all users of the local highway network from a safety perspective is high due to the high traffic and pedestrian traffic flows, and the magnitude of change, based on the design solutions, is low. Therefore, there is likely to be a direct, permanent, long-term effect on all users of the local highway network of **minor to moderate negative** significance prior to the implementation of mitigation measures.

Traffic

11.6.32. A different modal share, based on multiple datasets, has been applied to each visitor type. However, as a worst case scenario, this modal share has been uplifted by five and ten percentage points in favour of private car, and in detriment of rail visitors. This would generate more vehicular trips than originally predicted.

11.6.33. The assumed car occupancy rate for EPN is 3.0. This has been derived upon leisure consultant market experience, EPN feedback and a thorough review of most major leisure attractions in the UK. Indeed, this is one of the lowest car occupancy rates for a major leisure attraction. It includes sites within the Greater London area. (e.g. Chester Zoo 3.9, Gulliver's Park 3.8, Alton Towers 3.7, Thorpe Park 3.45, London Resort 3.0), and it is lower than the 3.16 average that includes the DfT rate.

11.6.34. It should be noted that this rate has been confirmed during pre-app scoping with Highways England as a *"reasonable assumption"*.

11.6.35. The car occupancy rate will change throughout the year due to changing visitor demographic. Off peak winter weekdays are likely to have a car occupancy rate closer to 2, whilst peak summer weekends are likely to have a car occupancy rate closer to 4.

11.6.36. In recognition of 250 days a year falling under the 100 peak days and circa 150 inter peak weekdays and holidays, it is recognised that for two thirds of the year the car occupancy rate is likely to be higher than 3.0.

11.6.37. Therefore, using a car occupancy rate lower than 3.0 does not seem appropriate. Not only would the average occupancy rate be higher than this, but it can be expected that due to the nature of the visitors (76% of total trips will be day trips) and the seasonality of the site, for two thirds of the year the car occupancy rate will be higher than 3.0.

11.6.38. This approach will accommodate both cases: a higher car occupancy rate during the peak season with a higher number of visitors; and a lower car occupancy rate during the off-peak season with a much lower number of visitors. It is key to providing enough infrastructure and parking for the peak season, but not to overdesign it and build infrastructure that would not be required in a few years' time as set out in the Net Zero Strategy.

11.6.39. This represents a worst-case scenario, as using a lower car occupancy rate than the one expected for two thirds of the year will provide a greater number of vehicular trips being generated by the proposed development, and a greater parking demand. However, for robustness of this TA, a car occupancy rate of 3.0 is proposed to be used.

11.6.40. Notwithstanding this, the booking system will allow EPN to understand the car occupancy rate for all days of the year. This will ensure that no more cars than parking spaces available are allowed to visit the proposed development as further described in the Parking Strategy.

11.6.41. Again, this is a worst-case scenario assumption that generates a higher volume of vehicular trips.

11.6.42. Lancashire CC commissioned Atkins to develop a Saturn model and traffic forecasting and economic appraisal report to support the 'South Lancaster Growth Catalyst Housing Infrastructure Funding' (also known as 'Junction 33 HIF'). A series of traffic surveys were undertaken in October and November 2018 to support this commission. The highway assessment model included the three single hour time periods representing the busiest peak hours of the highways network (weekday AM 08.00, PM 17.00-18.00 and average IP (10.00-16.00)). The Saturn model was accordingly calibrated and validated through a series of steps to ensure it was replicating traffic flows and journey times.

11.6.43. WSP understands that LCC's position in regards of the peak hour of the highway network is the one used to support the Junction 33 HIF works during 2018 and 2019. That is that the peak hours are weekday 08.00-09.00 in the AM and weekday 17.00-18.00 in the PM.

11.6.44. It can be stated, and it is commonly agreed, that the EPN peak day would fall outside the highways network peak day (weekends and holiday weekdays vs. weekdays) as highlighted in the seasonal calendar.

11.6.45. Similarly, the EPN peak hour would fall outside the highway's peak hour (11.00 to 16.00 vs 08.00-09.00 and 17.00-18.00). This is valid for both the original and manually adjusted arrivals and departures profile.

11.6.46. Both Councils have offered to EPIL the use existing underutilised car parks (both the M6 Junction 34 Caton Road Park and Ride, and Morecambe Town Centre sites). These are all car parks that already exist and have been consented through valid planning processes.

11.6.47. It can be stated that theoretically that these car parks could generate trips in the network without causing significant impact at any given junction, as highways infrastructure is in place to accommodate that demand. As these car parks are currently underutilised, EPN would fill that theoretical capacity throughout the day. An example of this is at the recently upgraded highways links and junctions at the M6 J34 and the Bay Gateway, where additional capacity has been recently provided to accommodate for the 650 spaces of the Park and Ride.

11.6.48. Thanks to the time controlled and advance booking system, no more car tickets than parking spaces available will be sold at any given day.

11.6.49. Therefore, the number of vehicular trips will not only be limited by the maximum number of visitors per hour and day limits, but by the parking capacity provided.

11.6.50. EPN would generate a maximum of 184 to 207 two-way vehicular movements at 14:00-15:00 on a peak day. EPN would generate a maximum of 104 and 63 on an inter peak and off-peak day.

11.6.51. This represents one vehicle every circa 20 seconds at the M6 J34. Only about half of them would be travelling into Morecambe, representing one vehicle every circa 40 seconds.

11.6.52. This represents a worst-case scenario that includes several worst case scenario assumptions. More importantly, it is not considered to be a significant number of new vehicular trips on the highways network. All of these trips will be using existing underutilised and consented car parks for which highways infrastructure is in place.

11.6.53. The sensitivity of all users of the local highway network from a traffic perspective is high, and the magnitude of change, based on the design solutions, is low. Therefore, there is likely to be a direct, permanent, long-term effect on all users of the local highway network of **minor to moderate negative** significance prior to the implementation of mitigation measures.

11.7. MITIGATION MEASURES

Introduction

11.7.1. Chapter 5 (Transport Principles), 7 (Active Travel and Public Transport Strategy), 8 (Parking Strategy), 9 (Visitor Group Strategy), 10 (Servicing and Refuse Strategy), 12 (Traffic Regulation Orders), 13 (Construction Traffic Management Plan) and 14 (Net Zero Transport Strategy) of the TA provides a detailed series of mitigation measures. These are accompanied and further developed by the ITP.

11.7.2. This chapter of the ES represents a summary of all the sections and documents mentioned above. All of which will mitigate both construction and operational traffic and transport impacts and effects arising from the proposed development.

Transport Strategy

11.7.3. The multi-modal Transport Strategy has been developed upon the Eden Transport Vision and collaboration with statutory and non-statutory stakeholders over a period of circa 28 months.

11.7.4. The Eden Transport Strategy, based on the time controlled and advance booking system, aims to position EPN as a leading example for progressive and healthy transport methods in the UK. It aims to provide clean, smooth, accessible, fun and active alternatives to the traditional transport strategies of reliance upon the private car.

11.7.5. The TA shows how visitor and employee numbers translate into demand for transport and how EPN intend to address such demand. The EPN Team have worked alongside both Lancaster CC and Lancashire CC to ensure the existing transport network is optimised and aligned with the anticipated growth of the wider region and the Eden Transport Vision.

11.7.6. The proposed development immediately benefits from enhanced capacity in the area created by recent local transport investments in infrastructure improvements through the Housing Infrastructure Fund (HIF) and possible future regeneration schemes as included in the Future High Streets Fund (FHSF) bid.

11.7.7. The key principle of Eden Transport Strategy is to encourage people to arrive by non-car modes, particularly for their last mile of the journey. At the same time as this, there is also a practical reality that in the Opening Year many visitors will still seek to travel by car, as certain infrastructure improvements will take time to deliver. For example the rail industry will take time to be able to provide more frequent services between Lancaster and Morecambe to respond to increased demand created by the proposed development and the wider uplift it will bring. While Morecambe is not congested with a large proportion of visitors arriving by car, the aim is to intercept many car trips as they leave the Motorway at the M6 Junction 34, where there is an underused and recently built Park and Ride amenity. Other car visitors would use readily available underutilised existing parking in the town centre, with these parking locations being linked through ticketing to allow a dynamic and flexible response according to demands.

Booking System

11.7.8. A time controlled and advance booking system will allocate visitors a specific time slot to enter the site. This will allow EPIL to control, manage and influence the visitors demand throughout the day and year, avoiding very large peak days and hours. This will enhance the visitor experience by providing a smooth access to the proposed development, as well as effectively limiting the number of generated trips to the site.

11.7.9. The time controlled and advance booking system is a way of spreading visitors throughout the day to avoid any large peaks, enhancing the visitor experience.

11.7.10. Subject to the selected method of travel, the entry ticket to the proposed development will vary to recognise the environmental impact of the travel method as per Eden Project (Cornwall). This could consist of direct discounts on active travel and sustainable transport tickets, or vouchers to redeem part of the expenditure at the proposed development (e.g. food and beverage, gift shop etc).

11.7.11. Visitors will have to book their ticket in advance on the EPN website, where they will be presented with a series of generic questions so EPIL can better understand where they will be travelling from (day vs. overnight visitors), how many people are in their party and when they would be planning to visit the proposed development.

11.7.12. Visitors will have the opportunity at this stage of the booking process to raise any accessibility requirements such as assistance dogs, accompanying carers or blue badge parking.

11.7.13. After these generic questions, the website will present the most sustainable travel option as the preferred method of travel to the proposed development. Visitors staying overnight in Lancashire and its immediate vicinity will be presented with walking, cycling and public transport tickets. Visitors travelling from further afield will be presented with rail and public transport integrated ticketing options as the most sustainable travel options. However, visitors will be able to select alternative travel methods (e.g. private car) if they wish, subject to parking availability at their chosen time.

11.7.14. Subject to the selected method of travel, travel routes and integrated ticketing options will be presented. For example, overnight visitors staying to the north of Morecambe and travelling by car may be presented with a preferred journey route to the site, directing them through the coastal A6 instead of the M6.

11.7.15. It is anticipated that each method of travel ticket will be accompanied by a sustainability accreditation, showcasing what is the carbon impact generated by that method of travel. This will encourage visitors to align with EPN's sustainability ethos and giving them an option to reconsider their method of travel.

11.7.16. Carbon offsetting would also be considered during the ticket purchase option, allowing visitors to offset their carbon impact.

11.7.17. This system will enable EPN to control, manage and influence how visitors travel to the proposed development. EPN will know in advance how visitors will be travelling, how many rail visitors will be using Lancaster Railway Station or how many parking spaces will be required at each parking location on any given day, and this will allow EPN to control, manage and influence the multi-modal transport demand in collaboration with both Councils and transport operators. The combination of a comprehensive and resilient transport network with capacity, combined advanced and dynamic ticketing plus limits on daily attendance allows EPN to make use of existing underused resources in a sustainable manner.

11.7.18. The time controlled and advance booking system is not only a way to enhance visitor experience by limiting the number of visitors per hour a day. It is a realistic and modern sustainable solution to make best use of existing resources. Understanding in advance number of visitors, method of travel and origin will enable EPN to collaborate with both Councils and relevant transport bodies to ensure that transport demand is accommodated accordingly. For example, EPN would collaborate with Avanti West Coast if on a particular day large groups of visitors are expected to travel to Lancaster and Morecambe by train, as additional rail employees may be required at Lancaster Railway Station.

11.7.19. This system is not only about transport. It goes well beyond, as it will enable EPN to plan ahead how many employees are required to work, how many meals they need to prepare or how much waste it will be generated on any given day. These are just some examples of how controlling the visitor demand to a major leisure attraction enables to achieve a site-wide sustainable strategy.

11.7.20. Historically, all these aspects were based on experience and historical data. However, time controlled and advance booking systems allows for a more accurate and sustainable planning and management, allowing EPN to make use of resources in the most sustainable manner.

Construction Traffic Management Plan

11.7.21. A Construction Traffic Management Plan will be produced and submitted by the appointed contractor before starting any construction works. This will include:

- Traffic strategy management;
- Construction vehicle routes;
- Temporary footway and highway closures with associated diversion routes, traffic impact, temporary traffic signals etc;
- Access retention to nearby buildings and facilities for users, emergency, servicing and refuse vehicles; and
- Air Quality and noise impact around the construction site and vehicular routes.

11.7.22. As the proposed development includes suitable design measures as detailed within the TA, no mitigation measures are required assuming the design measures outlined in the TA and the Construction Traffic Management Plan are implemented.

Travel Plan

11.7.23. A Travel Plan is a site-specific strategy and action plan for managing multi-modal access and travel to a site or development which focuses on promoting travel by sustainable and active modes of transport. Travel Plans are concerned with changing the travel behaviours of site users to reduce the number and length of motorised journeys and increase travel by walking, cycling and public transport.

11.7.24. The site-specific TP for the proposed development outlines the following:

- Methods proposed to reduce the number of employees and visitors travelling to and from the site by car;
- Timescales for surveying employees travel patterns following occupation of the site; and
- The measures that will be used to monitor the effectiveness of the Travel Plan in its objective to reduce the volume of private car trips to the site.

Other Measures

11.7.25. Other measures such as the proposed Traffic Regulation Orders and the different strategies set out in the TA will mitigate impacts on an ad hoc basis.

11.8. RESIDUAL EFFECTS

Construction Effects

11.8.1. The sensitivity of users of the highway network remains high. As there are no proposed mitigation measures the magnitude of change will remain low. There is therefore likely to be a direct, temporary, long-term residual effect on users of the highway network of **minor to moderate** negative significance.

Operational Effects

Pedestrian and Cycle

11.8.2. The sensitivity of pedestrians and cyclists is high, and the magnitude of change is medium. There is therefore likely to be a direct, permanent, long-term residual effect on the pedestrians and cyclists of a **major positive** significance.

Public Transport

11.8.3. The sensitivity of public transport users remains high. As there are no proposed mitigation measures the magnitude of change will remain medium. There is therefore likely to be a direct, permanent, long-term residual effect on the public transport users of **major positive** significance.

Road Safety

11.8.4. The sensitivity of all users of the local highway network remains high. As there are no proposed mitigation measures the magnitude of change will remain low. There is therefore likely to be a direct, permanent, long-term residual effect all the users of the local highway network of **minor to moderate negative** significance.

11.8.5. The sensitivity of the capacity of the users of the local highway network remains high. As there are no proposed mitigation measures the magnitude of change will remain medium. There is therefore likely to be a direct, permanent, long-term residual effect on the users of the highway network of a **moderate to major negative** significance.

12

NOISE AND VIBRATION

PUBLIC

12. NOISE AND VIBRATION

12.1. INTRODUCTION

12.1.1. This report presents the outcome of the assessment of likely significant effects due to noise and vibration on the proposed development. The focus is on the likely significant environmental effects on noise and vibration sensitive receptors immediately around the proposed development.

12.1.2. This report describes the assessment methodology and the baseline conditions relevant to the assessment, as well as a summary of the likely significant effects that may require specific mitigation measures required to avoid, prevent, reduce or, if possible, offset any likely significant adverse effects, and the likely residual effects and any required monitoring after these measures have been employed.

12.1.3. This report is necessarily technical in nature, a glossary of acoustic terminology is presented within Section 1 of **Appendix 12.1**.

12.2. POLICY CONTEXT

12.2.1. For a development of this nature, there is no specific all-encompassing UK legislation relating to the standards associated with noise emissions/noise effect. Noise legislation, where it does exist, tends to be either European Community-derived and focussed on specific items of noise-emitting plant or on more general nuisance, such as that addressed by the provisions of the *Environmental Protection Act 1990* (**Ref. 1.9**).

12.2.2. In lieu of any all-encompassing legislation, assessing the effect of such a development during the site preparation / construction and operational phases must draw on information from a variety of sources. This assessment, therefore, makes reference to a number of legislative documents, British Standards, national planning guidance and local planning policy documents.

12.2.3. The key referenced documents are listed below with summaries presented in **Appendix 12.1**.

LEGISLATIVE FRAMEWORK

12.2.4. The applicable legislative framework is summarised as follows:

- Environmental Protection Act 1990 (**Ref. 1.9**); and
- Control of Pollution Act 1974 (CoPA) (**Ref. 1.10**).

POLICY

12.2.5. The applicable national planning policy is summarised as follows:

- Noise Policy Statement for England (NPSE) (**Ref. 1.6**); and
- National Planning Policy Framework (NPPF) (**Ref. 1.7**);

12.2.6. The applicable local planning policy is as follows:

- Lancaster Local Plan Part One – Strategic Polices and Land Allocations DPD (2020**)** (**Ref. 1.11**);
- Lancaster Local Plan Part Two – Development Management Policies DPD (2020) (**Ref. 1.12**); and
- Morecambe Area Action Plan (2014) (**Ref. 1.13**)

GUIDANCE

12.2.7. The following guidance documents have been used during the preparation of this chapter:

- BS 5228-1:2009+A1:2014: *Code of practice for noise and vibration control on construction and open sites*. Part 1: *Noise* (BS 5228-1) (**Ref. 1.1**);
- BS 5228-2:2009+A1:2014: *Code of practice for noise and vibration control on construction and open sites*. Part 2: *Vibration* (BS 5228-2) (**Ref. 1.2**);
- DMRB LA 111, *Noise and Vibration*, Revision 2, 2020 (LA 111) (**Ref. 1.3**);
- *Calculation of road traffic noise* memorandum 1988 (CRTN) (**Ref. 1.4**);
- BS 4142:2014+A1:2019: *Methods for rating and assessing industrial and commercial sound* (BS 4142) (**Ref. 1.5**);
- Planning Practice Guidance (PPracG) (**Ref. 1.8**);
- ISO 9613-2:1996: Acoustics – *Attenuation of sound during propagation outdoors – Part 2: General method of calculation* (ISO 9613-2) (**Ref. 1.14**);
- Bavarian State Agency for the Environment (Bayerisches Landesamt Fur Umwelt - LfU) *Parking Area Noise - Recommendations for the calculation of sound emissions of parking areas, motorcar centres and bus stations, as well as of multi-storey car parks and underground car parks*, 2007 (PAN) (**Ref. 1.15**);
- Noise Advisory Council (1978). *A guide to measurement and prediction of the equivalent continuous sound level Leq* (**Ref. 1.16**); and
- The Noise Council (1995), *Code of Practice for Environmental Noise Control at Concerts* (**Ref. 1.16**).

12.3. CONSULTATION, SCOPE, METHODOLOGY AND SIGNIFICANCE CRITERIA

12.3.1. **Table 12-1** provides a summary of the consultation activities undertaken in support of the preparation of this assessment.

Table 12-1 - Summary of consultation undertaken

Body / organisation	Individual / statutory body / organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions
Lancashire City Council (LCC)	The dealing Environmental Protection Officer, Paul Cartmell (PC)	Email 28/04/2021 sent by WSP to PC Request to discuss the assessment and noise survey methodology.	Email response 04/05/21 from PC agreeing to meeting.
LCC	PC	Meeting via Teams 12/05/21 to discuss survey and assessment methodology. Attendees: Simon Faircloth (SF) from WSP and PC from LCC	Discussed possible survey locations and appropriate guidance documents for assessment. Also discussed committed developments that might influence operational traffic noise assessment. PC followed up with email 12/05/21 with details of committed developments that

Body / organisation	Individual / statutory body / organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions
			might be relevant to assessment. SF followed up with plan of proposed survey locations via email 24/05/21.
LCC	PC	Email 01/06/21 sent by SF with attached minutes of meeting on 12/05/21.	PC responded 02/06/21 with some clarification on attended measurements required during the daytime. PC also requested plans showing potential noise sources. SF followed up with email response and layout plan.
LCC	PC	Email 09/06/21 sent by SF with attached location plan for proposed evening surveys. SF provided update on surveys undertaken to date and those still required.	SF requested further meeting to discuss surveys undertaken to date.
LCC	PC`	Meeting via Teams 15/06/21	Discussed surveys undertaken to date and challenges finding suitable locations for long term monitoring. Also discussed presence of funfair on proposed development Site. PC asked if any traffic counts were to be undertaken with potential to compare against pre-Covid counts. SF advised that it was assumed no counts were available. Also discussed transport strategy WRT car parks and Park and Rides.

SCOPE OF THE ASSESSMENT

12.3.2. The scope of this assessment has been established through the consultation process. This section provides the scope of the assessment and presents the evidence base for those aspects of the assessment that are scoped-in following further iterative assessment.

Elements Scoped in and out of the Assessment

12.3.3. **Table 12-2** presents the elements that have been scoped in and out of the assessment.

Table 12-2 - Elements scoped in and out of the assessment

Element	Phase	Scoped In	Scoped Out	Justification
Construction Noise	Construction	✔		Proximity of sensitive receptors, including ecological receptors, which may experience temporary increases in noise during construction.
Construction vibration	Construction	✔		Proximity of sensitive receptors which may experience temporary increases in vibration during construction.
Construction generated road traffic noise	Construction		✔	Construction traffic would predominantly access via Marine Road Central. It is anticipated that insignificant noise changes would occur adjacent to these routes (due to the change in flows arising from construction traffic being small).
Development generated commercial operations	Operation	✔		Proximity of sensitive receptors which may experience permanent noise increases from the proposed development.
Development generated vibration	Operation		✔	The activities associated with the operational proposed development are not expected to generate significant vibration.
Development generated road traffic noise	Operation	✔		Proximity of sensitive receptors which may experience permanent noise increases due to the proposed development.
Development generated road traffic groundborne vibration	Operation		✔	Groundborne road traffic vibration is normally caused by heavy goods vehicles (HGVs) travelling over uneven surfaces. The proposed development will introduce a small number of HGVs for servicing the development and these will utilise new smooth road surfaces within the Site.

EXTENT OF THE STUDY AREA

12.3.4. Construction noise arising from the proposed development has been assessed at selected sensitive human receptors within a study area of approximately 300m of the Site Boundary.

12.3.5. Construction vibration arising from the proposed development has been assessed at selected sensitive human receptors within a study area of approximately 100m of the Site Boundary.

12.3.6. Operational noise from commercial activities has been assessed at selected sensitive receptors within a study area of approximately 500m from the Site Boundary.

12.3.7. Development generated road traffic noise is assessed for the existing road network. The adopted study area includes all routes in the traffic model developed for the Transport Assessment submitted in support of the planning application.

12.3.8. The ecological features and European Designated Sites are also provided in **Chapter 8: Nature Conservation and Biodiversity** with the Study Area for the various ecological features being defined in **Table 8-5.**

BASELINE NOISE SURVEY

METHOD OF BASELINE DATA COLLATION

Desk Study

12.3.9. A desktop review has identified the existing key noise sources in the vicinity of the Site and the closest noise sensitive receptors.

12.3.10. The following data sets were reviewed:

- Google and ESRI online mapping and aerial photography; and
- Street-view photography.

Site Visit and Surveys

12.3.11. A baseline noise survey has been completed. The aim of the survey was to establish the prevailing noise climate at locations selected as representative of the closest noise sensitive receptors to the proposed development. The survey included determination of the ambient ($L_{Aeq,T}$) and background (L_{A90}) sound levels.

12.3.12. Continuous unattended noise measurements were completed at two locations (locations ref. ML1 and ML2) between Thursday 3 June 2021 and Tuesday 8 June 2021 (ML1) and subsequently between Thursday 10 June and Friday 18th June 2021 (ML2).

12.3.13. A series of short duration attended measurements was also undertaken at various locations around the site and surrounding area during daytime and evening periods, including 3 June (daytime only) and 10 June (daytime and evening). These are referenced P1 to P12.

12.3.14. Details of the baseline noise survey are presented in Section 3 of **Appendix 12.1**. The measurement locations are shown in Figure 3-1 and described in Table 3-2 with a summary of the measurement data presented in Table 3-3 to Table 3-6 of **Appendix 12.1.**

ASSESSMENT METHODOLOGY

12.3.15. The adopted assessment methodology has been applied to demonstrate compliance with national policy and allow determination of whether significant environmental effects are likely to arise as a result of the proposed development. The adopted assessment methodology draws upon the policies and guidance in Section 1.2 above as applicable to each impact being assessed.

Construction Phase

Construction Noise

12.3.16. The assessment of construction noise is based on the guidance contained within BS 5228-1 (**Ref. 1.1**). Construction noise assessment criteria have been determined using the measured and modelled baseline noise levels, following the ABC method as detailed within Annex E Section E3.2 of this Standard (see Section 5 of **Appendix 12.1**).

12.3.17. Construction noise level predictions have been undertaken for a sample of the closest noise sensitive receptors. Predictions have been undertaken for each construction phase of the proposed development and the results have been compared against the assessment criteria. The margin of compliance / exceedance of the assessment criteria has been used to inform whether a significant effect would occur.

Construction Vibration

12.3.18. The assessment of construction vibration is based on the guidance contained within BS 5228-2 (**Ref. 1.2**) (see Section 5 of **Appendix 12.1**).

12.3.19. Construction vibration level predictions have been undertaken for a sample of the closest vibration sensitive receptors and the results have been compared against the assessment criteria. The margin of compliance / exceedance of the assessment criteria has been used to inform whether a significant effect would occur.

Operational Phase

Development Generated Road Traffic Noise

12.3.20. The assessment of development generated road traffic noise is based upon the guidance in the Design Manual for Roads and Bridges (DMRB), LA 111, Noise and Vibration, Revision 2 (**Ref. 1.3**).

12.3.21. The impact of development generated road traffic noise during the operational phase has been undertaken based on the proposed development traffic data.

12.3.22. The proposed development will operate at peak capacity during the school holidays (particularly during the summer months) and at weekends, with interpeak periods during spring and autumn months and off-peak periods during winter months (see 'Typical Seasonal Calendar' in Figure 6.2 in Section 6 of **Appendix 12.1,** as provided by the Transport Consultant). In order to provide a robust assessment, the impact of development generated road traffic noise has been assessed for peak and interpeak periods. The cumulative impact of noise from road traffic generated by committed developments was also included within the assessment (see Section 6 of **Appendix 12.1**).

12.3.23. The assessment has considered the following scenarios, for which traffic data have been generated:

- Do-minimum[12] opening year[13] (DMOY);
- Do-something[14] opening year (DSOY):
- Do-minimum future year[15] (DMFY); and
- Do-something future year (DSFY).

12.3.24. Basic Noise Level (BNL) calculations have been undertaken in accordance with the *Calculation of road traffic noise memorandum 1988* (CRTN) (**Ref. 1.4**) for each local road traffic link, and each of the above scenarios. The change in noise levels arising as a result of the proposed development (Short-term), and in combination with natural traffic growth (Long-term), have then been determined by making the following comparisons:

- Short-term = DSOY - DMOY; and

[12] The 'do-minimum' means a scenario with the proposed development.
13 The first year of operation is assumed to be 2024.
14 The 'do-something' means a scenario with the proposed development.
15 Fifteenth year after opening, assumed to be 2039.

- Long-term = DSFY - DMOY.

12.3.25. The significance of these noise level changes has then been informed by consideration to whether there are any existing noise sensitive receptors that are close to the assessed routes (i.e. that could be subject to the identified level changes), and by application of the short-term and long-term impact magnitude scales, as presented in Table 2-2 and Table 2-3 of **Appendix 12.1**.

Operational Site Noise

Noise from Outdoor Events

12.3.26. Noise from outdoor events, e.g. concerts featuring amplified music, has been assessed using guidance within the Noise Council's *Code of Practice for Environmental Noise Control at Concerts* (**Ref. 1.17**).

12.3.27. At this stage, the precise number of proposed events within the Rhythm Gardens outdoor space is not known although up to 8 events per year during spring and summer months have been assumed with no amplified music intended to be played after 23.00.

12.3.28. The assessment of noise from outdoor events is detailed in Section 7 of **Appendix 12.1**.

Noise from Car Parks and Park and Ride Scheme

12.3.29. The proposed development will not introduce any new car park infrastructure but instead will use existing capacity at five car parks within Morecambe town centre and the Caton Road Park and Ride scheme located near Junction 34 of the M6.

12.3.30. The predicted changes in noise levels from car parks have been assessed at the nearest noise sensitive receptors against the road traffic noise short-term impact magnitude scale, as presented in Table 2-2 of **Appendix 12.1**.

12.3.31. The assessment of noise from car parks and the Park and Ride is detailed in Section 7 of **Appendix 12.1**.

Noise from Service Vehicles/Delivery Operations

12.3.32. It is anticipated that there will be between two and five daily deliveries to site. There are three potential delivery points serving the proposed development, as shown in Figure 7-7 in **Appendix 12.1**.

12.3.33. Noise from proposed delivery operations have been assessed in accordance with BS 4142:2014+A1:2019: *Methods for rating and assessing industrial and commercial sound* (BS 4142) (Ref. 1.5). Drawing upon the results of the background noise survey, daytime and night-time noise assessment criteria have been determined in accordance with this standard.

12.3.34. The assessment of noise from service vehicles/delivery operations is detailed in Section 7 of **Appendix 12.1**.

Noise from Fixed Items of Building Services Plant

12.3.35. The proposed development will include various fixed items of building services plant at various locations around the Site.

12.3.36. The specifics of any proposed items of fixed building services plant are not known at this stage and therefore detailed assessment is not possible. Noise limits have, therefore, been proposed based on the guidance within BS4142:2014+A1:2019 (**Ref. 1.5**) and typical background sound levels measured at the nearest noise sensitive receptors in order to minimise the potential impact at such receptors.

12.3.37. The determination of appropriate noise limits is provided in Section 7 of **Appendix 12.1**.

ASSESSMENT MODELLING

Construction Noise

12.3.38. To inform the assessment of construction noise levels, a detailed noise model has been prepared for the site of the proposed development. This model has been prepared within the CadnaA noise modelling suite and extends to the nearest noise sensitive receptors. Noise modelling parameters are detailed in Section 4 of **Appendix 12.1**.

12.3.39. The methodology adopted for the prediction of construction noise levels follows that set out in BS 5228-1 (**Ref. 1.1**). The noise predictions have been made in accordance with the BS 5228-1 methodology.

12.3.40. The BS 5228-1 (**Ref. 1.2**) calculation methods allow noise levels to be determined for various construction activities. However, the accuracy of such predictions is necessarily limited by assumptions that have to be made regarding the number and type of plant used, their location and detailed operating arrangements. Whilst this information would be clarified as the detailed design progresses and when resources are mobilised, other information (such as exactly where the plant operates and for how long) would remain uncertain, even after works have commenced.

12.3.41. It has therefore been necessary to perform a generic construction phase noise assessment, focussing on key activities, with the aim of identifying whether significant temporary noise effects are likely to arise at the closest sensitive receptors. The plant types, quantities and utilisations adopted in the completed noise level predictions are detailed in Section 5 of **Appendix 12.1**.

Construction Vibration

12.3.42. The methodology adopted for the prediction of construction noise levels follows that set out in BS 5228-2 (**Ref. 1.2**). The vibration predictions have been made using calculations which have been developed in-house (by WSP) in accordance with BS 5228-2 methodologies.

12.3.43. The vibration predictions have been made using empirical data provided in BS 5228-2. However, the accuracy of such predictions is necessarily limited by assumptions that have to be made regarding the number and type of plant used, their location, detailed operating arrangements, and the ground conditions. Whilst this information would be clarified as the detailed design progresses and when resources are mobilised, other information (such as exactly where the plant operates and for how long) would remain uncertain, even after works have commenced.

12.3.44. It has therefore been necessary to perform a generic construction phase vibration assessment, focussing on key activities, with the aim of identifying whether significant temporary vibration effects are likely to arise at the closest sensitive receptors. The plant types, quantities and utilisations adopted in the completed vibrations level predictions are detailed in Section 5 of **Appendix 12.1**.

Operational Site Noise

Noise from Outdoor Events

12.3.45. To inform the assessment of noise from outdoor events, a detailed noise model has been prepared for the proposed development. This model has been prepared within the CadnaA noise modelling suite and extends to the noise sensitive receptors potentially impacted by outdoor events.

12.3.46. Noise from a generic public address (PA) loudspeaker arrangement (with main speakers to the left and right of the stage plus sub-woofer at the centre of the stage) has been modelled using typical directivity patterns and the ISO 9613-2 (**Ref 1.14**) propagation model. It is considered that this approach is sufficient to establish a 'proof of concept' but it is acknowledged that more detailed modelling by the supplier of any future proposed PA system using specific speaker array directivity patterns is likely to be required in due course.

12.3.47. Noise modelling parameters are detailed in Section 4 of **Appendix 12.1**. The approach adopted in the generation of the noise model is set out in Section 7 of **Appendix 12.1**.

Noise from Service Vehicles/Delivery Operations

12.3.48. Calculations have been undertaken to predict the contribution of noise at nearby noise sensitive receptors from the following sources:

- HGVs travelling at low speed along delivery routes within the proposed development;
- Noise from ambient goods and chilled goods operations;
- Loading and unloading goods to/from vehicles; and
- Air brakes

12.3.49. Noise from HGVs travelling at low speed across the Site has been predicted using the methodology in the Noise Advisory Council Document *A guide to measurement and prediction of the equivalent continuous sound level* L_{eq}. Noise from chilled trailers, unloading goods and door slams were derived from measurements at existing facilities and corrected for distance attenuation to the nearest noise sensitive receptors.

12.3.50. The assessment of noise from service vehicles/delivery operations is detailed in Section 7 of **Appendix 12.1**, which includes the noise source data used in the assessment.

Noise from Car Parks and Park and Ride Scheme

12.3.51. Noise from the use of existing car parks and the Caton Road Park and Ride scheme has been predicted using guidance within the Bavarian State Agency for the Environment, Bayerisches Landesamt für Umwelt (LfU) (2007) Parking Area Noise (**Ref. 1.15**).

12.3.52. Predictions of noise from the car parks within Morecambe identified as having spare capacity for use by visitors to the proposed development and the Caton Road Park and Ride scheme have been undertaken using the LfU 2007 module embedded within CadnaA.

12.3.53. The assessment of noise from car parks and the Park and Ride is detailed in Section 7 of **Appendix 12.1**.

Noise from Fixed Building Services Plant

12.3.54. The specifics of any proposed items of fixed building services plant are not known at this stage and therefore detailed assessment is not possible. Recommended noise limits that would be applicable to future plant are in Section 7 of **Appendix 12.1**.

SIGNIFICANCE CRITERIA

12.3.55. The approach to determining significant effects addresses the requirements of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended) to determine whether any effects would be significant or not. In addition, noise related planning policy also references the need to consider the significance of effect levels as referenced for use in the *Noise Policy Statement for England* (NPSE) (**Ref. 1.6**). To help differentiate these policy 'effect levels' from EIA significance effects, the former are referred to in this report as 'NPSE classification'.

12.3.56. Where it is appropriate to do so, the following subsections detail how noise impacts are classified against the NPSE (**Ref. 1.6**) effect level (i.e. NOEL[16], LOAEL[17], and SOAEL[18]), such that compliance with national noise policy is also demonstrated.

Construction Noise

Magnitude of Impact and NPSE Classification

12.3.57. For construction noise, the magnitude of impact and NPSE classification are determined based on noise level and duration.

12.3.58. The predicted construction noise level is compared against the construction noise threshold, as determined following the ABC method detailed in BS 5228-1 (**Ref. 1.1**). **Table 12-3** details the resulting impact magnitude and effect level criteria that have been applied.

Table 12-3 - Construction noise criteria

Construction Noise Level (x) vs. Receptor Criteria (ABC method)	Magnitude of Impact	NPSE Classification
x < criteria	Negligible to Minor	NOEL
x > criteria and ≤+5 dB over criteria	Minor to Moderate	LOAEL to SOAEL
x ≥+5 dB over criteria	Moderate to Major	Above SOAEL

12.3.59. In **Table 12-3** where the magnitude of impact or NPSE classification has more than one classification, a single classification is chosen from the two, taking into account duration, national guidance and professional judgement.

Significance of Effect

12.3.60. A significant effect occurs when a moderate or major impact occurs for a duration exceeding 10 or more days of working in any 15 consecutive days, or for a total number of days exceeding 40 in any 6 consecutive months.

16 NOEL = No Observed Effect Level
17 LOAEL = Lowest Observed Adverse Effect Level
18 SOAEL = Significant Observed Adverse Effect Level

Construction Vibration

Magnitude of Impact and NPSE Classification

12.3.61. For construction vibration, the magnitude of impact and NPSE classification are determined based vibration level and duration.

12.3.62. The predicted construction vibration level is compared against the construction vibration criteria. **Table 12-4** details the resulting impact magnitude and effect level criteria that have been applied.

Table 12-4 - Construction vibration criteria

Construction Vibration (x) in PPV, mm/s	Magnitude of Impact	NPSE Classification
x < 0.3	Negligible to Minor	NOEL
0.3 < x < 1.0	Minor to Moderate	LOAEL to SOAEL
1.0 < x	Moderate to Major	Above SOAEL

12.3.63. In **Table 12-4**, where the magnitude of impact or NPSE classification has more than one classification, a single classification is chosen from the two, taking into account duration, national guidance and professional judgement.

Significance of Effect

12.3.64. A significant effect occurs where a moderate or major impact occurs for a duration exceeding 10 or more days of working in any 15 consecutive days, or for a total number of days exceeding 40 in any 6 consecutive months.

Development Generated Road Traffic Noise

Magnitude of Impact and NPSE Classification

12.3.65. For development generated traffic noise, the criteria have been determined based upon the short-term and long-term classification scales detailed within the DMRB LA 111 (**Ref. 1.3**). The terminology used within these scales has been updated to reflect that being used in this assessment. The resulting magnitude of impact criteria are detailed below.

Table 12-5 - Development generated road traffic noise criteria

Noise change ($L_{A10,18hr}$), dB	Magnitude of Impact	
	Short-term	Long-term
0	No Change	No Change
0.1 to 0.9	Negligible	Negligible
1.0 to 2.9	Minor	Negligible
3.0 to 4.9	Moderate	Minor

Noise change ($L_{A10,18hr}$), dB	Magnitude of Impact	
	Short-term	Long-term
5.0 to 9.9	Major	Moderate
≥10.0	Major	Major

12.3.66. The NPSE classifications have been determined based on the absolute road traffic noise levels in accordance with the scale presented in **Table 12-6**.

Table 12-6 - Development generated road traffic NPSE classification

Period	Noise Level	NPSE classification
Day (0700-2300)	<55 dB $L_{A10,18h}$ facade	NOEL
	≥55 dB and <68 dB $L_{A10,18h}$ facade	LOAEL
	≥68 dB $L_{A10,18h}$ facade	SOAEL
Night (2300-0700)	<40 dB $L_{night,\ outside}$ free-field	NOEL
	≥40 dB and <55 dB $L_{night,\ outside}$ free-field	LOAEL
	≥55 dB $L_{night,\ outside}$ free-field	SOAEL

Significance of Effect

12.3.67. A significant effect occurs where a moderate or major impact is identified, but also subject to consideration of the following contextual factors:

- Absolute noise level;
- Proximity of sensitive receptors to the road links;
- Differing magnitude in short and long term;
- Whether or not the impact changes the acoustic character; and
- Likely perception of change by residents.

Operational Site Noise

Noise from Outdoor Events

12.3.68. For dwellings and other noise sensitive receptors, the magnitude of impact and effect level criteria have been determined based upon the guidance contained within the *Code of Practice for Environmental Noise Control at Concerts* (**Ref. 1.17**). This assessment considers the difference between the sound generated by the concert (the Music Noise Level, MNL) and the prevailing background sound levels from the preceding four hours of the concert, when averaged arithmetically over that period. There is also an upper MNL limit based on an absolute noise level. The applicable noise limit depends on the type of venue in which the concert takes place and also the number of proposed events per calendar year.

12.3.69. **Table 12-7** details the resulting magnitude of impact and effect level criteria that are considered to be the most appropriate for the proposed development.

Table 12-7 – Proposed MNL limits for Outdoor Concerts at proposed development

No. of events	Proposed Criteria dB(A) MNL	Target Noise Level dB(A) MNL[19]	Upper Limit dB(A) MNL	Potential NPSE Classification
Any	>75 dB(A) MNL			SOAEL
1 - 3	75 dB(A) MNL			LOAEL to SOAEL
4	Background level +23	69	75	
5	Background level +22	68	75	
6	Background level +21	67	75	
7	Background level +20	66	75	
8	Background level +19	65	75	
9	Background level +18	64	75	
10	Background level +17	63	75	
11	Background level +16	62	75	
12	Background level +15	61	75	
No more than 12	Background level +14 or less	60		< LOAEL

Noise from Service Vehicles/Delivery Operations and Fixed Items of Building Services Plant

[19] Target noise levels based on arithmetic average $L_{A90,15min,19:00-23:00}$ = 46 dB $L_{A90,15min}$ measured at ML2

Magnitude of Impact and NPSE Classification

12.3.70. For dwellings, the magnitude of impact and effect level criteria have been determined based upon the guidance contained within BS 4142 (**Ref. 1.5**). This assessment considers the difference between the sound from the operation of the proposed development (including any correction(s) for noticeable acoustic characteristics) and the prevailing background sound levels, but also taking into account context and the absolute sound levels. **Table 12-8** details the resulting magnitude of impact and effect level criteria that have been applied.

Table 12-8 - Operational site noise criteria for dwellings

Numerical criteria (x = Difference between Rating Level ($L_{Ar,Tr}$) and Background Sound Level ($L_{A90,T}$))	Magnitude of Impact[(1)]	NPSE Classification
x ≤ 0	Negligible	NOEL
0 < x ≤ 5	Minor	LOAEL
5 < to ≤ 10	Moderate	LOAEL to SOAEL
>10	Major	Above SOAEL
[(1)] Magnitude of impact can be subject to adjustment to account for context.		

Significance of Effect

12.3.71. A significant effect occurs where a moderate or major impact is identified, but also subject to consideration of the following contextual factors:

- Magnitude of change;
- Absolute sound level;
- Whether or not the impact changes the acoustic character; and
- Sensitivity of the receptor.

Noise from Car Parks and Park and Ride Scheme

12.3.72. Whilst there are no specific criteria against which to assess car park noise, it is considered reasonable to assess the potential impact in terms of the predicted change in noise levels as a result of the development. The criteria have therefore been determined based upon the short-term and long-term classification scales detailed within the DMRB LA 111 for operational road traffic noise (**Ref. 1.3**). The applicable noise criteria would therefore be those detailed in **Table 12-5**.

12.4. BASELINE CONDITIONS

12.4.1. Existing noise sources include:

- Road traffic noise from Marine Road Central, Marine Road West, Central Drive and from the wider road network;
- Pedestrians and tourists visiting the town;
- Occasional emergency vehicle sirens;
- Local avifauna (i.e. gulls); and

- The funfair located on the site of the proposed development (this is a temporary, seasonal noise source that was present during the baseline survey, particularly during the afternoon and early evening weekend periods (Friday to Sunday).

12.4.2. No vibration sources have been identified.

12.4.3. Details of the baseline noise survey are presented in Section 3 of **Appendix 12.1**. The measurement locations are shown in Figure 3-1 and described in Table 3-2. A summary of the measurement data is presented in Table 3-3 to Table 3-6.

FUTURE BASELINE

12.4.4. Given that the local noise environment is dominated by road traffic noise, it is anticipated that small increases in the baseline noise conditions may arise as a result of natural traffic growth over time.

SENSITIVE RECEPTORS

12.4.5. The following sensitive receptors within the study area are those closest to the proposed development and which therefore have the greatest potential to be subject to significant effects:

- Residential receptor R01 – Flat at second floor above Costa Coffee on Marine Road Central, adjacent to the Winter Gardens, 28m from Site boundary;
- Residential receptor R02 – Flat above shops opposite Eric Morecambe statue, Marine Road Central, 60m from Site boundary;
- Residential receptor R03 – Flat at second floor on corner of Marine Road Central and Pedder Street, 280m from Site boundary;
- Residential receptor R04 – Flat at first floor above Rita's Café, adjacent to the Goods Yard car park on Marine Road Central;
- Non-residential receptor NR01 – Third floor rooms of Midland Hotel, Marine Road Central, 30m from Site boundary (main hotel building; adjacent to the Rotunda bar 4m from Site boundary);
- Non-residential receptor NR02 – Second floor balcony of the Winter Gardens, Marine Road Central Non-residential receptor,[20] 28m from Site boundary;
- NR03 – Second floor rooms of Lakeland Rooms Hotel, Marine Road Central, 65m from Site boundary; and
- Ecological receptor ER01 – Ecological receptor: 30m north of site boundary, on the beach approx. 100m east of RNLI station[21], 30m from Site boundary.

12.4.6. The sensitive receptors are identified on Figure 5.1 in **Appendix 12.1.**

[20] The Winter Gardens is primarily a performance arts venue hosting live music and therefore not sensitive to daytime construction noise. Construction thresholds are not applicable although results have been provided as the receptor was identified by the Local Authority as being of interest.

[21] The ecological receptor ER01 is a notional location within Morecambe Bay although it is acknowledged that a potentially large area of the bay is ecologically sensitive. Assessment of the potential impact from construction noise at ecological receptors within the bay is addressed within the Ecology chapter.

12.5. ASSESSMENT OF POTENTIAL EFFECTS, MITIGATION AND RESIDUAL EFFECTS

CONSTRUCTION PHASE

12.5.1. Assessments of potential effects arising as a result of construction noise and vibration can be found in Section 5 of **Appendix 12.1**, with a summary of the results presented in below.

Table 12-9 - Assessment of potential effects, additional mitigation, residual effects and monitoring during construction

Sensitive Receptor	Potential Effects/Additional Mitigation/Residual Effects and Monitoring	
Receptor R01 Flat at second floor above Costa Coffee on Marine Road Central	**Potential effects**	Construction Noise This receptor would be subject to construction noise. Predicted construction noise levels, assuming a 2.4m hoarding around the site boundary, do not exceed BS 5228-1 (**Ref. 1.1**) thresholds during all of the assumed phases and activities, with the exception of earthworks, where a +1dB exceedance is predicted, resulting in a **minor** impact. It is recognised that the final noise levels at the receptor would be dependent upon the locations and durations of construction activities plus the final construction plant selections. Therefore, notwithstanding the margins of compliance that have been identified (between -6dB and +1dB), consideration has been given to appropriate mitigation measures. Construction Vibration This receptor may be subject to construction vibration. Predicted vibration levels may exceed BS 5228-2 thresholds (**Ref. 1.2**) based on the minimum separation distances between the receptor and the assumed phases and activities as highlighted in Section 5 of **Appendix 12.1**. Vibratory rollers have the potential for a **moderate** impact at this receptor. At this stage, the extent of any vibratory rolling within the separation distance that may cause an effect is unknown. Percussive piling methods are not anticipated, with continuous flight auger (CFA) methods being the most likely.
	Additional mitigation	Construction Noise & Vibration Construction works would be undertaken in accordance with the principle of Best Practicable Means (BPM) as defined in Section 72 of the CoPA (**Ref. 1.10**). Example measures in compliance with BPM are listed within Section 5 of **Appendix 12.1**. Mitigation measures would be secured and implemented via a Construction Environmental Management Plan (CEMP). The preparation of the CEMP, and subsequent compliance with it, could be ensured through the use of a planning condition. CFA piling is the anticipated method of piling at the site and this would be the recommended method due to the significant reduction in vibration levels generated in comparison to percussive piling techniques.

Sensitive Receptor	Potential Effects/Additional Mitigation/Residual Effects and Monitoring	
	Residual effects and monitoring	Construction Noise With mitigation measures in place, predicted results are likely to yield a sound reduction of up to 5dB. Therefore, a direct, temporary, local, adverse **minor** impact at worst is predicted for the receptor. This effect is **not significant**. Construction Vibration With consideration to the mitigation measures outlined above, a direct, temporary, local, adverse **minor** impact is predicted for the receptor. This effect is **not significant**. Monitoring The requirements for construction phase monitoring would be identified through the delivery of, and compliance with, the proposed CEMP. The appointed Principal Contractor would be responsible for the delivery and verification of BPM.
Receptor R02 Flat above shops opposite Eric Morecambe statue, Marine Road Central	**Potential effects**	Construction Noise This receptor would be subject to construction noise. Predicted construction noise levels, assuming a 2.4m hoarding around the site boundary, do not exceed BS 5228-1 (**Ref. 1.1**) thresholds during all of the assumed phases and activities, resulting in a **negligible** impact. It is recognised that the final noise levels at the receptor would be dependent upon the locations and durations of construction activities plus the final construction plant selections. Therefore, notwithstanding the margins of compliance that have been identified (between -17dB and -10dB), consideration has been given to appropriate mitigation measures. Construction Vibration This receptor may be subject to construction vibration. Predicted vibration levels may exceed BS 5228-2 thresholds (**Ref. 1.2**) based on the minimum separation distances between the receptor and the assumed phases and activities as highlighted in Section 5 of **Appendix 12.1.** Vibratory rollers have the potential for a **minor** impact at this receptor. At this stage, the extent of any vibratory rolling within the separation distance that may cause an effect is unknown. Percussive piling methods are not anticipated with continuous flight auger (CFA) methods being the most likely.
	Additional mitigation	Construction Noise & Vibration Construction works would be undertaken in accordance with the principle of Best Practicable Means (BPM) as defined in Section 72 of the CoPA (**Ref. 1.10**). Example measures in compliance with BPM are listed within Section 5 of **Appendix 12.1**. Mitigation measures would be secured and implemented via a Construction Environmental Management Plant (CEMP). The preparation of the CEMP, and subsequent compliance with it, could be ensured through the use of a planning condition.

Sensitive Receptor	Potential Effects/Additional Mitigation/Residual Effects and Monitoring	
		CFA piling is the anticipated method of piling at the site and this would be the recommended method due to the significant reduction in vibration levels generated in comparison to percussive piling techniques.
	Residual effects and monitoring	Construction Noise With mitigation measures in place, predicted results are likely to yield a sound reduction of up to 5dB. Therefore, a direct, temporary, local, adverse **negligible** impact is predicted for the receptor. This effect is **not significant**. Construction Vibration With consideration to the mitigation measures outlined above, a direct, temporary, local, adverse **negligible** impact is predicted for the receptor. This effect is **not significant**. Monitoring The requirements for construction phase monitoring would be identified through the delivery of, and compliance with, the proposed CEMP. The appointed Principal Contractor would be responsible for the delivery and verification of BPM.
Receptor R03 Flat at second floor on corner of Marine Road Central and Pedder Street	**Potential effects**	Construction Noise This receptor may be subject to construction noise. Predicted construction noise levels, assuming a 2.4m hoarding around the site boundary, do not exceed BS 5228-1 (**Ref. 1.1**) thresholds during all of the assumed phases and activities, resulting in **negligible** impact. It is recognised that the final noise levels at the receptor would be dependent upon the location and duration of construction activities plus the final construction plant selections. Therefore, notwithstanding the margins of compliance that have been identified (between -17dB and -14dB), consideration has been given to appropriate mitigation measures. Construction Vibration This receptor is unlikely to be subject to construction vibration. Predicted vibration levels is unlikely to exceed BS 5228-2 thresholds (**Ref. 1.2**) based on the minimum separation distances between the receptor and the assumed phases and activities as highlighted in Section 5 of **Appendix 12.1.**
	Additional mitigation	Construction Noise & Vibration Construction works would be undertaken in accordance with the principle of Best Practicable Means (BPM) as defined in Section 72 of the CoPA (**Ref. 1.10**). Example measures in compliance with BPM are listed within Section 5 of **Appendix 12.1**. Mitigation measures would be secured and implemented via a Construction Environmental Management Plant (CEMP). The preparation of the CEMP, and subsequent compliance with it, could be ensured through the use of a planning condition.

Sensitive Receptor	Potential Effects/Additional Mitigation/Residual Effects and Monitoring	
		CFA piling is the anticipated method of piling at the site and this would be the recommended method due to the significant reduction in vibration levels generated in comparison to percussive piling techniques.
	Residual effects and monitoring	Construction Noise With mitigation measures in place, predicted results are likely to yield a sound reduction of up to 5dB. Therefore, a direct, temporary, local, adverse **negligible** impact is predicted for the receptor. This effect is **not significant**. Construction Vibration With consideration to the mitigation measures outlined above, a direct, temporary, local, adverse **negligible** impact is predicted for the receptor. This effect is **not significant**. Monitoring The requirements for construction phase monitoring would be identified through the delivery of, and compliance with, the proposed CEMP. The appointed Principal Contractor would be responsible for the delivery and verification of BPM.
Receptor R04 Flat at first floor above Rita's Café, Marine Road Central	**Potential effects**	Construction Noise This receptor would be subject to construction noise. Predicted construction noise levels, assuming a 2.4m hoarding around the site boundary, do not exceed BS 5228-1 (**Ref. 1.1**) thresholds during all of the assumed phases and activities, with the exception of earthworks, where a +2dB exceedance is predicted, resulting in a **minor** impact. It is recognised that the final noise levels at the receptor would be dependent upon the locations and durations of construction activities plus the final construction plant selections. Therefore, notwithstanding the margins of compliance that have been identified (between -7dB and +2dB), consideration has been given to appropriate mitigation measures. Construction Vibration This receptor may be subject to construction vibration. Predicted vibration levels may exceed BS 5228-2 thresholds (**Ref. 1.2**) based on the minimum separation distances between the receptor and the assumed phases and activities as highlighted in Section 5 of **Appendix 12.1**. Vibratory rollers have the potential for a **moderate** impact at this receptor. At this stage, the extent of any vibratory rolling within the separation distance that may cause an effect is unknown. Percussive piling methods are not anticipated, with continuous flight auger (CFA) methods being the most likely.
	Additional mitigation	Construction Noise & Vibration Construction works would be undertaken in accordance with the principle of Best Practicable Means (BPM) as defined in Section 72

Sensitive Receptor	Potential Effects/Additional Mitigation/Residual Effects and Monitoring	
		of the CoPA (**Ref. 1.10**). Example measures in compliance with BPM are listed within Section 5 of **Appendix 12.1**. Mitigation measures would be secured and implemented via a Construction Environmental Management Plan (CEMP). The preparation of the CEMP, and subsequent compliance with it, could be ensured through the use of a planning condition. CFA piling is the anticipated method of piling at the site and this would be the recommended method due to the significant reduction in vibration levels generated in comparison to percussive piling techniques.
	Residual effects and monitoring	Construction Noise With mitigation measures in place, predicted results are likely to yield a sound reduction of up to 5dB. Therefore, a direct, temporary, local, adverse **minor** impact at worst is predicted for the receptor. This effect is **not significant**. Construction Vibration With consideration to the mitigation measures outlined above, a direct, temporary, local, adverse **minor** impact is predicted for the receptor. This effect is **not significant**. Monitoring The requirements for construction phase monitoring would be identified through the delivery of, and compliance with, the proposed CEMP. The appointed Principal Contractor would be responsible for the delivery and verification of BPM.
Receptor NR01 Third floor rooms of Midland Hotel, Marine Road Central	**Potential effects**	Construction Noise This receptor would be subject to construction noise. Predicted construction noise levels, assuming a 2.4m hoarding around the site boundary, do not exceed BS 5228-1 (**Ref. 1.1**) thresholds during all of the assumed phases and activities, with the exception of earthworks, where a +2dB exceedance is predicted, resulting in a **minor** impact. It is recognised that the final noise levels at the receptor would be dependent upon the location and duration of construction activities plus the final construction plant selections. Therefore, notwithstanding the margins of compliance that have been identified (between -5dB and +2dB), consideration has been given to appropriate mitigation measures. Construction Vibration This receptor may be subject to construction vibration. Predicted vibration levels may exceed BS 5228-2 thresholds (**Ref. 1.2**) based on the minimum separation distances between the receptor and the assumed phases and activities as highlighted in Section 5 of **Appendix 12.1**. Vibratory rollers have the potential for a **moderate** impact at this receptor. At this stage, the extent of any vibratory rolling within the separation distance that may cause an effect is unknown.

Sensitive Receptor	Potential Effects/Additional Mitigation/Residual Effects and Monitoring	
		Percussive piling methods are not anticipated with continuous flight auger (CFA) methods being the most likely.
	Additional mitigation	Construction Noise & Vibration Construction works would be undertaken in accordance with the principle of Best Practicable Means (BPM) as defined in Section 72 of the CoPA (**Ref. 1.10**). Example measures in compliance with BPM are listed within Section 5 of **Appendix 12.1**. Mitigation measures would be secured and implemented via a Construction Environmental Management Plant (CEMP). The preparation of the CEMP, and subsequent compliance with it, could be ensured through the use of a planning condition. CFA piling is the anticipated method of piling at the site and this would be the recommended method due to the significant reduction in vibration levels generated in comparison to percussive piling techniques.
	Residual effects and monitoring	Construction Noise With mitigation measures in place, predicted results are likely to yield a sound reduction of up to 5dB. Therefore, a direct, temporary, local, adverse **minor** impact at worst is predicted for the receptor. This effect is **not significant**. Construction Vibration With consideration to the mitigation measures outlined above, a direct, temporary, local, adverse **minor** impact is predicted for the receptor. This effect is **not significant**. Monitoring The requirements for construction phase monitoring would be identified through the delivery of, and compliance with, the proposed CEMP. The appointed Principal Contractor would be responsible for the delivery and verification of BPM.
Receptor NR03 Second floor rooms of Lakeland Rooms Hotel, Marine Road Central	**Potential effects**	Construction Noise This receptor would be subject to construction noise. Predicted construction noise levels, assuming a 2.4m hoarding around the site boundary, do not exceed BS 5228-1 (**Ref. 1.1**) thresholds during all of the assumed phases and activities. It is recognised that the final noise levels at the receptor would be dependent upon the location and duration of construction activities plus the final construction plant selections. Therefore, notwithstanding the margins of compliance that have been identified (between -11dB and -4dB), consideration has been given to appropriate mitigation measures. Construction Vibration This receptor may be subject to construction vibration. Predicted vibration levels may exceed BS 5228-2 thresholds (**Ref. 1.2**) based on the minimum separation distances between the receptor and the

Sensitive Receptor	Potential Effects/Additional Mitigation/Residual Effects and Monitoring	
		assumed phases and activities as highlighted in Section 5 of **Appendix 12.1.** Activities that show the potential for a **minor** impact on this receptor are for vibratory rollers. At this stage, the extent of any vibratory rolling within the separation distance that may cause an effect is unknown. Percussive piling methods are not anticipated with continuous flight auger (CFA) methods being the most likely.
	Additional mitigation	<u>Construction Noise & Vibration</u> Construction works would be undertaken in accordance with the principle of Best Practicable Means (BPM) as defined in Section 72 of the CoPA (**Ref. 1.10**). Example measures in compliance with BPM are listed within Section 5 of **Appendix 12.1**. Mitigation measures would be secured and implemented via a Construction Environmental Management Plant (CEMP). The preparation of the CEMP, and subsequent compliance with it, could be ensured through the use of a planning condition. CFA piling is the anticipated method of piling at the site and this would be the recommended method due to the significant reduction in vibration levels generated in comparison to percussive piling techniques.
	Residual effects and monitoring	<u>Construction Noise</u> With mitigation measures in place, predicted results are likely to yield a sound reduction of up to 5dB. Therefore, a direct, temporary, local, adverse **negligible** impact is predicted for the receptor. This effect is **not significant**. <u>Construction Vibration</u> With consideration to the mitigation measures outlined above, i.e. the use of CFA piling, a direct, temporary, local, adverse **negligible** impact is predicted for the receptor. This effect is **not significant**. <u>Monitoring</u> The requirements for construction phase monitoring would be identified through the delivery of, and compliance with, the proposed CEMP. The appointed Principal Contractor would be responsible for the delivery and verification of BPM.

OPERATIONAL PHASE

12.5.2. Assessments of potential effects arising as a result of operational noise can be found in Section 7 of **Appendix 12.1**. Noise impacts due to the following operational activities have been considered:

- Outdoor events;
- Car parks and Park and Ride;
- Delivery/service vehicles (Scenario 1: ambient goods, Scenario 2: chilled goods);
- Fixed plant and equipment; and
- Development generated road traffic.

12.5.3. The most relevant operational activities have been assessed at the identified sensitive receptors, depending on the proximity to the noise sources. These are summarised below.

Table 12-10 - Assessment of potential effects, additional mitigation, residual effects and monitoring during operation

Sensitive Receptor	Potential Effects/Additional Mitigation/Residual Effects and Monitoring	
Sensitive receptor: R01 Flat at second floor above Costa Coffee on Marine Road Central	**Potential effects**	Outdoor events The magnitude of impact due to amplified music from outdoor events is **moderate**. Car Parks N/A – receptor is not close to any of the car parks designated for use by the proposed development Delivery/service vehicles For scenario 1, day and night-time magnitudes of impacts are **negligible** and **minor** respectively. For scenario 2, day and night-time magnitudes of impact are **negligible** and **moderate** respectively. A potential **significant effect** is identified during the night. Fixed plant and equipment Noise limits have been determined for noise from any future fixed/mechanical plant. Development generated traffic noise The magnitude of impact due to development generated traffic on the existing network is **negligible** in both the short term and long term.
	Additional mitigation	Outdoor events Additional mitigation measures could include: ▪ Provision of temporary acoustic screen 2.8m high along southern boundary with Rhythm Gardens; ▪ Provision of highly directional sound system and system-specific noise modelling; and ▪ Implementation of a noise management plan (NMP). Car parks None required. Delivery/service vehicles For scenario 1, no additional mitigation is required. For scenario 2, it is recommended that chilled deliveries to the café/retail delivery area are scheduled to avoid night-time periods (23:00 – 07:00). Note that separate to this planning application, a Traffic Regulation Order will need to be approved and subject to consultation. Fixed plant and equipment

Sensitive Receptor	Potential Effects/Additional Mitigation/Residual Effects and Monitoring	
		Compliance with the noise limits could be delivered through the use of a planning condition. <u>Development Generated Traffic Noise</u> None required.
	Residual effects and monitoring	<u>Outdoor events</u> The magnitude of impact, following mitigation, is likely to be **moderate** at worst**.** Therefore, following the implementation of mitigation measures, there is likely to be a direct, temporary, long-term adverse residual effect on receptor R01 (**not significant**). It is likely that noise monitoring during outdoor events will be required at locations to be agreed with the Local Authority in due course. <u>Delivery/service vehicles</u> The magnitude of impact, following mitigation, is likely to be **minor.** Therefore, following the implementation of mitigation measures, there is likely to be a direct, permanent, long-term adverse residual effect on receptor R01 (**not significant**).
Sensitive receptor: R02 Flat above shops opposite Eric Morecambe statue, Marine Road Central	**Potential effects**	<u>Outdoor events</u> The magnitude of impact due to amplified music from outdoor events is **moderate**. <u>Car Parks</u> N/a – receptor is not close to any of the car parks designated for use by the proposed development <u>Delivery/service vehicles</u> For scenario 1, day and night-time magnitude of impacts are **negligible.** For scenario 2, day and night-time magnitude of impact are **negligible** and **minor** respectively. <u>Fixed plant and equipment</u> Noise limits have been determined for noise from any future fixed/mechanical plant. <u>Development generated traffic noise</u> The magnitude of impact due to development generated traffic on the existing network is **negligible** in both the short term and long term.
	Additional mitigation	<u>Outdoor events</u> Additional mitigation measures could include: ▪ Provision of temporary acoustic screen 2.8m high along southern boundary with Rhythm Gardens; ▪ Provision of highly directional sound system and system-specific noise modelling; and ▪ Implementation of an NMP.

Sensitive Receptor	Potential Effects/Additional Mitigation/Residual Effects and Monitoring	
		Car parks None required. Delivery/service vehicles For scenario 1, no additional mitigation is required. For scenario 2, it is recommended that chilled deliveries are scheduled so as to avoid night-time periods (23:00 – 07:00). Note that separate to this planning application, a Traffic Regulation Order will need to be approved and subject to consultation. Fixed plant and equipment Compliance with the noise limits could be delivered through the use of a planning condition. Development Generated Traffic Noise None required.
	Residual effects and monitoring	Outdoor events The magnitude of impact, following mitigation, is likely to be **moderate** at worst**.** Therefore, following the implementation of mitigation measures, there is likely to be a direct, temporary, long-term adverse residual effect on receptor R02 (**not significant**). It is likely that noise monitoring during outdoor events will be required at locations to be agreed with the Local Authority in due course. Delivery/service vehicles The magnitude of impact, following mitigation, is likely to be **negligible.** Therefore, following the implementation of mitigation measures, there is likely to be a direct, permanent, long-term negligible adverse residual effect on receptor R02 (**not significant**).
Sensitive receptor: R03 Flat at second floor on corner of Marine Road Central and Pedder Street	**Potential effects**	Outdoor events The magnitude of impact due to amplified music from outdoor events is **minor**. Car Parks N/A – receptor is not close to any of the car parks designated for use by the proposed development Delivery/service vehicles N/A (receptor >400m from noise source) Fixed plant and equipment N/A (receptor >400m from noise source) Development generated traffic noise The magnitude of impact due to development generated traffic on the existing network is **negligible** in both the short term and long term.

Sensitive Receptor	Potential Effects/Additional Mitigation/Residual Effects and Monitoring	
	Additional mitigation	Outdoor events Additional mitigation measures could include: ▪ Provision of temporary acoustic screen 2.8m high along southern boundary with Rhythm Gardens; ▪ Provision of highly directional sound system and system-specific noise modelling; and ▪ Implementation of an NMP. Car parks None required. Delivery/service vehicles N/a Fixed plant and equipment N/a Development Generated Traffic Noise None required.
	Residual effects and monitoring	Outdoor events The magnitude of impact, following mitigation, is likely to be **minor** at worst**.** Therefore, following the implementation of mitigation measures, there is likely to be a direct, temporary, long-term adverse residual effect on receptor R03 (**not significant**). It is likely that noise monitoring during outdoor events will be required at locations to be agreed with the Local Authority in due course.
Receptor R04 Flat at first floor above Rita's Café, Marine Road Central	**Potential effects**	Outdoor events The magnitude of impact due to amplified music from outdoor events is **minor**. Car Parks The magnitude of impact due to noise from the use of Goods Yard car park is **negligible**. Delivery/service vehicles For scenario 1, day and night-time magnitudes of impacts are **negligible** and **moderate** respectively. A potential **significant effect** is identified during the night. For scenario 2, day and night-time magnitudes of impact are **negligible** and **major** respectively. A potential **significant effect** is identified during the night. Fixed plant and equipment Noise limits have been determined for noise from any future fixed/mechanical plant. Development generated traffic noise

Sensitive Receptor	Potential Effects/Additional Mitigation/Residual Effects and Monitoring	
		The magnitude of impact due to development generated traffic on the existing network is **negligible** in both the short term and long term.
	Additional mitigation	Outdoor events Additional mitigation measures could include: ▪ Provision of temporary acoustic screen 2.8m high along southern boundary with Rhythm Gardens; ▪ Provision of highly directional sound system and system-specific noise modelling; and ▪ Implementation of a noise management plan (NMP). Car parks None required. Delivery/service vehicles For scenario 1, it is recommended that ambient deliveries to the café/retail delivery area are scheduled to avoid the quietest night-time periods (00:00 – 06:00). For scenario 2, it is recommended that chilled deliveries to the café/retail delivery area are scheduled to avoid night-time periods (23:00 – 07:00). Note that separate to this planning application, a Traffic Regulation Order will need to be approved and subject to consultation. Fixed plant and equipment Compliance with the noise limits could be delivered through the use of a planning condition. Development Generated Traffic Noise None required.
	Residual effects and monitoring	Outdoor events The magnitude of impact, following mitigation, is likely to be **minor** at worst**.** Therefore, following the implementation of mitigation measures, there is likely to be a direct, temporary, long-term adverse residual effect on receptor R04 (**not significant**). It is likely that noise monitoring during outdoor events will be required at locations to be agreed with the Local Authority in due course. Delivery/service vehicles The magnitude of impact, following mitigation, is likely to be **minor.** Therefore, following the implementation of mitigation measures, there is likely to be a direct, permanent, long-term adverse residual effect on receptor R04 (**not significant**).
Sensitive receptor: NR01	**Potential effects**	Outdoor events The magnitude of impact due to amplified music from outdoor events is **negligible**.

Sensitive Receptor	Potential Effects/Additional Mitigation/Residual Effects and Monitoring	
Third floor rooms of Midland Hotel, Marine Road Central		Car Parks N/A – receptor is not close to any of the car parks designated for use by the proposed development Delivery/service vehicles For scenario 1, day and night-time magnitude of impacts are **negligible**. For scenario 2, day and night-time magnitude of impact are **negligible.** Fixed plant and equipment Noise limits have been determined for noise from any future fixed/mechanical plant. Development generated traffic noise The magnitude of impact due to development generated traffic on the existing network is **negligible** in both the short term and long term.
	Additional mitigation	Outdoor events None required. Car parks None required. Delivery/service vehicles None required. Fixed plant and equipment Compliance with the noise limits could be delivered through the use of a planning condition. Development Generated Traffic Noise None required.
	Residual effects and monitoring	Outdoor events The magnitude of impact, following mitigation, is likely to be **negligible.** Therefore, following the implementation of mitigation measures, there is likely to be a direct, temporary, long-term adverse residual effect on receptor NR01 (**not significant**). It is likely that noise monitoring during outdoor events will be required at locations to be agreed with the Local Authority in due course. Delivery/service vehicles The magnitude of impact, following mitigation, is likely to be **negligible.** Therefore, following the implementation of mitigation measures, there is likely to be a direct, permanent, long-term adverse residual effect on receptor NR01 (**not significant**).

Sensitive Receptor	Potential Effects/Additional Mitigation/Residual Effects and Monitoring	
Sensitive receptor: NR03 Second floor rooms of Lakeland Rooms Hotel	**Potential effects**	Outdoor events The magnitude of impact due to amplified music from outdoor events is **moderate**. Car Parks N/A – receptor is not close to any of the car parks designated for use by the proposed development Delivery/service vehicles For scenario 1, day and night-time magnitude of impacts are **negligible** and **minor** respectively. For scenario 2, day and night-time magnitude of impact are **negligible** and **moderate** respectively. Fixed plant and equipment Noise limits have been determined for noise from any future fixed/mechanical plant. Development generated traffic noise The magnitude of impact due to development generated traffic on the existing network is **negligible** in both the short term and long term.
	Additional mitigation	Outdoor events Additional mitigation measures could include: ▪ Provision of temporary acoustic screen 2.8m high along southern boundary with Rhythm Gardens; ▪ Provision of highly directional sound system and system-specific noise modelling; and ▪ Implementation of a noise management plan (NMP). Car parks None required. Delivery/service vehicles For scenario 1, no additional mitigation is required. For scenario 2, it is recommended that chilled deliveries are scheduled to avoid night-time periods (23:00 – 07:00). Note that separate to this planning application, a Traffic Regulation Order will need to be approved and subject to consultation. Fixed plant and equipment Compliance with the noise limits could be delivered through the use of a planning condition. Development Generated Traffic Noise None required.
	Residual effects and monitoring	Outdoor events The magnitude of impact, following mitigation, is likely to be **moderate** at worst**.** Therefore, following the implementation of

Sensitive Receptor	Potential Effects/Additional Mitigation/Residual Effects and Monitoring	
		mitigation measures, there is likely to be a direct, temporary, long-term adverse residual effect on receptor NR03 (**not significant**). It is likely that noise monitoring during outdoor events will be required at locations to be agreed with the Local Authority in due course. <u>Delivery/service vehicles</u> The magnitude of impact, following mitigation, is likely to be **minor.** Therefore, following the implementation of mitigation measures, there is likely to be a direct, permanent, long-term adverse residual effect on receptor NR03 (**not significant**).

12.5.4. Note that operational noise levels have been predicted at NR02 (The Winter Gardens) but an assessment of noise impact has not been undertaken as the receptor is not noise sensitive.

12.5.5. The assessment of operational noise impacts at ecological receptors (ER01) is included within **Chapter 8: Nature Conservation and Biodiversity.**

12.5.6. The impact of noise from the use of existing car parks and the Caton Road Park and Ride has been assessed at the nearest sensitive receptors to those sources and is included within Section 7 of **Appendix 12.1**. The car park impacts are likely to be direct, permanent, local, adverse **negligible**. The effect is **not significant**.

ASSESSMENT AGAINST FUTURE BASELINE

12.5.7. The completed assessment work has been undertaken against the existing baseline noise environment, as these are lower and therefore more stringent than can reasonably be expected to arise in the future.

12.6. OPPORTUNITIES FOR ENVIRONMENTAL ENHANCEMENT

12.6.1. The following potential enhancement opportunities have been identified:

- Maximise the distance between noise sources and sensitive receptors where possible; and
- Using building layout to screen noise sources (e.g. service yards, fixed plant and equipment) from sensitive receptors where possible.

12.7. DIFFICULTIES AND UNCERTAINTIES

12.7.1. As is typical at planning application stage, the precise details of the noise generating sources during construction and operation are not confirmed. Therefore, a number of assumptions have been made focussing on key activities and drawing upon WSP's experience of similar schemes, with the aim of identifying whether significant noise effects are likely to arise at the closest sensitive receptors. Additional calculations may be required at a later stage. However, the completed calculations are considered appropriate to provide an appreciation of any potentially significant effects.

12.7.2. For the construction phase, the type and number of construction plant items, programme and working methodologies to be applied are not known and would be dependent upon the appointed Principal Contractor. The construction noise level predictions have therefore been undertaken based on assumed plant details drawing upon WSP's experience of similar schemes.

12.7.3. The traffic flow data from the Transport Assessment submitted in support of the planning application are the basis for the development generated road traffic assessment. The assessment is considered worst-case because the 'with proposed development' (do-something) scenario includes traffic generated by the committed developments detailed in Section 6 of **Appendix 12.1**, in addition to the vehicle numbers generated only by the proposed development.

12.7.4. At this stage, information about the final items of building services plant required by the proposed development are not known. Noise emission limits in terms of a rating level in accordance with BS4142:2014 have been proposed at the nearest sensitive receptors.

12.8. REFERENCES

- Ref. 1.1: Subcommittee B/564/1. (2009). BS 5228-1:2009+A1:2014: *Code of practice for noise and vibration control on construction and open sites* – Part 1: *Noise*. London: BSi
- Ref. 1.2: Subcommittee B/564/1. (2009). BS 5228-2:2009+A1:2014: *Code of practice for noise and vibration control on construction and open sites* – Part 2: *Vibration*. London: BSi
- Ref. 1.3: Highways England, Design Manual for Roads and Bridges, LA 111, Revision 2, 2020, Noise and Vibration
- Ref. 1.4: Department of Transport and Welsh Office (1988). *Calculation of Road Traffic Noise.*
- Ref. 1.5: Technical Committee EH/1 and subcommittee EH/1/3. (2019). BS 4142:2014+A1:2019: *Method for Rating and Assessing Industrial and Commercial Sound*. London: BSi
- Ref. 1.6: Defra (2010). *Noise Policy Statement for England*
- Ref. 1.7: Ministry of Housing, Communities & Local Government (2019). *National Planning Policy Framework*
- Ref. 1.8: Ministry of Housing, Communities & Local Government (2019). *Planning Practice Guidance. Noise*.
- Ref. 1.9: HM Government (1990). Environmental Protection Act 1990 (as amended). London: HMSO
- Ref. 1.10: HM Government (1974). *Control of Pollution Act 1974.*
- Ref. 1.11: *Lancaster Local Plan Part One – Strategic Polices and Land Allocations* DPD (2020)
- Ref. 1.12: *Lancaster Local Plan Part Two – Development Management Policies* DPD (2020)
- Ref. 1.13: *Morecambe Area Action Plan* (2014)
- Ref. 1.14: International Standards Organisation (1996). ISO 9613-2. Acoustics – Attenuation of sound during propagation outdoors – Part 2: *General method of calculation*.
- Ref. 1.15: Bavarian State Agency for the Environment (Bayerisches Landesamt Fur Umwelt – LfU) *Parking Area Noise - Recommendations for the calculation of sound emissions of parking areas, motorcar centres and bus stations, as well as of multi-storey car parks and underground car parks*, 2007 (PAN)
- Ref. 1.16: Noise Advisory Council (1978). *A guide to measurement and prediction of the equivalent continuous sound level Leq*
- Ref. 1.17: The Noise Council (1995), *Code of Practice for Environmental Noise Control at Concerts..*

13

AIR QUALITY

PUBLIC

13. AIR QUALITY

13.1. INTRODUCTION

13.1.1. This chapter provides a review of existing air quality conditions at and in proximity to the site and an assessment of the potential impacts of the proposed development on local air quality during the construction and operational phases. The assessment was undertaken in accordance with current technical guidance published by the Department of Environment, Food and Rural Affairs (Defra) and other relevant guidance published by the Institute of Air Quality Management (IAQM).

13.1.2. Air pollution in urban areas and adjacent to major roads is dominated by emissions from road vehicles. The main pollutants of health concern from road traffic exhaust releases are nitrogen dioxide (NO_2) and fine particulates assessed as the fraction of airborne particles of mean aerodynamic diameter less than 10 micrometres (PM_{10}) and less than 2.5 micrometres ($PM_{2.5}$). These pollutants are most likely to approach their respective air quality objectives in proximity to major roads and in congested urbanised areas. As such, emissions of NO_2, PM_{10} and $PM_{2.5}$ associated with the proposed development form the focus of this assessment.

13.1.3. This report is supported by six technical appendices:

- Appendix 13.1 – Figures;
- Appendix 13.2 – Glossary;
- Appendix 13.3 – Air Quality Legislation and Policy;
- Appendix 13.4 – IAQM Construction Assessment Methodology;
- Appendix 13.5 – Construction Phase Assessment;
- Appendix 13.6 – Dispersion Model Approach & Verification;
- Appendix 13.7 – Site-Specific Monitoring; and
- Appendix 13.8 – Atmospheric Dispersion Modelling Results.

13.2. POLICY CONTEXT

13.2.1. Air quality legislation and policy relevant to this assessment is summarised below, with further detail available in **Appendix 13.3**.

AIR QUALITY LEGISLATION & POLICY

13.2.2. Air quality legislation in the UK is derived from Directive 2008/50/EC[22] of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe which defines the limit values for the concentration of pollutants in the ambient air, and the requirements on government to improve and report upon air quality in their jurisdiction. The limit values and requirements outlined in Directive 2008/50/EC[22] are transposed into English law through a series of air quality regulations[23,24,25], the most recent being the Air Quality Standards (Amendment) Regulations 2016[26].

[22] European Parliament (2008) Council Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe
[23] The Air Quality (England) Regulations 2000 - Statutory Instrument 2000 No.928
[24] The Air Quality (England) (Amendment) Regulations 2002- Statutory Instrument 2002 No.3043
[25] The Air Quality Standards Regulations 2010 - Statutory Instrument 2010 No. 1001
[26] The Air Quality Standards (Amendment) Regulations 2016 – SI 2016 No.1184

13.2.3. The Environment Act 1995[27] requires the UK Government and devolved administrations to produce a national air quality strategy (AQS)[28] that sets out the UK's air quality objectives and recognises that action at a national, regional and local level may be required proportionate to the scale and nature of the air quality problem. Under the Act, local authorities are required to document and review local air quality in an Annual Status Report (ASR) with the aim of meeting the limit and objective values for relevant pollutants. Where the limit and objective values are unlikely to be met, a local authority is required to declare an air Quality Management Area (AQMA). Where AQMAs are declared, a local authority must complete an Air Quality Action Plan (AQAP) detailing measures to improve the air quality in that area towards compliance with the limit and objective values. The limit and objective values from the regulations and AQS are described in **Table 13-1**. Whilst there are no statutory limit values for dust deposition, Section 79 of the Environmental Protection Act 1990[29] provides definitions of statutory nuisance relevant to dust and particles.

13.2.4. In 2019 the UK government published its Clean Air Strategy[30]. The strategy recognises the effects on human health of poor air quality and the value of the natural environment and its susceptibility to air pollution. The strategy details current actions to reduce emissions from transport and other sources, and to reduce nitrogen deposition resulting from air pollutants to the natural environment.

Table 13-1 - National (England) Air Quality Objectives Set for the Protection of Human Health

Pollutant	Applies to	Objective	Measured as	Date to be achieved by and maintained thereafter
Nitrogen dioxide (NO_2)	UK	200µg/m^3 not to be exceeded more than 18 times a year	1 hour mean	31.12.2005
	UK	40µg/m^3	annual mean	31.12.2005
Particulate Matter (PM_{10}) (gravimetric)[A]	UK (except Scotland)	40µg/m^3	annual mean	31.12.2004
	UK (except Scotland)	50µg/m^3 not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
Particulate Matter ($PM_{2.5}$)	UK (except Scotland)	25µg/m^3	annual mean	2020

13.2.5. After the departure of the UK from the EU, the Environment Bill[31] will introduce a duty to set a legally-binding target for fine particulate matter ($PM_{2.5}$), in addition to at least one further long-term air quality target by October 2022. The European Union (Withdrawal) Act[32] ensures that the whole body of existing EU environmental law continues to have effect in UK law.

[27] Environment Act 1995 (Original (as enacted)) [online] https://www.legislation.gov.uk/ukpga/1995/25/part/IV/enacted
[28] Department for Environment, Food and Rural Affairs (Defra) and the Devolved Administrations (2007). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volumes 1 and 2)
[29] Environmental Protection Act (Original (as enacted)) [online] https://www.legislation.gov.uk/ukpga/1990/43/contents/enacted
[30] Defra (2019) Clean Air Strategy 2019 [online] https://www.gov.uk/government/publications/clean-air-strategy-2019
[31] Department for food, Environment and Rural Affairs (Defra) Air Quality Targets in the Environment Bill, https://uk-air.defra.gov.uk/library/air-quality-targets
[32] European Union (Withdrawal) Act (2018). https://www.legislation.gov.uk/ukpga/2018/16/contents/enacted.

PLANNING POLICY

13.2.6. A summary of the national and local planning policy relevant to the proposed development and air quality is provided below, with further detail available in **Appendix 13.3**.

National Planning Policy

National Planning Policy Framework

13.2.7. The latest National Planning Policy Framework[33] provides guidance to local authorities for planning decisions that includes a presumption in favour of sustainable development. This should be achieved through a balance of economic, social and environmental factors.

13.2.8. Developments should also take account of the presence of an AQMA, Clean Air Zone (CAZ) or Low Emission Zone (LEZ), and be consistent with the local AQAP where such controlled zones are present.

Local Planning Policy

Lancaster Local Plan

13.2.9. The Local Plan[34] is LCC's primary planning document that directs planning permission in the district. The Local Plan includes air quality specific policy (*Policy DM31: Air Quality Management & Pollution*) to ensure that development proposals seek to minimise emissions and exposure, not significantly worsen existing emissions or air quality conditions, consider LCC's *Low Emissions and Air Quality* Planning Advisory Note (hereafter referred to as LCC's PAN)[35], and align with Lancaster District Air Quality Action Plan[36].

Low Emissions & Air Quality Planning Advisory Note

13.2.10. LCC's PAN[35] provides guidance to developers to support action through the planning system to improve air quality and lower transport emissions in Lancaster. LCC's PAN provides guidelines for tailoring air quality assessment and mitigation requirements according to the nature and scale of proposed developments, to ensure minimal air quality impacts. This assessment has been conducted with close alignment to LCC's PAN and full transparency with LCC's Environmental Health Department.

13.3. ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

13.3.1. This section describes the adopted methodology for assessing and appraising the potential air quality impacts associated with the proposed development. It also provides details of the data and information supplied for the purposes of undertaking the air quality assessment.

KEY DATA & RESOURCES

An index of the key data and resources used within the assessment is presented in **Table 13-2**.

Table 13-2 – Key Data & Resources

[33] Ministry of Housing, Communities and Local Government (2019) National Planning Policy Framework.
[34] Lancaster City Council (2020). A Local Plan for Lancaster District 2011-2031. Part Two: Review of the Development Management DPD. July 2020
[35] Lancaster City Council (2017) *Low Emission and Air Quality*, Guidance for Development – Planning Advisory Note September 2017
[36] Lancaster City Council (2007) Lancaster City Council Air Quality Action Plan for Lancaster, Version 1

Data/Resource	Summary	Source/Reference
Annual Mean NO_2 monitoring data	Data obtained for the study area required to facilitate baseline air quality review and air quality model verification	LCC 2020 Air Quality Annual Status Report[37]
Defra national background pollutant mapping data	Background 1km x 1km grid pollutant data obtained for the respective grid squares encompassing the study area	Defra 2018 annual mean background concentrations[38]
DEFRA Local Air Quality Management (LAQM) Tools	A suite of tools to enable collation of vehicle emissions inventory data, background pollutant adjustment, and conversion of NO_x to NO_2	All LAQM tools sourced from DEFRA: https://laqm.defra.gov.uk/review-and-assessment/tools/tools.html
Atmospheric dispersion modelling system for roads (ADMS-Roads)	Dispersion model capable of predicting dispersion of vehicle emissions from the assessed road network and calculating pollutant concentrations at identified receptors	ADMS-Roads v5.0 developed by Cambridge Environmental Research Consultants (CERC) Ltd
Baseline and future years traffic data for all model scenarios	Traffic data provided in appropriate format to enable air pollutant emissions inventory (NO_x, PM_{10}, $PM_{2.5}$) databases to be generated prior to dispersion modelling	Traffic Data supplied by projects transport consultant (WSP) (see **Appendix 13.6**)
Meteorological Data	Numerical Weather Prediction (NWP) data representative of 2019 for Morecambe over a 4 x 4 km grid	See **Appendix 13.6**
LAQM Technical Air Quality Guidance 16 (hereafter referred to as 'LAQM.TG16')[39]	Defra Guidance document on undertaking air quality assessments	Defra (2016) Local Air Quality Management Technical Guidance TG16
Land Use Planning & Development Control Guidance (hereafter referred to as 'the Land Use Planning Guidance')[40]	Guidance provided by (EPUK) IAQM that includes air quality impact descriptor criteria	Document published by EPUK/IAQM (2017), Land-Use Planning and Development Control: Planning for Air Quality
Guidance on the assessment of dust from demolition and construction (hereafter referred to as 'the Construction Guidance')[41]	Guidance provided by IAQM on the appropriate assessment of construction impacts	Document published by IAQM (2016), Guidance on the assessment of dust from demolition and construction
A guide to the assessment of air quality impacts on designated sites (hereafter referred to as 'the Designated Sites Guidance')[42]	Guidance provided by the IAQM on how to assess impacts on designated nature conservation sites	IAQM (2020) A guide to the assessment of air quality impacts on designated nature conservation sites

[37] Lancaster City Council (2020) Air Quality Annual Status Report. October 2020
[38] Defra (2020) Background Mapping Data for Local Authorities – 2018 [online] https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018
[39] Defra (2016) Part IV The Environment Act 1995 and Environment (Northern Ireland) Order 2002 Part III, Local Air Quality Management Technical Guidance LAQM.TG16 (Updated February 2018)
[40] Moorcroft and Barrowcliffe. *et al.* (2017) Land-use Planning & Development Control: Planning for Air Quality. v1.2. Institute of Air Quality Management, London.
[41] Holman *et al* (2014). IAQM Guidance on the assessment of dust from demolition and construction, Institute of Air Quality Management, London. www.iaqm.co.uk/text/guidance/construction-dust-2014.pdf.
[42] Holman *et al* (2020). A guide to the assessment of air quality impacts on designated nature conservation sites – version 1.1, Institute of Air Quality Management, London.

Data/Resource	Summary	Source/Reference
LCC's Low Emissions and Air Quality Planning Application Note (hereafter referred to as 'LCC's PAN')[35]	Supplementary guidance provided by LCC to ensure development proposals consider the potential impacts to air quality	LCC (2017) Low Emissions and Air Quality Guidance for Development, Planning Advisory Note
Technical guidance on detailed modelling approach for an appropriate assessment for emissions to air (hereafter referred to as 'the Environment Agency Guidance')[59]	Guidance to assist in carrying out a Stage 3 appropriate assessment of air quality impacts under the Conservation of Habitats and Species Regulations 2017 (hereafter referred to as 'the Habitats Regulations')[43]	Environment Agency (2014) AQTAG06 Technical Guidance on Detailed Modelling Approach for an Appropriate Assessment for Emissions to Air
Natural England's Internal Guidance Note Advising Competent Authorities on the Assessment of Road Traffic Emissions under the Habitats Regulations (hereafter referred to as 'Natural England's Internal Guidance')[44]	Guidance on the assessment of plans and projects as required by the Habitats Regulations[43] likely to generate road traffic emissions to air which are capable of affecting European Sites[45]	Natural England (2018) Internal Guidance Note Advising Competent Authorities on the Assessment of Road Traffic Emissions Under the Habitats Regulations, Version 3.0

CONSULTATION

13.3.2. Consultation with the LCC Environmental Health Officer (EHO) and Natural England has occurred throughout the air quality assessment process and development of the ES Air Quality Chapter. **Table 13-3** presents key points of discussion to date and a summary of all consultation following receipt of the submission of the Scoping Opinion[46].

Table 13-3 – Consultation to date

Consultation	Contact	Comments
LCC EHO	Paul Cartmell	20 May 2021: WSP submitted the proposed scope and data requests in fulfilment of the air quality impact assessment for the ES Air Quality Chapter. 23 June 2021: A meeting request was sent and agreed to discuss the points and requirements noted in the previous consultation email submitted 20 May 2021. 24 June 2021: Meeting held to agree the scope and proposed methodology provided. The following topics were agreed:

[43] The Conservation of Habitats and Species Regulations 2017

[44] Natural England (2018) Internal Guidance Note Advising Competent Authorities on the Assessment of Road Traffic Emissions Under the Habitats Regulations, Version 3.0

[45] The term 'European Site' refers to the following Protected Sites England; Special Areas of Conservation (SACs), candidate SACs, Special Protection Areas (SPAs), Sites of Community Importance (SCIs), potential SPAs, possible SACs, listed or proposed Ramsar sites and sites identified, or required, as compensatory measures for adverse effects on these European sites (see also page 28 of the National Planning Policy Framework 2012 and regulation 8 of the Habitats Regulations 2017.

[46] Lancaster City Council (2019) Scoping Opinion in Accordance with Regulation 15 of the Town and Country Planning (Environmental Impact Assessment Regulations 2017 for the Demolition of Existing Buildings/Structures and Proposed Construction of Major Mixed Use Leisure Development in Association with Eden Project (Including Use Classes A1, A3, A4, B1, D1, D2, and SUI Generis) Including Public Realm, Land Scaping, Car Parking and Associated Engineering Works at Central Promenade Regeneration Site, Morecambe, Lancashire. 30 August 2019

Consultation	Contact	Comments
		▪ Whilst the points were discussed and reviewed, it was agreed that no adverse air quality impacts or exposure are expected to occur at the proposed development due to existing and proposed point source emissions of pollutants and odour. ▪ Whilst it was agreed that the proposed development is unlikely to result in adverse air quality impacts, it was agreed that the air quality impact assessment should provide enough detail to determine the potential impacts and provide recommendations to minimise these further. 05 July 2021: The EHO confirmed that the existing Morecambe Bay car parks are under-utilised, and that the potential air quality impacts at ecological receptors should be assessed to consider the increased utilisation following operation of the proposed development. 02 August 2021: The air quality assessment progress was summarised for the EHO to confirm the agreed methodology had been followed, provide mitigation measures associated with the proposed development, and to confirm that no further assessment is required. In response, the EHO required confirmation on traffic flows and additional pieces of information, for which responses were provided on 05 August 2021.
Natural England	Elizabeth Knowles	15 June 2021: A meeting was held with Natural England, the project ecology team and air quality team. The air quality scope was presented to Natural England. 25 June 2021: Natural England provided feedback and the following was agreed: ▪ There is no specific requirement to assess the Wild Bird General License Protected Sites Condition Zone for air quality impacts ▪ Potential impacts associated with onsite generators to be assessed during qualitative impact assessment ▪ Modelling base and opening years to be advised on at a later date 21 July 2021: Natural England provided further advice regarding dispersion modelling years and it was agreed that the additional dispersion modelling scenarios for 2039 'with' and 'without' the proposed development would also be assessed.

BASELINE AIR QUALITY REVIEW

13.3.3. To inform this baseline review, the following tasks have been undertaken:

- Review of LCC latest Air Quality Annual Status Report (ASR)[37];
- Review of relevant data, including background pollutant maps[38] and monitoring data, available from Defra's online LAQM support pages;
- Review of local mapping data to identify surrounding land uses and sensitive receptors, including consideration of the Multi-Agency Geographic Information for the Countryside (MAGIC) website[47], Natural England Open Data[48] and the Woodlands Trust Ancient Tree inventory[49];
- A review data on the Air Pollution Information Systems (APIS) website[50] to derive respective nitrogen (N) deposition rates and empirical habitat critical loads/levels for nutrient N and ammonia (NH_3); and

[47] Defra (2019) Multi-Agency Geographical Information for the Countryside (MAGIC) [online] https://magic.defra.gov.uk/MagicMap.aspx
[48] Natural England (2021) Natural England Open Data [online] https://naturalengland-defra.opendata.arcgis.com/
[49] Woodland Trust Ancient Tree Inventory [online] https://ati.woodlandtrust.org.uk/
[50] Air Pollution Information Systems [online] http://www.apis.ac.uk/

- Identification of the key air pollutant sources near to the proposed development, taking into consideration information relating to existing and proposed industrial processes that generate emissions to air available from Defra's online public register[51], LCC's public register[52] and LCCs Planning Applications and Decisions[53] portal.

CONSTRUCTION PHASE ASSESSMENT METHODOLOGY

13.3.4. A construction phase impact assessment was undertaken using the relevant Construction Guidance[41], LAQM TG16[39], information provided by the Client and Project Team, and professional judgement.

13.3.5. The Construction Guidance[41] methodology determines the risk of potential impacts from the following four sources of dust and PM_{10} emissions: demolition; earthworks; general construction activities and track-out. The level of risk associated with dust soiling, human health and ecological health is based on the magnitude of impact, which considers the nature and scale of activities for each source, and the sensitivity of the receiving environment to increased dust and PM_{10} levels. The overall level of risk is described as low, medium or high based on the source associated with highest risk. Once the level of risk is ascertained, site-specific mitigation proportionate to the level of risk is identified, and the significance of residual effects determined. An overview of the Construction Guidance[41] methodology is provided in **Appendix 13.4**.

13.3.6. Additionally, the impacts of exhaust emissions from construction vehicles, non-road mobile machinery (NRMM) and plant were assessed in line with the Construction Guidance[41], Land Use Planning Guidance[40] and LAQM TG16[39].

OPERATIONAL PHASE ASSESSMENT METHODOLOGY

13.3.7. The air quality assessment has focussed on the predicted changes in concentrations of specific air pollutants at identified sensitive receptors, which are associated with changes in vehicle emissions attributed to the operation of the proposed development. The assessed vehicle pollutants comprise NO_X, NO_2, NH_3, PM_{10} and $PM_{2.5}$.

Atmospheric Dispersion Modelling

13.3.8. The operational phase assessment focussed on the following scenarios, for which traffic data were provided to facilitate atmospheric dispersion modelling of vehicle emissions using CERC's ADMS-Roads v5.0 model:

- Baseline & Model Verification Year (2019);
- Opening Year Without proposed development, including other committed developments in the area (2024);
- Opening Year With proposed development, including surrounding committed developments in the area (2024);
- Future Year Without proposed development, including surrounding committed developments (2039); and
- Future Year With proposed development, including surrounding committed developments (2039).

[51] Defra Public Register [online] https://environment.data.gov.uk/public-register/view/index
[52] LCC Public Register [online] https://www.lancaster.gov.uk/sites/business/licences-and-permissions/public-registers-licensing
[53] LCC Planning Applications and Decisions [online] https://planning.lancaster.gov.uk/online-applications/

Traffic Data

13.3.9. Traffic flows for the proposed development were produced by the projects transport consultant (WSP) using the validated SATURN model.

13.3.10. The proposed development will operate at peak capacity (maximum of 4,000 visitors per day but an estimated average of 3,750 visitors per day) during the school holidays, summer months, and at weekends, with interpeak periods (estimated average of 2,500 visitors per day) during spring and autumn months and off-peak periods during winter months. For a conservative assessment, development generated traffic flows associated with the peak operational period were assumed to remain constant throughout the assessment years (opening year 2024 and future year 2039). Opening year (2024) and future year (2039) traffic flows provided are inclusive of traffic flows generated by surrounding committed developments in the area, allowing for a cumulative assessment.

13.3.11. The 'With proposed development' scenarios above account for the following factors:

- Peak number of visitors leading to a maximum increase of 800 annual average daily traffic (AADT) per day.
    - Of the 800 AADT, 400 AADT are expected to travel to and from the existing Morecambe Bay Park and Ride. Thereafter, visitors will be transported between the park and ride and the proposed development by a maximum of 40 – 50 shuttle busses (likely to be electric vehicles) per day.
    - The remaining 400 AADT are expected to travel to and from five existing Morecambe carparks earmarked for the proposed development.

13.3.12. The traffic input data used for the dispersion modelling scenarios include details of the AADT flows, speed limits (km/h) and the percentage of Heavy-Duty Vehicles (HDVs) applicable to the local road network in all assessment years considered. Traffic speeds were reduced at junctions in line with guidance provided in LAQM.TG16[39] and using professional judgement.

13.3.13. The traffic flows for the 'without proposed development' scenario represent (2019) and future (2024 and 2039) baseline flows, inclusive of generated traffic from surrounding committed developments, but do not include any contribution to road traffic from the proposed development itself. The traffic flows for the 'with proposed development' scenario account for the baseline flows, generated traffic from surrounding committed developments, and traffic generated from operation of the proposed development. Further details on the traffic data are included in **Appendix 13.6**.

Vehicle Emissions Inventories

13.3.14. The traffic data were used to develop emissions inventory databases for each pollutant (NO_X, PM_{10}, $PM_{2.5}$ and NH_3) and scenario using the Defra Emissions Factors Toolkit (EFT) version 10.1[54] and the Calculator for Road Emissions of Ammonia (CREAM) calculator version 1A[55].

13.3.15. This accounts for traffic flow characteristics, including:

- Road type (e.g. urban, rural, motorway);

[54] Defra (2020) Emissions Factors Toolkit, Version 10.1. [online] https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html
[55] Air Quality Consultants (2020) Calculator for Road Emissions of Ammonia, Version 1A [online] https://www.aqconsultants.co.uk/resources/calculator-for-road-emissions-of-ammonia

- Total vehicle flow by link (AADT);
- Percentage of Heavy-Duty Vehicles (HDVs) per link; and
- Average link speed (km/h) – EFT v10.1 only, CREAM emission factors (NH_3) not speed dependent.

13.3.16. The key features of CREAM v1A are that:

- Petrol vehicles emit significantly more NH_3 than diesel vehicles; and
- Emissions from petrol vehicles are not expected to improve over time.

13.3.17. The first feature arises from observation of vehicle emissions using remote sensing. The second is a precautionary position, based on uncertainty over the performance of three-way catalysts as Euro 5 and 6 vehicles age and uncertainty in relation to emissions from hybrid petrol vehicles. Therefore, CREAM v1A is conservative with respect to deriving NH_3 emissions from vehicles in future years, by which time emissions from vehicles would be expected to have improved with a shift towards zero emission vehicles.

13.3.18. The emissions database outputs for each respective scenario provided road link-specific pollutant emission rates (g/km/s), which were input to the ADMS-Roads model to enable prediction of pollutant concentrations at identified sensitive receptor locations. In addition, the following model inputs were required:

- Geometry of each affected road link;
- Meteorological data obtained from an NWP model, which provided hourly sequential variables representative of 2019 over a 4 x 4 km grid over Morecambe; and
- Coordinates of each identified sensitive receptor at which the model calculated pollutant concentrations.

13.3.19. Further detailed information of the modelling process and input data used for this assessment is presented in **Appendix 13.6**.

Emissions from Car Parks

13.3.20. In addition to vehicle emissions from the local road network, vehicle emissions from car parks within the study area we also included in the assessment. The following car parks have been included in the model:

Baseline and 'without development' scenarios

- Morecambe Bay Car Park; and
- Caton Road Park and Ride

'With development' scenarios

- Caton Road Park and Ride;
- Goods Yard Car Park;
- F & B's Car Park;
- Telephone Exchange Car Park;
- Billy Hill Car Park; and
- Town Hall Car Park.

13.3.21. The Bay Arena is the existing car park at the site. As such, it will be cleared as part of the construction process and will not be operational by the opening year of the proposed development. Therefore, it has not been included in any of the 'with development' scenarios.

13.3.22. Given the low utilisation of the existing five town centre car parks, and the high proportion of parking spaces expected to be occupied by future visitors to the proposed development, the five existing town centre car parks were only included in the 'with development' scenarios. This provides a conservative impact assessment because the 'without development' emissions will be underestimated.

13.3.23. Further details on how car park emissions were calculated are included in **Appendix 13.6**.

Onsite Energy Generation and Heating

13.3.24. No onsite energy generation is proposed at the application site.

13.3.25. Air Source Heat Pumps (ASHP)/energy pods are currently proposed for indoor air and domestic water heating. ASHPs offer a sustainable means of heating, generating no emissions to air.

13.3.26. Given that no emissions are expected from onsite energy generation and heating, resulting air quality impacts are considered to be negligible and do not require further assessment.

Model Verification

13.3.27. Verification of the ADMS-Roads model outputs has been undertaken through comparing the annual mean NO_2 base year (2019) model outputs with baseline NO_2 monitoring data at the corresponding monitoring locations. This enabled appropriate model adjustment factors, derived with reference to LAQM.TG16[39], to be applied to model outputs to ensure the performance of the dispersion model was suitable within the context of the available monitoring data.

13.3.28. Verification of PM_{10} and $PM_{2.5}$ has been completed using the same factor determined through verification of NO_2 concentrations, in accordance with LAQM.TG16[39] technical guidance, which states *"…In the absence of any PM_{10} data for verification, it may be appropriate to apply the road-NO_x adjustment to the modelled road-PM_{10}."*

13.3.29. Based on the above, verification of NH_3 concentrations was completed using the same factor determined through verification of NO_2 concentrations.

13.3.30. Further detailed information in regard to the model verification and adjustment procedure is presented in **Appendix 13.6**.

Pollution Climate Mapping Compliance Assessment

13.3.31. As part of the UK's responsibility to fulfil the requirements of EU Directive 2008/50/EC[22], Defra undertakes a range of air pollutant modelling at different spatial scales, one of which is the Pollution Climate Mapping (PCM) model. The PCM model is used to project roadside pollutant concentrations adjacent to ~9,000 road links throughout the UK to enable an assessment of compliance with relevant EU limit values. The PCM model projects concentrations for all years between 2018 and 2030.

13.3.32. The most up to date PCM model data published by Defra[56] include sections of Marine Road and the A589, which fall within the modelled road network. The impact of the proposed development on these roads, with reference to Design Manual for Roads and Bridges LA105 (DMRB LA105)[57] guidance, has been assessed in this report.

13.3.33. DMRB LA105[57] sets out an approach for identifying and quantifying impacts of a proposed development on the respective EU limit values. The approach set out in the guidance states that compliance is achieved where:

- *"There are no modelled exceedances of the air quality thresholds for any PCM link; or*
- *There are modelled exceedances of the air quality thresholds for any PCM link, but the change in annual mean NO_2 concentrations between the DM and DS is less than or equal to +/-0.4 ug/m^3; or*
- *The project does not materially impact on measures within local air quality or national plans for the achievement of compliance."*

13.3.34. The compliance risk assessment is presented in Section 13.5.

Model Output Processing for Assessment

Pollutant Concentrations

13.3.35. Modelled road contributions at each receptor were multiplied by the verification factor determined through the model verification process described above. Modelled road contributions to NO_X concentrations were first converted to modelled road NO_2 contributions, using the Defra NO_X to NO_2 calculator (v8.1)[58]. Thereafter, modelled road contributions were combined with annual mean background concentrations (represented by the Defra background maps) to enable comparison with the relevant annual mean air quality objectives.

13.3.36. Compliance with short-term objectives (hourly and 24-hour objectives) is assessed with reference to Defra's LAQM.TG16[39] for hourly NO_2 and 24-hour PM_{10} concentrations. The LAQM.TG16[39] states that in locations where the annual mean NO_2 concentration exceeds 60µg/m^3, the hourly objective may be exceeded. Where annual mean concentrations are less than 60µg/m^3, then exceedance of the hourly air quality objective can be treated as being unlikely.

[56] 2020 NO_2 and PM projections data, 2018 reference year [online] https://uk-air.defra.gov.uk/library/no2ten/2020-no2-pm-projections-from-2018-data
[57] Design Manual for Roads and Bridges. Volume 11, Section 3, Part 1, HA207/07 Air Quality (2007)
[58] Defra NO_X to NO_2 Calculator v8.1 [online] https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc

13.3.37. Since 35 exceedances of the 24-hour PM_{10} limit value (50µg/m^3) are permitted per annum under this objective, LAQM.TG16[39] provides the below equation for compliance assessment of 24-hour PM_{10} concentrations. The equation relates annual mean PM_{10} concentration to the number of 24-hour objective limit value exceedances per annum:

- No. 24-hour exceedances = -18.5 + 0.00145 x annual mean^3 + (206 / annual mean).

13.3.38. The Land Use Planning Guidance[40] states that, *"The equation in LAQM.TG16 shows an annual mean of 32µg/m^3 equating to 35 days at or above 50µg/m^3."* As such, where annual mean concentrations are less than 32µg/m^3, then exceedance of the daily mean air quality objective can be treated as being unlikely.

Nitrogen Deposition

13.3.39. N deposition rates were derived for each applicable designated site with reference to the Environment Agency Guidance[59]. This guidance provides recommended dry deposition velocities for NO_2 and NH_3 based on 'grassland' or 'forest' land use/habitat types. Given that the majority of the Morecambe Bay designated site is covered with short vegetation and grassland habitats such as salt marshes, grasslands, dune habitats etc., a dry deposition velocity equivalent to 'grassland' was adopted for the air quality modelling.

13.3.40. To account for the inevitable fallout of NH_3 before reaching receptors, the dispersion model utilised the plume depletion function (based on a depositional velocity of 0.02 m/s) to prevent overestimation of N deposition at modelled ecological receptors (see Paragraph 13.3.53).

13.3.41. Modelled road contributions to NO_X concentrations were converted to modelled road NO_2 contributions using the Defra NO_X to NO_2 calculator (v8.1[58]). Thereafter, NO_2 and NH_3 road contributions were converted to dry N deposition rates using specific conversion factors published by the Environment Agency[59]:

- Grassland and similar habitats;
  - 1 µg/m^3 of NO_2 = 0.14 kg N/ha/yr
  - 1 µg/m^3 of NH_3 = 5.19 kg N/ha/yr

13.3.42. The dry N deposition rates from modelled road sources were subsequently added to the maximum average background deposition, as derived from the APIS website[50], to derive the total annual N deposition rate for comparison against the relevant critical loads.

IDENTIFIED DISCRETE RECEPTORS

13.3.43. Sensitive locations are places where the public or sensitive ecological habitats may be exposed to pollutants resulting from activities associated with the proposed development. These will include locations sensitive to an increase in dust deposition and PM_{10} exposure as a result of on-site construction activities, and locations sensitive to exposure to gaseous pollutants emitted from the exhausts of construction and operational traffic associated with the proposed development.

Construction Phase

13.3.44. The IAQM construction phase air quality assessment focusses on the following sensitive locations:

[59] Environment Agency (2014) AQTAG06 Technical Guidance on Detailed Modelling Approach for an Appropriate Assessment for Emissions to Air

- ‘human receptors’ within 350 m of the site boundary, or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s); and/or,
- ‘ecological receptors’ within 50 m of the site boundary, or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

13.3.45. It is within these distances that the impacts of dust soiling and increased particulate matter in the ambient air will have the greatest impact on local air quality at sensitive receptors.

Operational Phase

13.3.46. In terms of locations that are sensitive to pollutants emitted from vehicles on the local road network and from the proposed car park, these will include places where members of the public are likely to be regularly present over the period of time prescribed in the Air Quality Strategy. For instance, on a footpath where exposure will be transient (for the duration of passage along that path) comparison with a short-term standard (i.e. 15-minute mean or 1 hour mean) may be relevant. At a school or adjacent to a private dwelling, where exposure may be for longer periods, comparison with a long-term standard (such as 24-hour mean or annual mean) may be more appropriate.

13.3.47. To complete the assessment of operational phase impacts, a number of ‘receptors’ representative of locations of relevant public exposure were identified (using satellite imagery and OS mapping) at which pollutant concentrations were predicted. Receptors have been located adjacent to the roads that are likely to experience the greatest change in traffic flows or composition, and therefore NO_2, PM_{10}, and $PM_{2.5}$ concentrations, as a result of the proposed development.

13.3.48. The locations of the high sensitive human receptors, used in this assessment, are shown in **Table 13-4** and depicted on **Figure 13.5** in Volume 4 of the ES. All receptors were modelled at “breathing height” which is defined as 1.5 m above the ground level.

Table 13-4 – Modelled Human Receptors

Receptor	Description/Address	Grid Reference		Height (m)
		X	Y	
R1	Turnpike Fold - Residential	347615	464266	1.5
R2	Lancaster & Morecambe College	345869	463310	1.5
R3	Morecambe Road - Residential	345508	463428	1.5
R4	Morecambe Road - Residential 2	345362	463622	1.5
R5	Lancaster Road - Residential	345090	463808	1.5
R6	Lancaster Road - Residential 2	344889	463836	1.5
R7	Lancaster Road Primary School	344540	464006	1.5
R8	Lancaster Road - Residential 3	344134	464156	1.5
R9	Euston Road - Residential	343905	464308	1.5

Receptor	Description/Address	Grid Reference		Height (m)
		X	Y	
R10	Morecambe Bay Community Primary School	343758	464322	1.5
R11	Central Drive - Residential	343516	464260	1.5
R12	A589 - Residential (1st floor)	343290	464423	4.5
R13	329 Maine Road Central - Residential	343669	464692	1.5
R14	Victoria Parade - Residential	344164	464916	1.5
R15	Broadway - Residential	344590	464764	1.5
R16	Broadway - Residential 2	344926	464130	1.5
R17	Broadway - Residential 3	345154	463819	1.5

13.3.49. Additionally, receptors were included 4 m from the roadside at PCM links stretching along Marine Road Central, Broadway and Morecambe Road, as illustrated in **Figure 13.6**. A total of 137 PCM compliance risk receptors were modelled at spacings of 50 m at heights of 2 m above ground level and did not include locations within 25 m of junctions or roundabouts, which aligns with DMRB LA10536 guidance. A number of annual mean NO2 concentrations at these links were modelled to assess the potential impact that the proposed development would have with respect to compliance with the EU annual mean limit value for NO2. Many PCM receptors could potentially represent worst case exposure for nearby receptors (conservatively assuming that they are positioned 4m from the road). Examples of this include two residential units located on floors above Cooper's Amusements and Rita's Café, respectively, approximately 10 m from the kerb of Marine Road Central, south of the proposed development. Where imperceptible impacts are predicted at PCM receptors along Marine Road Central, imperceptible impacts will also be predicted at sensitive receptors located further from the roadside."

13.3.50. Additionally, receptors were included 4 m from the roadside along PCM links, as illustrated in **Figure 13.6**. The PCM compliance risk receptors were modelled at spacings of 50 m at heights of 2 m above ground level and did not include locations within 25 m of junctions or roundabouts, which aligns with DMRB LA105[57] guidance. Annual mean NO_2 concentrations at these links were modelled to assess the potential impact that the proposed development would have with respect to compliance with the EU annual mean limit value for NO_2.

13.3.51. In accordance with the Designated Sites Guidance[42] and Natural England's Internal Guidance, the impact of vehicle emissions at designated sites (Sites of Special Scientific Interest (SSSI), Special Protection Areas (SPA), Special Areas of Conservation (SAC), National Nature Reserves (NNR), Local Nature Reserves (LNR) and Ancient Woodlands (AW)) within 200m of an affected road link should be considered within the air quality assessment.

13.3.52. Morecambe Bay is located between the coasts of South Cumbria and North Lancashire and forms one of the largest areas of intertidal estuarine flats in Britain. Defra's MAGIC Map online portal[47], Natural England Open Data[48] and the Woodlands Trust Ancient Tree inventory[49] were used to identify potential designated sites at Morecambe Bay in close proximity to the Application Site. The results showed that there are three designated sites within 200m of the proposed development and affected road links included in the assessment. These are overlapping designations identified directly adjacent to the northern boundary of the site:

- Morecambe Bay Site of Special Scientific Interest (SSSI);
- Morecambe Bay Special Area of Conservation (SPA); and
- Morecambe Bay & Duddon Estuary Special Protection Area (SPA).

13.3.53. No SACs, NNRs, LNRs, AWs or veteran trees within 200m of the ARN were identified.

13.3.54. In order to model impacts on Morecambe Bay, a receptor grid has been modelled. The grid starts at the designated site boundary and extends up to 200m from the affected road network. Receptor points in the grid are spaced 10m apart and assigned a height of 0m to assess ground level predictions. The extent of the receptor grid area is shown in **Figure 13.8**.

SIGNIFICANCE CRITERIA

Construction Phase

13.3.55. The Construction Guidance[41] recommends that the significance of effect is determined for residual effects only. While the Construction Guidance[41] does not provide specific criteria to measure significance of effect, it states that this should be determined through professional judgement based on the evidence provided. Furthermore, the Construction Guidance[41] also states that *"It is anticipated that with the implementation of effective site-specific mitigation measures the environmental effect will not be significant in most cases"*.

13.3.56. In terms of on-site plant and NRMM emissions, the Construction Guidance[41] states: *"Experience of assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality"*. Therefore, in accordance with the Construction Guidance[41], the significance of residual effects has been determined using professional judgement based on the evidence provided.

13.3.57. In terms of vehicle exhaust emissions from construction phase traffic, the significance of residual effects have been determined using professional judgement in line with the Construction Guidance[41] and the Land Use Planning Guidance[40].

Operational Phase

Sensitive Human Receptors

13.3.58. The approach provided in the Land Use Planning Guidance[40] has been used within this assessment to assist in describing the air quality effects of additional emissions from traffic generated by the proposed development once operational.

13.3.59. This guidance recommends that the degree of an impact is described by expressing the magnitude of incremental change in pollution concentration as a proportion of the relevant assessment level and examining this change in the context of the new total concentration and its relationship with the assessment criterion, as summarised in **Table 13-5**.

Table 13-5 - Impact Descriptors for Individual Receptors

Long term average concentration at receptors in assessment year	% Change in Concentration Relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Notes

AQAL = Air Quality Assessment Level, which for this assessment related to the UK Air Quality Strategy objectives.

Where the %change in concentrations is <0.5%, the change is described as 'Negligible' regardless of the concentration.

When defining the concentration as a percentage of the AQAL, 'without scheme' concentration should be used where there is a decrease in pollutant concentration and the 'with scheme;' concentration where there is an increase.

Where concentrations increase, the impact is described as adverse, and where it decreases as beneficial.

13.3.60. The Land Use Planning guidance[40] notes that the criteria in **Table 13-5** should be used to describe impacts at individual receptors and should be considered as a starting point to make a judgement on significance of effects, as other influences may need to be accounted for. The Land Use Planning guidance states that the assessment of overall significance should be based on professional judgement, taking into account several factors, including:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

13.3.61. The Land Use Planning guidance[40] states that for most road transport related emissions, long-term average concentrations are the most useful for evaluating the impacts. The guidance does not include criteria for determining the significance of the effect on hourly mean NO_2 concentrations or daily mean PM_{10} concentrations. The significance of effects of hourly mean NO_2 and daily mean PM_{10} concentrations arising from the operational phase have therefore been determined qualitatively using professional judgement and the principles described above.

13.3.62. The Land Use Planning guidance[40] states that *'Where the air quality is such that an air quality objective at the building facade is not met, the effect on residents or occupants will be judged as significant, unless provision is made to reduce their exposure by some means. For people working at new developments in this situation, the same will not be true as occupational exposure standards are different, although any assessment may wish to draw attention to the undesirability of the exposure.'*

Sensitive Ecological Receptors

13.3.63. The magnitude of change has been expressed as a percentage of the relevant environmental benchmarks adopted for the air quality assessment:

- the UK air quality objective and EU limit value for annual mean NO_X (30 µg/m^3),
- the lowest critical level value for NH_3 (1 µg/m^3), and
- the lowest critical load value with respect to N deposition (10 kgN/ha/yr).

13.3.64. Further details on how backgrounds and benchmarks were derived are included in **Table 13-10**.

13.3.65. The magnitude of change, as a percentage of the relevant Critical Level or Critical Load, has then been compared against the 1% screening criterion (outlined within the IAQM Designated Sites Guidance[42] and Natural England's Internal Guidance[44]).

13.3.66. Where the change in NO_X/NH_3 concentrations/N deposition exceeds 1% of the relevant environmental benchmark, the potential for significant effects on the sensitive feature(s) to occur cannot be ruled out. Below the 1% screening threshold, the impacts can be treated as imperceptible, resulting in no significant effects.

13.3.67. If the results indicate that the 1% significance screening criterion is exceeded at any sensitive feature, the results of the air quality assessment should be provided to a suitably qualified ecologist to determine if the predicted change in NO_x, NH_3 and/or N deposition at the sensitive feature constitutes a significant effect.

LIMITATIONS & ASSUMPTIONS

Meteorological Data

13.3.68. Meteorological data for the most recent completed calendar year (2019) was used in the assessment to represent future meteorology. The impact of variations in annual trends on predicted annual mean concentrations could make a difference to predicted pollutant concentrations.

Atmospheric Dispersion Model

13.3.69. There are uncertainties associated with both measured and predicted concentrations. The model (ADMS Roads) used in this assessment relies on input data such as predicted traffic flows and meteorological data which are subject to uncertainty. The model itself simplifies complex physical systems into a range of algorithms. In addition, local micro-climatic conditions, such as those caused by coastal effects, may affect the concentrations of pollutants that the ADMS Roads model does not consider.

Model Verification

13.3.70. The average uncertainty (derived as the root mean square error) calculated in the model verification equates to 2.1µg/m^3 for annual mean NO_2. As such, the modelled receptors that are predicted to experience NO_2 concentrations between 37.9µg/m^3 and 42.1µg/m^3 are considered to be at potential risk of exceeding the annual mean objective of 40µg/m^3. None of the modelled receptors included in the assessment are predicted to be within this range in any modelled scenario (see **Appendix 13.8**).

13.4. BASELINE CONDITIONS

LCC REVIEW & ASSESSMENT OF AIR QUALITY

13.4.1. LCC has designated three AQMA's within their administrative areas as a consequence of their local air quality review and assessment work. None of these three AQMA's are located within 4km of the site. As such, the potential impact of the proposed development on AQMA's is considered to be negligible and hasn't been considered further in this assessment.

LOCAL EMISSION SOURCES

13.4.2. The site is located in an area where air quality is mainly influenced by emissions from road transport using the A589.

13.4.3. With reference to Defra's public register[51] and LCC's public register[52], there are no existing or proposed Part A Industrial Installations or Part B Installations within 1km of the proposed development. Therefore, it is unlikely that such point sources will have adverse impacts on air quality at the application site.

13.4.4. Following review of the LCC's Planning Applications and Decisions[53] portal, one permitted application was identified for an upgraded plant room and installation of roof-mounted flue (20/01405/FUL). This application was granted for Winter Gardens, along Marine Road Central (directly opposite the application site). It is unlikely that this small scale development will result in adverse air quality impacts and exposure at the proposed development, given the nature of the operations (small plant upgrade of existing building), the strong westerly winds that are likely to disperse pollutants away from the application site, and confirmation from LCC's planning consultation response that no significant health implications were noted as a result of the proposed roof-mounted flue[60]. Furthermore, following review of available data and ongoing discussions with the EHO, no significant sources of existing point source emissions of air pollutants and odour have been identified in proximity to the application site, and therefore it is unlikely that emissions will cause adverse impacts on air quality.

BACKGROUND AIR QUALITY DATA

13.4.5. Background pollutant concentrations for NO_2, PM_{10} and $PM_{2.5}$ were obtained from Defra's national background maps[38] for the 1km x 1km grid squares encompassing the site.

[60] LCC (2020) *Winter Gardens, 209 Marine Road Central, Morecambe, Lancashire, LA4 4BU Installation of a roof mounted flue*, Planning Consultation Response, Environmental Health Service, Environmental Protection Team (22 December 2020) [online] https://planningdocs.lancaster.gov.uk/NorthgatePublicDocs/00981796.pdf

13.4.6. Data were obtained for the baseline year (2019), current year (2021), opening year (2024) and future year (2039) as summarised in **Table 13-6**. Defra background maps only go up to the year 2030 and as such, 2030 backgrounds were used to represent 2039 conditions. This is considered to be conservative as background concentrations are expected to decrease from 2030 to 2039.

13.4.7. The data from **Table 13-6** shows that all of the annual mean background concentrations are well below the relevant objectives. Furthermore, all pollutants are predicted to decrease from the current year to the opening year (and beyond) of the proposed development with the greatest reduction observed in annual mean NO_2.

Table 13-6 - Defra Background Concentrations (µg/m^3)

Grid Square (centre on O.S. Grid Reference)	NO_2 (µg/m^3)				PM_{10} (µg/m^3)				$PM_{2.5}$ (µg/m^3)			
	2019	2021	2024	2030	2019	2021	2024	2030	2019	2021	2024	2030
342500, 464500	6.6	6.1	5.6	5.0	8.5	8.3	8.0	7.9	5.8	5.6	5.4	5.3
343500, 464500	10.2	9.4	8.6	7.6	10.1	9.8	9.5	9.4	6.9	6.6	6.4	6.3
AQS Objective	40µg/m^3				40µg/m^3				25µg/m^3			

LOCAL AUTHORITY AIR QUALITY MONITORING DATA

Continuous Monitoring

13.4.8. LCC operates continuous automatic monitoring at three locations within the district; however, these continuous monitors are all located 5km from the site, within the City of Lancaster AQMA. As such, concentrations from these monitors are not considered to be representative of air quality conditions at the site and have not been included in the baseline assessment.

Passive Monitoring

13.4.9. LCC carry out passive diffusion tube monitoring of NO_2 at various locations throughout the district. Annual mean NO_2 concentrations for those locations situated within 3km of the site are provided in **Table 13-7**.

Table 13-7 - LCC NO_2 Diffusion Tube Data (µg/m^3)

Site Name	Site Type	Distance from Application Site (km)	Annual Mean NO_2 Concentration (µg/m^3)		
			2017	2018	2019
H1	Roadside	1.4	21	22	20
MC4	Roadside	2.2	-	-	26
T1	Roadside	2.6	29	28	24

13.4.10. The data from **Table 13-7** shows that annual mean NO_2 concentrations have been below the objective at all locations within 3km of the application site between 2017 and 2019. In the most recent year 2019, the highest concentration recorded from diffusion tubes within 2km of the site was 26µg/m^3 which is above the objective by 14µg/m^3. Furthermore, concentrations recorded in 2019 are lower than concentrations recorded in 2017 and 2018 and H1 and T1.

13.4.11. Diffusion tube H1 is closest to the application site and is also adjacent to the A589 (near the southern half of the application site). As such, diffusion tube H1 is considered to be most representative of air quality conditions and shows NO_2 concentrations below the annual mean objective by 20µg/m^3.

SITE-SPECIFIC MONITORING

13.4.12. A site-specific NO_2 baseline monitoring programme was completed to supplement the local authority monitoring results and inform baseline conditions for the study area. The six-month programme began in August 2019 and ended in February 2020 and comprised eleven roadside monitoring locations. The locations of the monitoring sites selected are shown in **Figure 13.1** and detailed in **Appendix 13.7**.

13.4.13. The six months of data were used to derive annualised mean NO_2 concentrations at each monitoring location for the base year (2019). Details of the annualisation process are provided in **Appendix 13.7** and final annualised results are shown in **Table 13-8** below.

Table 13-8 - Summary of Site-Specific Baseline Annualised Mean NO_2 Monitoring

Site ID	Location	Grid Reference		2019 Annualised Annual Mean NO_2 Concentration ($\mu g/m^3$)
		X	Y	
EPN1	Caton Road Park & Ride	349543	464136	17.2
EPN2	Morecambe Road – Opposite Lancaster & Morecambe College	345854	463147	18.0
EPN3	A683 – Near roundabout with Mellishaw Lane	345052	462333	20.2
EPN4	A589 Morecambe Road	345604	463360	21.2
EPN5	A589 Morecambe Road	345431	463550	24.4
EPN6	B5321 Lancaster Road	344375	464043	30.2
EPN7	B5321 Lancaster Road	344375	464069	22.8
EPN8	B5321 Central Drive	343211	464219	17.6
EPN9	A589 Marine Road East	344050	464923	16.3
EPN10	A589 Broadway	344873	464200	19.7
EPN11	Westgate	343095	463091	19.7

13.4.14. **Table 13-8** indicates that no exceedances of the annual mean NO_2 objective were recorded by any of the site-specific monitors. The highest concentration was recorded by monitor EPN6 on Lancaster Road, which recorded concentrations below the annual mean objective by 9.8µg/m^3.

POLLUTION CLIMATE MAPPING MODEL LINKS

13.4.15. The most up to date PCM model data[56] published by Defra includes sections of A589, as shown in **Figure 13.1**. Roadside annual mean NO_2 concentrations between for the baseline year (2019) and opening year (2024) are presented in **Table 13-9** below.

Table 13-9 - Defra PCM Modelling Results for Roadside Annual Mean NO_2 ($\mu g/m^3$)

Census ID	Road	Annual Mean NO_2 Concentration ($\mu g/m^3$)	
		2019	2024
802017261	A589	16	12
802057370		20	15

13.4.16. **Table 13-9** shows that modelled roadside PCM concentrations are not predicted to exceed the annual mean NO_2 objective along the A589. In the opening year of the proposed development (2024), there is a headroom of at least 25 µg/m^3 below the EU limit value. Furthermore, roadside annual mean NO_2 concentrations are predicted decline beyond 2024.

IDENTIFIED DESIGNATED SITES & ENVIRONMENTAL BENCHMARKING

13.4.17. As described in Paragraph 13.3.52, one designated site was identified within 200m of the modelled road network, which is sensitive to N deposition.

13.4.18. Respective N deposition levels, annual mean NH_3 concentrations and respective empirical habitat critical loads/levels for nutrient N and NH_3 (where available) were obtained from the APIS[50] website and are presented in **Table 13-10** below.

Table 13-10 – Morecambe Bay Adopted Benchmarks

Site	Designation	2019 Average Background NO_x (µg/m^3)	Background NH_3 (µg/m3)[1]	Average Background N-Deposition (kgN/ha/yr)[1,2]	N-Deposition Critical Load Range (kgN/ha/yr)
Morecambe Bay	SSSI/SPA/SAC	11.8	1.75	16.66	10-20
Adopted Benchmarks		**30 µg/m^3**	**1 µg/m^3**	**10 kgN/ha/yr**	

a) [1] Based on 3 year mean 2017-2019 (APIS[50]) location-specific tool based on modelled grid coordinates.

b) [2] Background N-deposition rate not reduced for the future assessment years which is in line with the current IAQM guidance[42].

13.4.19. The data show that the lower critical load for N deposition is exceeded by the average background N deposition. The baseline average annual mean background NO_X is well below the UK annual mean objective. However, the maximum annual average NH_3 concentrations exceeds the critical level (1µg/m^3).

13.4.20. The relevant environmental benchmarks adopted for the air quality assessment equate to the UK air quality objective and EU limit value for annual mean NO_x (30µg/m^3), the lowest critical level value for NH_3 (1µg/m^3) and the lowest critical load value with respect to N-deposition (10 kgN/ha/yr).

SUMMARY

13.4.21. The proposed development is not located within or near to any AQMA. LCC operates a network of continuous monitoring and passive diffusion tubes within the district, a number of which are located in proximity to the site. Furthermore, a six-month site-specific baseline study was carried out between 2019 and 2020 to supplement the baseline study. Data from **Table 13-7** and **Table 13-8** demonstrate that there are no pollutant exceedances from monitors located in proximity to the application site.

13.4.22. Defra's background pollutant data from **Table 13-6** show that concentrations in the current year (2021) are predicted to remain below their respective annual mean objectives. Furthermore, these concentrations are predicted to fall further by the opening year of the proposed development (2024) and beyond (2030).

13.5. IDENTIFICATION AND VALUATION OF KEY IMPACTS

CONSTRUCTION PHASE

Construction phase impacts associated with the proposed development are summarised below, with further detail provided in **Appendix 13.5**.

Construction Activities Onsite

13.5.1. The predicted dust and PM_{10} emission magnitude was combined with the defined sensitivity of the area to determine the risk of impacts during the construction phase, prior to mitigation. The risk category identified for each construction activity has been used to determine the level of mitigation required. Overall, there is a **High Risk** of dust impacts relating to the expected construction phase activities, prior to mitigation being applied.

Construction Plant Onsite

13.5.2. Given the variable number of plant equipment (including onsite generators) and Non-Road Mobile Machinery (NRMM) at the application site, together with the relatively low background concentrations of NO_2, PM_{10} and $PM_{2.5}$ (**Table 13-6**), the local air quality impact associated with emissions from plant and NRMM is expected to be negligible, in line with the relevant guidance[39,41].

Construction Vehicles on the Public Highway

13.5.3. Construction traffic generated by the proposed development will be low in comparison to the existing baseline flows. Furthermore, embedded mitigation includes travel routes, which will be minimised and controlled using an offsite deliveries hub (~600m from the application site), and a comprehensive construction logistics plan to manage vehicular movements and delivery routes.

13.5.4. Given the embedded mitigation and existing background levels of NO_2, PM_{10} and $PM_{2.5}$ (**Table 13-6**), the local air quality impact associated with emissions from construction vehicles is expected to be negligible.

OPERATION PHASE

13.5.5. Full results of the dispersion modelling are presented in **Appendix 13.8** and a summary is provided below.

Predicted Impacts at Existing Sensitive Human Receptors

Annual Mean NO_2 Concentrations

13.5.6. The AQS objective for annual mean NO_2 concentrations is 40µg/m^3. The results of the assessment show that in the 2019 baseline scenario predicted concentrations at existing sensitive human receptors do not exceed the annual mean objective at any of the modelled receptors.

13.5.7. In the baseline, the highest predicted concentration is 24.4µg/m^3 at receptor R26, a residential dwelling on Euston Road in Morecambe town centre, approximately 0.5km south east of the application site.

13.5.8. For the opening year (2024), both the 'with' and 'without' proposed development scenarios predict no exceedances of the annual mean NO_2 objective. The highest annual mean concentrations occur at receptor R26, where the predicted concentrations are 17.3µg/m^3 in the 'without development' scenario and 17.9µg/m^3 in the 'with development' scenario.

13.5.9. The greatest increase in annual mean NO_2 concentrations in 2024 is predicted to occur at receptor R26 (+0.6µg/m^3). This magnitude of increase equates to a negligible impact on local air quality with reference to the Land Use Planning guidance[40].

13.5.10. For the future year (2039), both the 'with' and 'without' proposed development scenarios predict no exceedances of the annual mean NO_2 objective. The highest annual mean concentrations occur at receptor R26, where the predicted concentrations are 12.7µg/m^3 in the 'without development' scenario and 13.0µg/m^3 in the 'with development' scenario.

13.5.11. The greatest increase in annual mean NO_2 concentrations in 2039 as a result of the proposed development is predicted to occur at receptor R26 (+0.3µg/m^3). This magnitude of increase equates to a negligible impact on local air quality with reference to the Land Use Planning guidance[40].

13.5.12. The proposed development is predicted to cause increases in annual mean NO_2 concentrations at all modelled receptors, in both the opening year (2024) and future year (2039) scenarios. These changes in annual mean concentrations all equate to negligible impacts, with reference to the Land Use Planning guidance[40].

13.5.13. Overall, the predicted impact of the changes in vehicle emissions associated the proposed development on annual mean NO_2 concentrations at existing sensitive receptors is **negligible**.

Hourly Mean NO_2 Concentrations

13.5.14. Predicted annual mean NO_2 concentrations for all model scenarios fall below 60µg/m^3, and therefore hourly mean NO_2 concentrations are unlikely to cause a breach of the hourly mean AQS objective, in line with the Land Use Planning Guidance[40]. The impact of the proposed development on hourly mean NO_2 concentrations at existing sensitive receptors is considered to be **negligible**.

Annual Mean PM_{10} Concentrations

13.5.15. The AQS objective for annual mean PM_{10} concentrations is 40µg/m^3. The results of the assessment show that in the 2019 baseline scenario predicted concentrations, at existing sensitive human receptors, do not exceed the annual mean objective at any of the modelled receptors.

13.5.16. In the baseline, the highest predicted concentration is 12.8µg/m^3 at receptor R25, a residential dwelling on Lancaster Road, approximately 1.1km south east of the application site.

13.5.17. For the opening year (2024), both the 'with' and 'without' proposed development scenarios predict no exceedances of the annual mean PM_{10} objective. The highest annual mean concentrations are predicted to occur at receptor R25, where the predicted concentrations are 12.2µg/m^3 in the 'without development' scenario and 12.3µg/m^3 in the 'with development' scenario.

13.5.18. The greatest increase in annual mean PM_{10} concentrations in 2024 as a result of the proposed development is predicted to occur at receptor R26 (+0.1µg/m^3). This magnitude of increase equates to a negligible impact on local air quality with reference to the Land Use Planning guidance[40].

13.5.19. For the future year (2039), both the 'with' and 'without' proposed development scenarios predict no exceedances of the annual mean PM_{10} objective. The highest annual mean concentrations are predicted to occur at receptor R25, where the predicted concentrations are 12.1µg/m^3 in the 'without development' scenario and 12.2µg/m^3 in the 'with development' scenario.

13.5.20. The greatest increase in annual mean PM_{10} concentrations in 2039 as a result of the proposed development is predicted to occur at receptor R26 (+0.1µg/m^3). This magnitude of increase equates to a negligible impact on local air quality with reference to the Land Use Planning guidance[40].

13.5.21. The proposed development is predicted to cause increases in annual mean PM_{10} concentrations at all modelled receptors, in both the opening year (2024) and future year (2039) scenarios. These changes in annual mean concentrations all equate to negligible impacts, with reference to the Land Use Planning guidance[40].

13.5.22. Overall, the predicted impact of the changes in vehicle emissions associated with the operation of the proposed development on annual mean PM_{10} concentrations, at existing sensitive receptors, is **negligible**.

Daily Mean PM_{10} Concentrations

13.5.23. Predicted annual mean PM_{10} values, in all modelled scenarios fall below 32µg/m^3, therefore in line with the LAQMTG16[39] and Land Use Planning Guidance[40], exceedances of the 24-hour objective are very unlikely. The impact of the proposed development on daily mean PM_{10} concentrations is considered to be **negligible**.

Annual Mean $PM_{2.5}$ Concentrations

13.5.24. The AQS objective for annual mean $PM_{2.5}$ concentrations is 25µg/m^3. The results of the assessment show that in the 2019 baseline scenario, predicted concentrations at existing sensitive human receptors do not exceed the annual mean objective at any of the modelled receptors, with the highest predicted concentration of 8.4µg/m^3 at receptor R25.

13.5.25. For the opening year (2024), both the 'with' and 'without' proposed development scenarios predict no exceedances of the annual mean $PM_{2.5}$ objective. The highest annual mean concentrations are predicted to occur at receptor R25, where the predicted concentrations are 7.9µg/m^3 in both the 'without development' and 'with development' scenarios.

13.5.26. The greatest increase in annual mean $PM_{2.5}$ concentrations in 2024 as a result of the proposed development is predicted to occur at receptor R26 (+0.1µg/m^3). This magnitude of increase equates to a negligible impact on local air quality with reference to the Land Use Planning guidance[40].

13.5.27. For the future year (2039), both the 'with' and 'without' proposed development scenarios predict no exceedances of the annual mean objective for $PM_{2.5}$. The highest annual mean concentrations are predicted to occur at receptor R25, where the predicted concentrations are 7.8µg/m^3 in the 'without development' scenario and 7.9µg/m^3 in the 'with development' scenario.

13.5.28. The greatest increase in annual mean $PM_{2.5}$ concentrations in 2039 as a result of the proposed development is predicted to occur at receptor R26 (+0.1µg/m^3). This magnitude of increase equates to a negligible impact on local air quality with reference to the Land Use Planning guidance[40].

13.5.29. The proposed development is predicted to cause increases in annual mean $PM_{2.5}$ concentrations at all modelled receptors in both the opening year (2024) and future year (2039) scenarios. These changes in annual mean concentrations all equate to negligible impacts, with reference to the Land Use Planning guidance[40].

13.5.30. The predicted $PM_{2.5}$ concentrations fall below the AQS annual mean objective, but also the more stringent World Health Organisation (WHO) guideline of 10 µg/m^3, at all receptor locations for all model scenarios. Overall, the predicted impact of the changes in vehicle emissions associated with the operation of the proposed development on annual mean $PM_{2.5}$ concentrations, at existing sensitive receptors, is **negligible**.

Compliance Risk Assessment

13.5.31. The results of the compliance risk assessment at receptors adjacent to the relevant PCM links, as detailed in **Appendix 13.8**, show that all of the 137 modelled PCM receptors are predicted to be below the EU limit value for NO_2, in all modelled scenarios.

13.5.32. In the opening year of the proposed development (2024), 130 PCM receptors are predicted to experience increases in annual mean NO2 concentrations up to 0.4 µg/m3 (i.e. an imperceptible impact) as a result of the proposed development, including all PCM receptors positioned along Marine Road Central, directly south of the proposed development. The remaining 7 receptors, positioned along Broadway and Morecambe Road, are predicted to experience increases in annual mean concentrations above 0.4µg/m3 up to a maximum of 0.6 µg/m3..

13.5.33. In the future year of 2039, all PCM receptors are predicted to experience increases in annual mean NO_2 concentrations between up to 0.4 µg/m^3 (i.e. an imperceptible impact) as a result of the proposed development.

13.5.34. The maximum increase identified from the dispersion modelling component of the compliance risk assessment is 0.6 µg/m^3. With the maximum increase added onto the equivalent maximum Defra PCM model concentration (see **Table 13-9**), the maximum equivalent development PCM NO_2 concentration equates to 15.1 µg/m^3, which is 24.9 µg/m^3 below the EU Limit Value for annual mean NO_2.

13.5.35. Compliance is therefore predicted to be achieved at all modelled PCM receptors with the proposed development in operation.

Predicted Impacts at Ecological Receptors

13.5.36. An assessment of changes in air quality at the designated sites was undertaken with reference to Natural England's Internal Guidance[44] and Designated Sites Guidance[42]. A summary of the results is provided below. Where the predicted change due to the proposed development exceeds 1% of the relevant Critical Levels and/or Load, these exceedances are indicated along with recommendations for further assessment (if required) is provided in this section.

13.5.37. Data pertaining to each receptor output point for each pollutant and each scenario can be provided on request.

Annual Mean NO_X Concentrations

13.5.38. The results of atmospheric dispersion modelling for annual mean NO_X concentrations demonstrate that no exceedances of the relevant benchmark (30µg/m^3) are predicted in any of the modelled scenarios.

13.5.39. The implementation of the proposed development is predicted to result in an increase (i.e. deterioration) in annual mean concentrations at the vast majority of modelled ecological receptors in Morecambe Bay. Some decreases (i.e. improvements) are predicted at the receptors located to the west of the modelled grid area, adjacent to the application site. These improvements are a result of the removal of the existing car park at the site, leading to a decrease in emissions.

13.5.40. The greatest increase in annual mean NO_X as a result of the proposed development (2024) is 0.5µg/m^3. This is predicted at a number of receptors closest to the roadside of the A589.

13.5.41. Of the 2,554 modelled ecological receptors, exceedances of the 1% criterion for annual mean NO_x are predicted at 149 receptors for the opening year scenario (2024) and none for the future year scenario (2039). This makes up 5.8% of the total number of modelled receptors in 2024 and 0% in 2039.

Annual Mean NH_3 Concentrations

13.5.42. The results of atmospheric dispersion modelling for annual mean NH_3 concentrations, demonstrate that at all receptors are predicted to exceed the relevant assessment benchmark (1µg/m^3) in all modelled scenarios, given that the baseline levels reported by APIS are already above the benchmark.

13.5.43. The proposed development is predicted to result in increases in annual mean concentrations at all modelled receptors, however, these increases are predicted to be imperceptible and equate to less than or equal to 0.1µg/m^3.

13.5.44. Of the 2,554 modelled ecological receptors, exceedances of the 1% criterion for NH_3 are predicted at 33 receptors for the opening year scenario (2024) and 0 for the future year scenario (2039). This makes up 1.3% of the total number of modelled receptors in 2024 and 0% in 2039.

N Deposition Levels

13.5.45. N deposition levels at all modelled ecological receptors are predicted to exceed the relevant assessment benchmark (10 kgN/ha/yr) in all modelled scenarios. This is due to the existing levels of deposition at the identified ecological receptors reported by APIS already being above the benchmark.

13.5.46. The implementation of the proposed development is predicted to result in an increase (i.e. deterioration) in N deposition levels at the vast majority of modelled receptors, with the exception of a small area next to the existing car park at the application site (to be removed), which will see minor improvements.

13.5.47. The greatest increase in N deposition as a result of the proposed development (2024) is 0.1kgN/ha/yr, which is predicted at a number of receptors closest to the A589 roadside.

13.5.48. Of the 2,554 modelled ecological receptors, exceedances of the 1% criterion for N deposition are predicted at 20 receptors for the opening year scenario (2024) and none for the future year scenario (2039). This makes up 0.8% of the total number of modelled receptors in 2024 and 0% in 2039.

Potential Significance

13.5.49. With reference to Natural England's Internal Guidance[44] and Designated Sites Guidance[42], where the change in concentration/deposition exceeds 1% of the relevant environmental benchmark, the potential for significant effects on the sensitive ecological feature(s) cannot be explicitly ruled out.

13.5.50. Exceedances of the 1% criterion, due to increased vehicle emissions as a result of the proposed development are predicted for annual mean NO_x, NH_3 and N deposition in the opening year (2024) of the proposed development. No, exceedances of the 1% criterion are predicted for any pollutant in the future year (2039).

13.5.51. **Figure 13.8** shows the modelled receptor locations where the 1% criterion for NO_x, NH_3 and N deposition are exceeded (2024). These exceedances are all located at receptors in Morecambe Bay, closest to the A589. In general, pollutant increases as a result of the proposed development are expected to drop below the respective 1% criterion at a distance of 30m from the roadside of the A589. No exceedances are predicted for 2039.

13.5.52. Exceedances of the 1% criterion, due to increases in vehicle emissions, are predicted at 5.8% of the total number of modelled receptors for NO_X, 1.3% for NH_3 and 0.8% for N deposition in 2024. The vast majority of modelled receptors are predicted to experience changes in concentrations below the 1% criterion. No exceedances are predicted for 2039.

13.5.53. Given a small number of exceedances of the 1% criterion are predicted, potential significant effects cannot be screened out, as such, the results of this air quality assessment are discussed further in Chapter 9: Ecology, in which a judgement of significance is provided.

13.6. CUMULATIVE EFFECTS

DURING CONSTRUCTION

13.6.1. Cumulative impacts during the construction phase of developments can occur when the construction buffer zones (and construction timeframes) overlap with those of other nearby committed developments. Depending on the construction scales and timeframes for these committed developments, it may be necessary to increase mitigation in areas with potential cumulative impacts.

13.6.2. Given the permitted application (17/00534/FUL) for demolition and reconstruction at an existing site approximately 250m south-southwest of the application site, there is the potential for cumulative construction phase impacts to air quality should the construction phases of each development overlap. It is advised that consultation take place with LCC to avoid where possible and manage cumulative impacts of construction phase operations. It is also recommended that liaison takes place with nearby committed developments (within 500m of the application site) that potentially have overlapping construction phases with that of the proposed development. In this way, the overlap of construction activities known to have a high magnitude for dust impacts (e.g.: concrete pouring) may be avoided or minimised. Given the nature of fugitive construction phase emissions, the limited operation of these sources, and implementation of a Construction Environmental Management Plan, there is predicted to be a negligible magnitude of impact leading to effects of neutral significance.

DURING OPERATION

13.6.3. The traffic data provided by the project's transport consultant takes into account flows from local committed developments (as detailed in **Appendix 13.6**) so are cumulative in this regard. Given the overall operational stage impacts are considered to be negligible with these committed developments included, there are no cumulative operational impacts anticipated.

13.7. MITIGATION MEASURES

CONSTRUCTION PHASE

Embedded Mitigation

13.7.1. The following mitigation measures are embedded within the design and are aligned with the LCC PAN35 and Construction Guidance41 for effective air emissions mitigation during construction phase operations:

- There will be one construction vehicular access gate for all incoming and outgoing construction vehicles located at the East boundary of the site using the existing formed access off the highway. This is likely to:
  - Minimise unpaved and temporary road use and thereby minimise dust emissions from vehicle track out; and
  - Limit the extent to which new exposure is created to existing receptors, as the existing access will be used.
- The appointed contractor will produce a comprehensive construction logistics plan to manage vehicular movements and delivery routes.
- The appointed contractor will implement a booking in system for deliveries to ensure that all deliveries are planned and spread out during the working day. This will:
  - Limit the number of construction vehicles travelling along the highway and accessing the site at any given time, thereby limiting emissions to air at any given time;
  - Prevent queuing of construction vehicles along the highway and exposure to the harmful emissions associated with congestion.
- Potentially utilise an off-site logistics hub for storing materials. This would allow for:
  - Deliveries to be made to the application site out of peak public movement and traffic flow periods, thereby limiting emissions and exposure to potential air quality impacts; and
  - Reduction in travel distances (to approximately 600m), thereby limiting emissions to air and preventing adverse air quality impacts.
- The surface condition and cleanliness of the entry gate will be maintained and checked at the start and completion of every working day.
- Travel to the site will be via a mix of public transport, crew buses, car sharing and single user cars. No car parking will be provided onsite. The alternative means of sustainable transport (such as public transport) should limit the number of single user cars accessing the application site.

Secondary Mitigation

13.7.2. Based on the construction phase air quality assessment results, there is a **high risk** of dust impacts occurring at identified sensitive receptors throughout the construction phase. Appropriate mitigation is required to further prevent or minimise the release of dust entering the atmosphere and/or being deposited on nearby receptors. Attention should be paid to operations that unavoidably take place in the immediate vicinity of sensitive receptors.

13.7.3. Mitigation measures are provided in **Appendix 13.5** that have been recommended commensurate to the level of risk of impact based on the outcome of the construction phase assessment. The mitigation and management measures provided are typical for a development of this nature and are consistent with Construction Guidance[41].

13.7.4. The LCC PAN[35] (as well as the Construction Guidance[41]) recommends the use of a Construction Environmental Management Plan (CEMP) to cover issues regarding construction vehicle emission standards, construction staff travel planning, delivery arrangements and control of fugitive dust emissions.

13.7.5. *"Measures, may include:*

- *On site wheel washing*
- *Restrictions on use of unmade roads*
- *Agreement on the routes to be used by construction traffic with the Council (larger schemes).*
- *Restriction of stockpile size, also covering or spraying them to reduce possible dust.*
- *Targeted sweeping of roads subject to high traffic levels and silt loading*
- *Minimisation of evaporative emissions and prompt clean-up of liquid spills.*
- *Prohibition of intentional on-site fires and avoidance of accidental ones.*
- *Control of construction equipment emissions (incl. use of low emission fuels and technology).*
- *Using equipment fitted or partnered with dust suppression devices.*
- *Dust/particulate monitoring"*[35]

13.7.6. The CEMP should present the above-mentioned recommendations together with measures provided in **Appendix 13.5** based on the outcomes of the construction phase assessment. The CEMP should also include a detailed plan for the management and control processes to be employed to ensure mitigation measures are effectively implemented and adhered to effectively.

13.7.7. *"Prior to any works commencing onsite, a CEMP shall be submitted to and approved in writing by the Local Planning Authority. The CEMP should identify the steps and procedures that will be implemented to minimise the creation and impact of dust resulting from the site preparation, demolition, groundwork and construction phases of the development. It is recommended that routing of construction traffic is also agreed within this plan, to prevent increased emissions from construction vehicles affecting the wider urban area."*[35]

OPERATIONAL PHASE

Embedded Mitigation

13.7.8. The LCC PAN[35] recommends that emissions are controlled through a mitigation hierarchy based on the four key approaches:

- *"Further Electrical Vehicle Infrastructure: Although a standard level of EV infrastructure is expected as part of the standard provision. Well targeted investment beyond this may be considered as part of further mitigation.*
- *Trip Reduction: It is important that the sites minimise trip initially through sensible location and good design; and then through effective mitigation. Requirement are usually established via the separate transport assessment process and packaged in the form of a site-specific travel plan.*
- *On-Site Technology Measures: are aimed at reducing emissions from individual vehicle trips that remain following a trip reduction. Measures typically encourage fitting of emission reduction*

technologies for existing vehicles or by enabling and promoting the uptake of newer alternatively fuelled ones.

- *Off-Site Contribution: Where the emission impact can't be fully mitigated by measures on or in close proximity to a development, a financial contribution may be requested towards wider compensatory measures, typically including investment in local fleets, road networks or low emission infrastructure (via the Lancaster District Highways and Transport Masterplan)".*

13.7.9. The below demonstrates how the above LCC PAN[35] mitigation recommendations are already considered as part of the proposed development's inherent design and embedded mitigation:

- Further Electrical Vehicle Infrastructure: The proposed development will utilise the Caton Road Park and Ride, adjacent to junction 34 of the M6, to transport visitors to and from the proposed development. It is understood that electric buses are proposed to transport visitors between the park and ride and the proposed development.
- Trip Reduction: The application site was chosen for the proposed development largely due to the under-utilised Caton Park and ride, which provides a sustainable mode of transport for future visitors of the proposed development, especially since there is no parking proposed onsite. Furthermore, a Travel Plan[61] has been developed to reduce trips and encourage visitors to use public transport and active travel methods. It is estimated that the Caton Park and Ride alone will take 400 AADT (associated with the proposed development generated traffic) off the road network and likely replace them with electric shuttle buses.
- Onsite Technology Measures: The proposed development will utilise ASHPs for onsite heating and remove the existing car park to facilitate the redevelopment of the site. Furthermore, the proposed development will reduce trips and encourage sustainable travel through the online booking system. The time controlled and advanced booking system will allocate visitors a specific timeslot to enter the site. The booking system will limit the trips generated by the proposed development and avoid peaks throughout the day. When booking their tickets, each potential visitor will be presented the best options for public / active travel routes unique to their situation (prior to purchasing the tickets), and sustainable travel modes will be incentivised through discounted ticket costs or redeemable vouchers.
    - Therefore, it is expected that the number of private cars travelling to the proposed development will decline following the opening year.
- Off-site Contribution: The Eden Transport Strategy aims to position the proposed development as a leading example for progressive, healthy and sustainable travel. The proposed development team have worked alongside both LCC and Lancashire County Council to ensure the existing transport network is optimised and aligned with the anticipated growth of the wider region and the Eden Transport Vision. This dynamic and proactive approach aims to manage the evolving demand on the transport network through alternative transport modes and innovative management systems.

[61] WSP Eden Project North Interim Travel Plan. August 2021

Secondary Mitigation

13.7.10. Given the above embedded mitigation, and that the air quality impacts are negligible at all modelled human health receptors, further mitigation measures are not considered necessary. However, the results associated with modelled ecological receptors have been provided to a suitably qualified ecologist to determine the level of significance and potential mitigation requirements (Chapter 8: Nature Conservation and Biodiversity).

13.8. RESIDUAL EFFECTS

CONSTRUCTION

13.8.1. The residual effects of dust and PM_{10} generated by construction activities following the application of the mitigation measures described above and good site practice is considered to be negligible.

13.8.2. The residual effects of emissions to air from construction vehicles and plant on local air quality remain negligible.

OPERATIONAL

13.8.3. The residual effects of the proposed development on air quality are considered to be negligible for all pollutants considered within the assessment, based on the assessment results and criteria provided by the Land Use Planning Guidance[40] and Natural England's Internal Guidance[44], with the application of professional judgement.

14

DAYLIGHT, SUNLIGHT, OVERSHADOWING AND WIND MICROCLIMATE

PUBLIC

14. DAYLIGHT, SUNLIGHT, OVERSHADOWING AND WIND MICROCLIMATE

14.1. APPROACH TO CHAPTER

14.1.1. This chapter has been prepared by Hilson Moran and covers two discrete disciplines – daylight, sunlight and overshadowing (D/S/O) and wind – both of which fall under the broader discipline of 'microclimate studies.

14.2. DAYLIGHT, SUNLIGHT AND OVERSHADOWING (D/S/O)

INTRODUCTION

14.2.1. Hilson Moran has been commissioned by Eden Project International Ltd. to undertake a daylight impact assessment to support the proposed development of Eden Project North, located in Morecambe.

14.2.2. This ES Chapter describes the effect of the proposed development on the daylight and sunlight to habitable rooms in adjacent existing developments to the application site and the effects on overshadowing on adjacent amenity spaces.

14.2.3. The Building Research Establishment's (BRE) 'Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice' (Littlefair, 2011) was used to establish the extent to which the proposed development meets current best practice guidelines. In cases where the proposed development is likely to cause a reduction of daylight and sunlight to key receptors in the surrounding area, the results were compared against the criteria.

14.2.4. While the BRE benchmarks are widely used, these criteria should not be seen as an instrument of planning policy. As stated in the BRE Guide:

'…..The guide is intended for building designers and their clients, consultants and planning officials. The advice given here is not mandatory and the guide should not be seen as an instrument of planning policy; its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design.'

Site Context

14.2.5. The site extends to circa 4.58 hectares and comprises land situated to the north and west of Morecambe Town Centre. The main development site bound by the promenade to the north and east, Marine Road Central to the south and the Grade II* listed Midland Hotel to the west. The main development site is identified by Lancaster City Council as a Development Opportunity Site. The site is known as the Seafront Headland, Central Promenade.

Summary of Effects

14.2.6. Full details of the daylight and sunlight analysis are included in **Appendix 14.1 of Volume 3** and a summary has been provided below.

14.2.7. The daylight assessment has been conducted for receptors of the surrounding domestic and hospitality buildings. Impacts on retail units had been excluded as they are not sensitive receptors to daylight and sunlight.

14.2.8. Windows of residential dwellings have been classified as having a high sensitivity to daylight whereas commercial office or hotel spaces have been classified as having a medium sensitivity to daylight.

14.2.9. The results of the daylight, sunlight and overshadowing assessments have indicated that the proposed development has a negligible effect on all of the surrounding developments and outdoor areas.

D/S/O POLICY CONTEXT

14.2.10. There is no legislation which specifically references daylight, sunlight and overshadowing effects.

National Planning Policy Framework

14.2.11. Page 37 of the NPPF states:

"Where there is an existing or anticipated shortage of land for meeting identified housing needs, it is especially important that planning policies and decisions avoid homes being built at low densities and ensure that developments make optimal use of the potential of each site. In these circumstances: ……c) local planning authorities should refuse applications which they consider fail to make efficient use of land, taking into account the policies in this Framework. In this context, when considering applications for housing, authorities should take a flexible approach in applying policies or guidance relating to daylight and sunlight, where they would otherwise inhibit making efficient use of a site (as long as the resulting scheme would provide acceptable living standards)."

Planning Practice Guidance

14.2.12. The Planning Practice Guidance (PPG) (Ref. 14.2) is an online resource for planning practitioners. Specific to daylight and sunlight and building form, Paragraph 25 of the PPG states:

"Some forms pose specific design challenges, for example how taller buildings meet the ground and how they affect local wind and sunlight patterns should be carefully considered."

14.2.13. In respect to building scale it states at paragraph 26 that:

"Account should be taken of local climatic conditions, including daylight and sunlight, wind, temperature and frost pockets."

Local Planning Policy

14.2.14. A Local Plan for Lancaster District 2011-2031 Part Two: Review of the Development Management DPD

14.2.15. Policy DM29 of the Local Plan states that:

"New development should be as sustainable as possible and make a positive contribution to the surrounding landscape and / or townscape. The Council will expect development to:

II. Ensure there is no significant detrimental impact to amenity in relation to overshadowing, visual amenity, privacy, overlooking, massing and pollution;"

Building Research Establishment Guidelines: Site Layout Planning for Daylight and Sunlight 2011, A Guide to Good Practice, Second Edition

14.2.16. The BRE Guide provides criteria and methods that are detailed below for calculating the effect of the proposed development on the daylight and sunlight availability to surrounding properties. These guidelines were first published in 1991 and superseded the document 'Sunlight and Daylight Planning Criteria and Design of Buildings' (Department of the Environment, 1971). The second and latest edition of the BRE Guide was released in 2011.

14.2.17. The BRE Guide includes advice on how to achieve good daylighting and sun lighting both within buildings and open spaces in new developments. It also covers guidance to safeguard daylight and sunlight of existing buildings nearby and the protection of daylighting of adjoining land for future development.

14.2.18. Whilst the BRE Guide provides numerical guidelines for daylight, sunlight and overshadowing, these criteria should not be seen as absolute targets since, as the document states, the intention of the Guide is to help rather than constrain the designer. The Guide is not an instrument of planning policy, therefore, whilst the methods given are technically robust, some level of flexibility should be applied given the context and constraints of the site.

D/S/O ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

Scope of the Assessment

14.2.19. The purpose of the study is to determine the effect of the proposed development on the daylight and sunlight availability to windows of the surrounding developments.

Extent of the Study Area

14.2.20. The study area modelled for this analysis includes the site and the surrounding properties likely to be affected by the proposed development. The buildings around the site that were identified for the purpose of this study are illustrated in **Appendix 14.1** and listed in **Table 14.1** and **Other residential** properties were identified above Rita's/Coopers Amusements on Marine Road Central. The 25° threshold does not apply to the windows here, and therefore they do not require a detailed assessment.

14.2.21. Table 14.2.

Image 14.1: Buildings and outdoor areas identified for the assessment

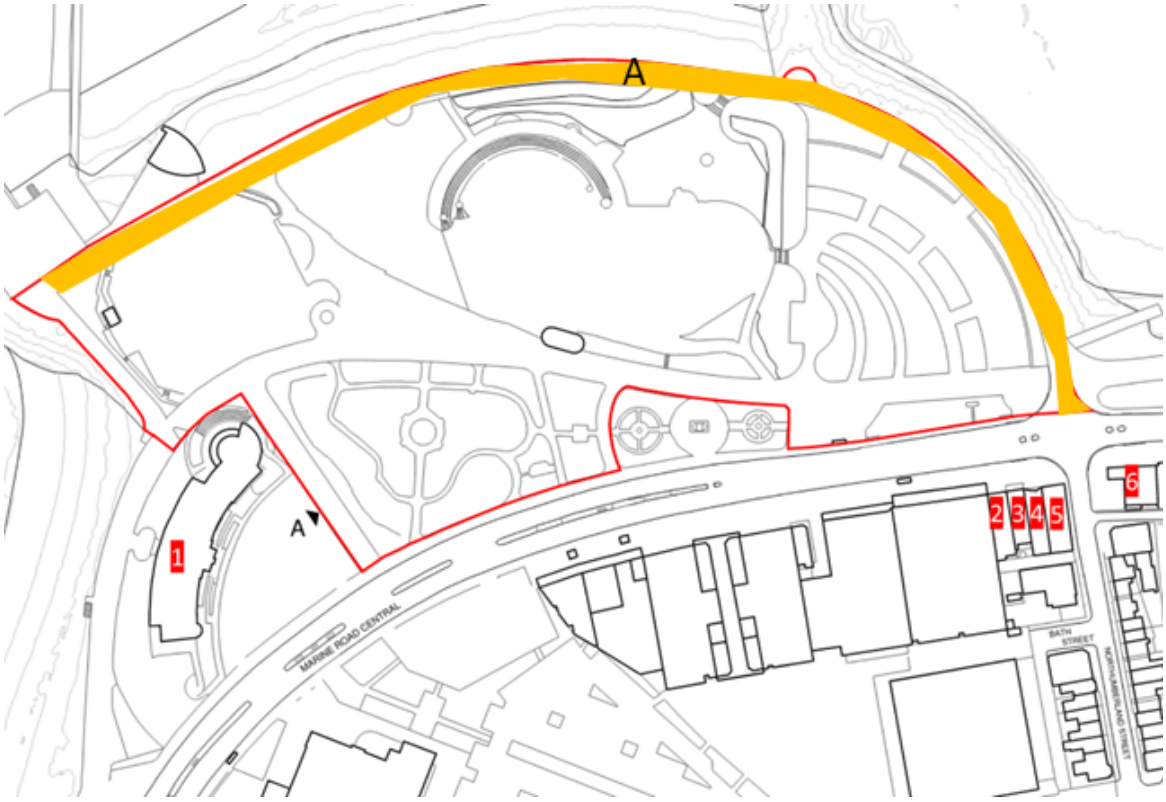


Table 14.1 Buildings and uses identified for the assessment

No.	Building Reference	Use
1	The Midland - Hotel	Hospitality
2	Apartment above Bedland - Marine Rd Central	Residential
3	Apartment above Brucciani - Marine Rd Central	Residential
4	Apartment above Costa - Marine Rd Central	Residential
5	Apartment above Troutflies - Marine Rd Central	Residential
6	223 Marine Rd Central	Residential

14.2.22. Other residential properties were identified above Rita's/Coopers Amusements on Marine Road Central. The 25° threshold does not apply to the windows here, and therefore they do not require a detailed assessment.

Table 14.2 Outdoor areas and uses identified for the assessment

No.	Space Reference	Use
A	Pier Walk	Public Realm

Method of Data Collation

14.2.23. The baseline and proposed conditions at the site and the surrounding areas were established from the following:

- 3D model of the existing buildings provided by the design team; and
- 3D model of the proposed development produced by Grimshaw architects and received on 06/07/2021.

14.2.24. The baseline and proposed scenarios assessed for the purposes of this study have been illustrated in **Image 14.2** and **Image 14.3** below:

Image 14.2 Baseline Scenario

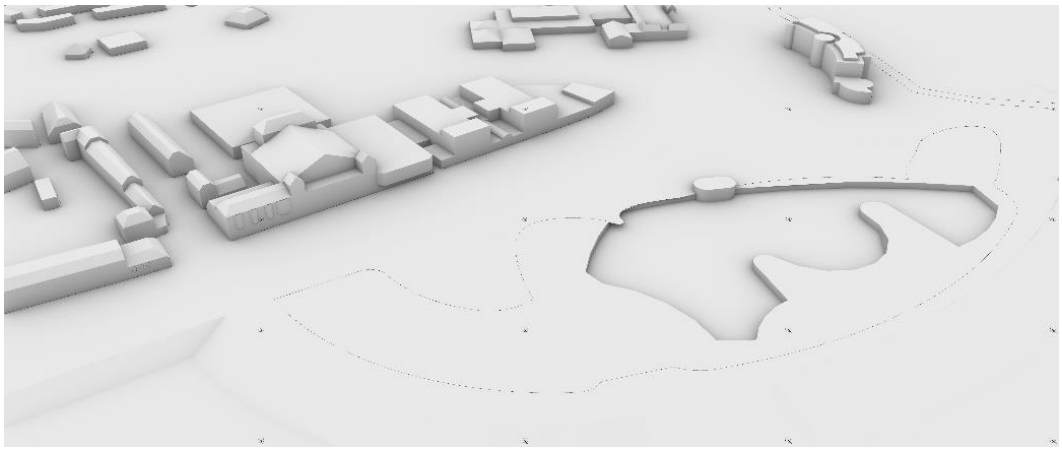
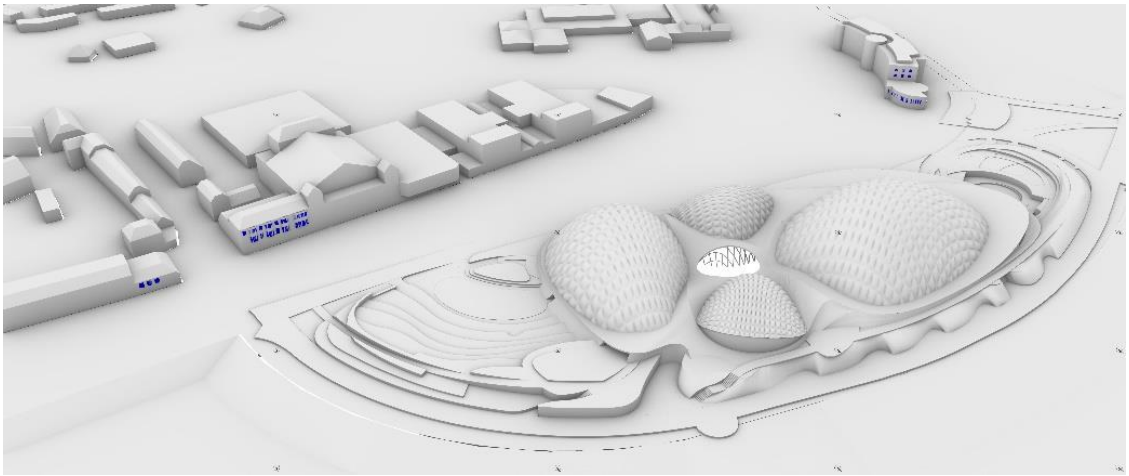


Image 14.3 Proposed Scenario



Receptors for Daylight

14.2.25. The scoping of impacts has considered the guidance contained in the BRE Guide.

14.2.26. Paragraph 2.2.2 of the BRE Guide (Littlefair, 2011) states that the guidelines for daylight impacts are primarily for residential properties, where daylight is deemed to be required, including:

- Living rooms;
- Kitchens; and
- Bedrooms.

14.2.27. Paragraph 2.2.2 of the BRE Guide (Littlefair, 2011) goes on to say that the guidelines can also be applied to non-domestic buildings which have a reasonable expectation of daylight such as:

- Schools;
- Hospitals;
- Hotels/Hostels;
- Small workshops; and
- Some offices.

Receptors for Sunlight

14.2.28. Paragraph 3.1.2 of the BRE Guide (Littlefair, 2011) states that the main requirement for sunlight is in housing, particularly living rooms and conservatories. It is viewed as less important in bedrooms and kitchens, where people prefer sunlight in the morning rather than the afternoon.

14.2.29. In the absence of detailed internal layout information for the surrounding developments, all windows of residential properties facing within 90° of due south will be included within the assessment of effects.

14.2.30. Paragraph 3.1.3 of the BRE Guide (Littlefair, 2011) further states that sunlight is also valued in non-domestic buildings. However, this requirement will vary according to the type of non-domestic building, the aims of the occupants and the extent to which the occupants can control their environment.

14.2.31. No sensitive receptors to daylight have been identified as there are no of residential developments facing the proposed development within 90° of due south.

Receptors for Overshadowing

14.2.32. Paragraph 3.3.3 of the BRE Guide (Littlefair, 2011) states that the guidance is also concerned with the availability of sunlight in open space such as:

- Gardens (usually the back garden);
  - Parks/playing fields;
  - Children playgrounds;
  - Outdoor swimming pools;
  - Sitting out areas such as public squares; and
  - Focal points for views.

Assessment Methodology and Significance Criteria

14.2.33. The methodology adopted for the study follows that set out in BRE Guide which gives criteria and methods for calculating daylight and sunlight.

14.2.34. The BRE Guide uses a set of parameters to quantify the potential effect on light levels: the Vertical Sky Component (VSC), the Probable Sunlight Hours (PSH) for windows. The Guide uses the hours of sunlight availability to quantify the sunlight levels in open spaces.

Vertical Sky Component (VSC)

14.2.35. The Vertical Sky Component (VSC) calculation is the ratio of the direct sky illuminance falling on the outside of a window, to the simultaneous horizontal illuminance under an unobstructed sky. The standard CIE (Commission Internationale d'Éclairage) Overcast Sky is used, and the ratio is expressed as a percentage. The maximum VSC value is close to 40% for a completely unobstructed vertical wall.

14.2.36. The BRE Guide sets out two guidelines for the VSC:

- *If the VSC at the centre of the existing window exceeds 27% with the new development in place, then enough sky light should still be reaching the existing window; and*
- *If the VSC with the new development in place is both less than 27% and less than 0.8 times its former value, then the reduction in light to the window is likely to be noticeable. This means that a reduction in the VSC value of up to 20% its former value would be acceptable and thus, the effect would be considered negligible.*

Probable Sunlight Hours (PSH)

14.2.37. Access to sunlight is measured on the windows to habitable rooms facing within 90° of due south. The Probable Sunlight Hours (PSH) calculation method measures the proportion of the window assessed that is sunlit for a period of time. In new developments, each dwelling should have at least one main living room within 90° of due south to receive a reasonable amount of sunlight. The BRE Guide recommends that the PSH is calculated for the whole year, and for the winter months (21 September to 21 March).

14.2.38. If the window reference point can receive more than 25% of Annual Probable Sunlight Hours (APSH), including at least 5% of winter probable sunlight hours (WPSH) during the winter months between 21 September and 21 March, then the room should still receive enough sunlight and the effect will therefore, be negligible.

14.2.39. However, if the available sunlight hours are both less than the amount given above and less than 0.8 times their former value, either over the whole year or during the winter months (21 September to 21 March), then the occupants of the existing building will notice the loss of sunlight.

14.2.40. Further, if the overall annual loss is greater than 4% of APSH, the room may appear colder and less cheerful and pleasant.

Overshadowing

14.2.41. The summary of section 3.3 of the BRE guide states as follows:

> *"3. 3 .17 It is recommended that for it to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours of sunlight on 21 March. If as a result of new development an existing garden or amenity area does not meet the above, and the area which can receive two hours of sun on 21 March is less than 0.8 times its former value, then the loss of sunlight is likely to be noticeable. If a detailed calculation cannot be carried out, it is recommended that the centre of the area should receive at least two hours of sunlight on 21 March."*

Significance Criteria

14.2.42. The primary purpose of the daylight and sunlight assessment is to determine the likely loss of light to adjacent buildings resulting from the construction of the proposed development. Therefore, in these cases, the proposed development is identified as the potential source of effect.

14.2.43. The study quantifies the likely daylight and sunlight availability to the receptors identified and derives the resulting ratio of impact. The potential effects that the study accounts for include:

- Noticeable reductions in daylight that are likely to make the rooms identified to appear gloomier, and electric lighting will be needed more often. This may result in a minor to major negative effect depending on the sensitivity of the receptor;
- Noticeable reductions in sunlight to the windows identified that will make the room appear colder and less pleasant. This may result in a minor to major negative effect depending on the sensitivity of the receptor;
- Noticeable increase in daylight thus improving the visual comfort qualities of rooms identified. This would result in a minor to major positive effect depending on the sensitivity of the receptor; and
- Noticeable increase in sunlight to the windows identified that will make the rooms benefit from direct solar gains for longer, thus making the rooms appear warmer and more pleasant. This would result in a minor to major positive effect depending on the sensitivity of the receptor.

Key Sensitive Receptors

14.2.44. In order to undertake the assessment, first the key sensitive receptors around the Site need to be identified. According to the BRE Guide, sensitive receptors are described as windows to habitable rooms facing the site where the occupants have a reasonable expectation of daylight. As the BRE Guide states:

> *"The guidelines given here are intended for use in adjoining dwellings where daylight is required, including living rooms, kitchens and bedrooms. Windows to bathrooms, toilets, storerooms, circulation areas and garages need not be analysed. The guidelines may also be applied to any existing non-domestic building where the occupants have a reasonable expectation of daylight; this would normally include schools, hospitals, hotels and hostels, small workshops and some offices".*

14.2.45. It is evident, therefore, that the focus of the guidelines in the assessment of daylight impacts is habitable rooms within adjoining dwellings. Consideration has also been given to non-domestic buildings although these have been assigned a lower sensitivity.

14.2.46. The Guide further states that in designing a new development or extension to a building, care should be taken to safeguard the access to sunlight both for existing dwellings and for any nearby non-domestic buildings where there is a particular requirement for sunlight. In relation to the assessment of loss of sunlight to an existing building, the Guide suggests that:

> *"…..all main living rooms of dwellings, and conservatories, should be checked if they have a window facing within 90° of due south. Kitchens and bedrooms are less important, although care should be taken to not block too much sun. In non-domestic buildings any spaces which are deemed to have a special requirement for sunlight should be checked; these will normally face within 90° of due south anyway….."*

14.2.47. In the context of the BRE Guide, the guidelines for sunlight have been applied to the existing residential developments facing within 90° of due south. In the absence of internal layout information detailing the location of kitchens, bedrooms and living spaces, all receptors facing the site have been assessed.

Determining the Sensitivity of Receptors

14.2.48. Having identified the receptors (which include a mix of residential and commercial buildings) for the assessment, it is necessary to identify their sensitivity. A window sensitivity rating has been developed using professional judgement based on the BRE Guide, which is described below and categorised into high, medium and low based on the function or use of the space being assessed. This rating is indicative and there will be occasions where the sensitivity may be interpreted differently:

- Habitable rooms such as living rooms, kitchens and bedrooms within residential developments generally require good levels of daylight to render them more enjoyable and adequate to their function. Windows to such spaces are classified as having high sensitivity to daylight;
- Non- domestic buildings where the occupants have a reasonable expectation of daylight such as offices have been classified as having a medium sensitivity to daylight;
- Windows of residential dwellings have been classified as having high sensitivity to sunlight, particularly for living rooms and conservatories. In the absence of internal layout information of the surrounding residential developments, all windows on the façade facing the proposed development have been classified as having a high sensitivity to sunlight as a 'worst case' scenario;
- The windows of the surrounding non-domestic buildings have been classified as having a low sensitivity to sunlight; and
- Windows on communal entrances to flat have been excluded from the assessment, as these are classified as having no sensitivity to daylight.

14.2.49. For the purpose of this assessment, given the nature of the locality, only receptors with high and medium sensitivity have been assessed.

Determining Magnitude of Change

14.2.50. As per the BRE Criteria for daylight, sunlight and overshadowing, compliance with the criteria is either achieved or not. However, the Guide does not provide criteria for determining the magnitude of the change. The compliance criteria for the effects on the surrounding development are detailed in the section below, alongside how the magnitude of change has been determined using professional judgement.

Compliance Criteria and Magnitude of change

14.2.51. The BRE criteria have been used to assess the likely levels of daylight and sunlight to habitable rooms in the surrounding properties. Compliance with the BRE Guide is achieved if the levels of daylight/sunlight within the identified receptors of the surrounding properties are equal to or greater than the absolute values established by the Guide.

14.2.52. Compliance with the BRE Guide is also achieved for the identified receptors of the surrounding properties if the ratio of impact between the baseline and proposed scenarios is 0.80 or higher, i.e. the reduction in daylight or sunlight hours is 20% or less. An additional criterion of overall annual loss for APSH values also needs to be satisfied to comply with the recommended BRE guidelines.

14.2.53. A negligible magnitude of change is established if compliance with the BRE criteria is met.

14.2.54. For the affected receptors that lie below the recommended BRE guidelines, the magnitude of change has been classified using professional judgement depending on the ratio of impact between the baseline and proposed scenarios. The criteria used for determining the magnitude of change for the VSC, APSH and WPSH results has been detailed below.

Table 14.3 Determination of the Magnitude of change for Vertical Sky Component (VSC) Results

VSC Values		Ratio of Impact	Magnitude of change
VSC ≥ 27%		≥ 0.8	Negligible
VSC ≥ 27%		< 0.8	Negligible
VSC < 27%		> 0.8	Negligible
VSC < 27%		0.7 – 0.8	Low
VSC < 27%		0.6 – 0.7	Medium
VSC < 27%		< 0.6	High

Table 14.4 Determination of the Magnitude of change for Annual Probable Sunlight Hours (APSH) Results

APSH Values	Ratio of Impact	Absolute reduction in APSH	Magnitude of change
APSH ≥ 25%	>0.8	≤ 4%	Negligible
APSH ≥ 25%	>0.8	> 4%	Negligible
APSH ≥ 25%	<0.8	> 4%	Negligible
APSH < 25%	>0.8	≤ 4%	Negligible
APSH < 25%	>0.7	>4%	Low
APSH < 25%	0.6 – 0.7	>4%	Medium
APSH < 25%	< 0.6	>4%	High

Table 14.5 Determination of the Magnitude of change for Winter Probable Sunlight Hours (APSH) Results

WPSH Values	Ratio of Impact	Magnitude of change
WPSH ≥ 5%	>0.8	Negligible
WPSH ≥ 5%	<0.8	Negligible
WPSH < 5%	>0.8	Negligible
WPSH < 5%	0.7 – 0.8	Low

WPSH < 5%	0.6 – 0.7	Medium
WPSH < 5%	< 0.6	High

Table 14.6 Determination of the Magnitude of change for Overshadowing Results

% of area achieving > 2hrs of sun on 21st March	Ratio of Impact	Magnitude of change
≥ 50%	>0.8	Negligible
≥ 50%	<0.8	Negligible
< 50%	>0.8	Negligible
< 50%	0.7 – 0.8	Low
< 50%	0.6 – 0.7	Medium
< 50%	< 0.6	High

Table 14.7 Effects significance matrix -daylight, Sunlight Overshadowing

Magnitude of change/ Receptor sensitivity	Low	Medium	High
Negligible	Negligible	Negligible	Negligible
Low	Negligible	Negligible	Moderate Adverse
Medium	Minor Adverse	Minor Adverse	Major Adverse
High	Minor Adverse	Moderate Adverse	Extreme adverse

D/S/O BASELINE CONDITIONS

14.2.55. The assessment of the baseline condition identified that all the existing receptors receive adequate levels of daylight, sunlight and solar access(overshadowing). Full details of the baseline assessment can be found in **Appendix 14.1**.

IDENTIFICATION AND VALUATION OF KEY D/S/O IMPACTS (CONSTRUCTION AND OPERATIONAL)

Construction phase

14.2.56. The assessment of potential effects during the construction of the proposed development on daylight, sunlight and overshadowing to surrounding sensitive receptors have not been modelled and analysed. Effects in relation to daylight, sunlight and overshadowing would vary throughout the construction stage. They would, however, be less than the effects of the completed development.

14.2.57. Based on the considerations above, the impact of the proposed development during the construction phase is likely to be negligible

Operational phase

Daylight to surrounding properties

14.2.58. A summary of the Vertical Sky Component results and the magnitude of change for the assessed receptors is provided in **Table 14.8** below.

Table 14.8 Daylight results summary

Receptor	Windows	Above BRE Criteria		Below BRE (Low)		Below BRE (Medium)		Below BRE (High)	
Name	Num	Num	%	Num	%	Num	%	Num	%
The Midland - Hotel	18	18	100	0	0	0	0	0	0
Apartment above Bedland - Marine Rd Central	8	8	100	0	0	0	0	0	0
Apartment above Brucciani - Marine Rd Central	8	8	100	0	0	0	0	0	0
Apartment above Costa - Marine Rd Central	8	8	100	0	0	0	0	0	0
Apartment above Troutflies - Marine Rd Central	7	7	100	0	0	0	0	0	0
223 Marine Rd Central	3	3	100	0	0	0	0	0	0
Total	**52**	**52**	**100**	**0**	**0**	**0**	**0**	**0**	**0**

14.2.59. All the receptors are well within the BRE criteria for daylight, which means that no negative effects have been identified on daylight levels of the surrounding properties and all the receptors receive adequate levels of daylight.

14.2.60. A complete set of results are reported in **Appendix 14.1**.

Effect on Overshadowing Levels

14.2.61. The overshadowing assessment has been conducted for the seaside walk north of the propose development. Results show that the proposed development has a negligible impact on overshadowing level of the pier walk assessed.

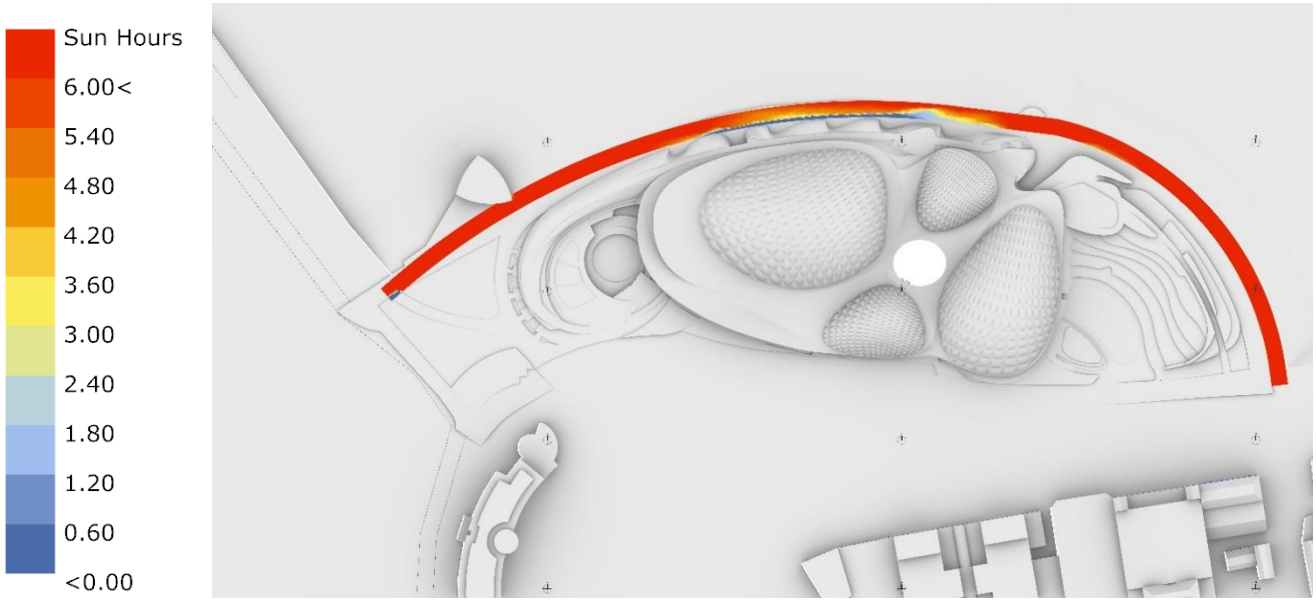
14.2.62. A summary of the magnitude of change for the assessed receptor has been provided below.

Table 14.8 Overshadowing results summary

Receptor	Baseline (%)	Proposed (%)	Ratio of Impact	BRE Compliance

Name	Area receiving >2hrs of sun on 21st March		_	_
Pier Walk	99.72	94.32	0.95	Above

Image 14.4 Baseline Scenario



D/S/O CUMULATIVE EFFECTS

14.2.63. No cumulative development has been identified within the proximity of the sensitive receptors; therefore the Cumulative effects are considered negligible.

D/S/O MITIGATION MEASURES

14.2.64. No mitigation measures have been implemented as the effect of the proposed development has no significant effects on the sensitive receptors.

D/S/O RESIDUAL EFFECTS

14.2.65. The proposed development has no significant effects on sensitive receptors, no residual effects have been identified.

14.3. WIND MICROCLIMATE

INTRODUCTION

Background

14.3.1. Hilson Moran was appointed by the developer, Eden Project International Ltd, to provide a ground level wind microclimate assessment for the proposed development, based on a series of computational models.

Notable Aerodynamic Features of the Existing Built Environment

14.3.2. The main development site is bound by the promenade to the north and east, Marine Road Central to the south and the Grade II* listed Midland Hotel to the west.

14.3.3. The site currently comprises vacant land, public gardens, car parking space and outdoor auditorium seating. The site currently includes a handful of large shrubs, and three trees at the western end of the site, near the Midland Hotel.

14.3.4. The existing surrounding building stock is typically 2-4 storeys high. The Midland Hotel to the west is ~16m high. The Grade II* listed Winter Gardens building to the southeast of the site rises from ~16m high at the front to ~23m high at the rear.

Notable Aerodynamic Features of the proposed development

14.3.5. The proposed development comprises 4 main domed halls, of between 16-30m in height. A surrounding lower section rises up to 12m with an open central plaza. An eastern landscaped region rises to 6m, while a western outdoor sunken garden falls to ~3m below the surrounding ground level. The outdoor regions will include soft landscaping, such as bushes and trees.

Wind Policy Context

Introduction

14.3.6. Legislation and planning documents of relevance to this assessment include the following:

- The National Planning Policy Framework (July 2021);
- Planning Practice Guidance (2014)

14.3.7. National planning policies do not impose specific limits on the microclimate wind environment around a new development, but there is a requirement to inform the planning process, so that specific site conditions and functions can be assessed, and to show that other users around the development will not be unreasonably affected by the wind microclimate.

14.3.8. As a result it is proposed to assess effects based on UK industry standards, assessing the pedestrian level wind microclimate against the Lawson pedestrian comfort criteria. The Lawson criteria define acceptable windiness for different activities such as sitting, walking and standing.

Legislation

14.3.9. There is no legislation which specifically governs wind microclimate planning policy.

National Planning Policy

14.3.10. The National Planning Policy Framework (NPPF) does not specifically reference wind or microclimate; however, the NPPF emphasises the benefits of high quality built environment, for example:

- Paragraph 90.b) *"This should include assessment of [...] the impact of the proposal on town centre vitality and viability."*
- Paragraph 126 *"Good design […] creates better places in which to live and work and helps make development acceptable to communities."*
- Paragraph 130.f) *"Planning policies and decisions should ensure that developments create places that are safe, inclusive and accessible [...] with a high standard of amenity for existing and future users."*

Planning Practice Guidance (2014)

14.3.11. Planning Practice Guidance identifies the potential for a development's size and shape to affect the wind microclimate. In particular, paragraphs 25 and 26 state:

"Design: How should buildings and the spaces between them be considered?

Consider Form: Some forms pose specific design challenges, for example how taller buildings meet the ground and how they affect local wind … patterns should be carefully considered.

Consider Scale: Account should be taken of local climatic conditions, including … wind".

Local Planning Policy

14.3.12. A review of the relevant policies for Lancaster City Council did not highlight any specific wind microclimate requirement additional to the national planning policies.

WIND ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

Introduction

14.3.13. To identify the likely effect of the proposed development on the pedestrian level wind environment, quantitative computational models of the proposed development and surrounding regions were created. The methodology is summarised here, and detailed in **Appendix 14.2**.

Methodology

14.3.14. 3D Computational Fluid Dynamics (CFD) models were created for both the existing and proposed scenarios from geometry provided by the architect, and publicly available LiDAR data (from https://environment.data.gov.uk), to a radius of more than 5 times the proposed building height. The models used ~3 million elements, including boundary layer prism cells and local refinements. Wind profiles were calculated using the ESDU 01008 methodology, and simulations run for 36 wind directions at 10° intervals around the compass. The results at 1.5m above ground level were then compared against the industry standard "LDDC Lawson Criteria for Comfort & Distress" using a statistical analysis of wind measurements at Walney Island Airfield (26km WNW of the site).

Significance Criteria

14.3.15. The following Significance Criteria are adopted. All effects would be continuous, but reversible (if the site were to be returned to an undeveloped state).

Table 14.9 On-site Receptors

On-site Receptors		
Significance	**Trigger**	**Mitigation required?**
Major Adverse	Conditions breach the distress criteria on major routes, with no suitable alternative. Conditions breach the intended comfort criteria by 2 category levels or more.	Yes
Moderate Adverse	Conditions breach the intended comfort criteria by 1 category level. Panoramic locations may be assessed as 1 category higher.	Yes

Negligible	Conditions meet the intended comfort criteria	No

Table 14.10 Off-site Receptors

Off-site Receptors		
Significance	**Trigger**	**Mitigation required?**
Major Adverse	New regions which breach the distress criteria are created on major routes, with no suitable alternative. OR Conditions breach the comfort criteria for the current use, in regions that were previously acceptable.	Yes
Moderate Adverse	Conditions meet the comfort criteria for the current use, but are windier by 1 category level over a significantly large area.	No
Negligible	Conditions remain the same as in the baseline scenario.	No
Minor Beneficial	Conditions that previously breached the distress criteria in the baseline scenario are shown to meet the distress criteria as a result of the proposed development	No

WIND BASELINE CONDITIONS

Pedestrian Comfort

14.3.16. Simulations show that most areas are likely to be currently acceptable according to the Lawson Comfort Criteria for the existing activities. The seafront is a panoramic location, and therefore still considered acceptable for Category III (Pedestrian Walking). Although there are several benches provided along the seafront, these are likely to be for the benefit of those who are intentionally seeking exposed seafront conditions.

Pedestrian Distress

14.3.17. Simulations show no existing regions of pedestrian distress for general users within the assessment area.

14.3.18. Simulations show large existing regions of distress (highlighted in magenta) for frail pedestrians and cyclists around the site, and along the seafront. As a conservative measure, these simulations do not include the effects of vegetation, which would provide some local mitigation.

14.3.19. All three pedestrian crossings of Marine Road Central in this area are shown to lie within these existing regions of distress for frail people and cyclists.

IDENTIFICATION AND VALUATION OF KEY WIND IMPACTS (CONSTRUCTION AND OPERATIONAL)

Construction Impacts

14.3.20. Construction impacts on the wind microclimate have not been quantitatively assessed.

14.3.21. Impacts on the wind microclimate within the wider public realm during construction are expected to transition between the existing and proposed scenarios, without exceeding the conditions found in either of these two scenarios.

14.3.22. Impacts on the wind microclimate within the construction site and its immediately adjacent public realm will depend on construction methods. Mitigating these during construction with appropriate measures, such as PPE and solid fences, would be the responsibility of the construction contractor.

Operational Impacts: Pedestrian Comfort

Off-site

14.3.23. The simulations show that wind conditions do not deteriorate away from the site of the proposed development. All off-site effects are **Negligible Impacts**.

On-site

14.3.24. Simulations show that, following the proposed development, in all regions, the conditions are likely to continue to be milder than the existing conditions, and milder than the required threshold in most locations. This is a **Negligible Impact**.

14.3.25. There are six on-site regions in which simulated conditions are shown to breach the Lawson Comfort Criteria. After accounting for panoramic locations, and the proposed landscaping strategy, four remaining regions have a **Moderate Adverse Impact**, shown in **Image 14.5**:

- Two seating regions overlooking the seafront
- Two seating regions in the southwest of the site

Operational Impacts: Pedestrian Distress

Off-site

Simulations show that, following the proposed development, off-site regions of distress for frail pedestrians and cyclists are significantly reduced. This is a **Minor Beneficial Impact**. Some large off-site regions still remain, particularly on the Jetty, south of the Midland Hotel, and the seafront to the east of the site.

No new regions of distress are introduced off-site, for either general users, or for frail pedestrians and cyclists. This is a **Negligible Impact**.

On-site

Simulations show three on-site regions of distress for frail pedestrians and cyclists. After accounting for alternative routes, and the proposed landscaping strategy, two remaining on-site regions have a **Major Adverse Impact**, also shown in **Image 14.5**:

- At the southeast corner of the main building;
- At the southeast corner of the site.

Image 14.5: Locations of Regions with Adverse Impacts

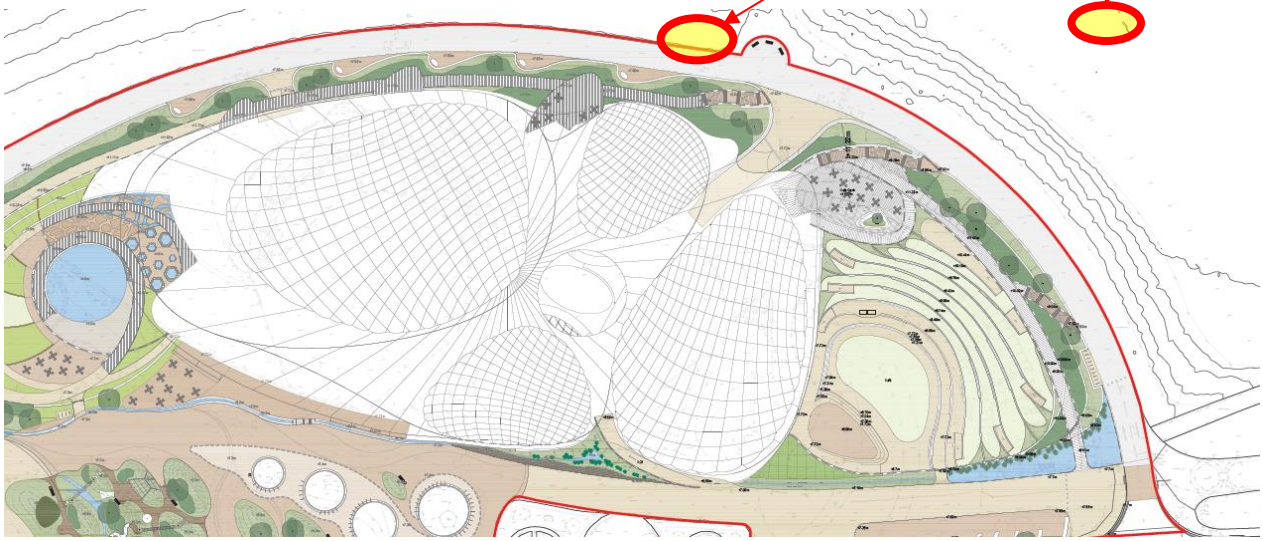
Regions Not "Acceptable" for Intended Pedestrian Comfort

Moderate Adverse

On-site Region of Distress for Frail People & Cyclists

Major Adverse

ID	Location	Criteria
a)	Two seating regions overlooking the seafront	Pedestrian Comfort
b)	Two seating regions in the southwest of the site	Pedestrian Comfort
c)	At the southeast corner of the main building	Pedestrian Distress for Frail People or Cyclists
d)	At the southeast corner of the site	Pedestrian Distress for Frail People or Cyclists



WIND CUMULATIVE EFFECTS

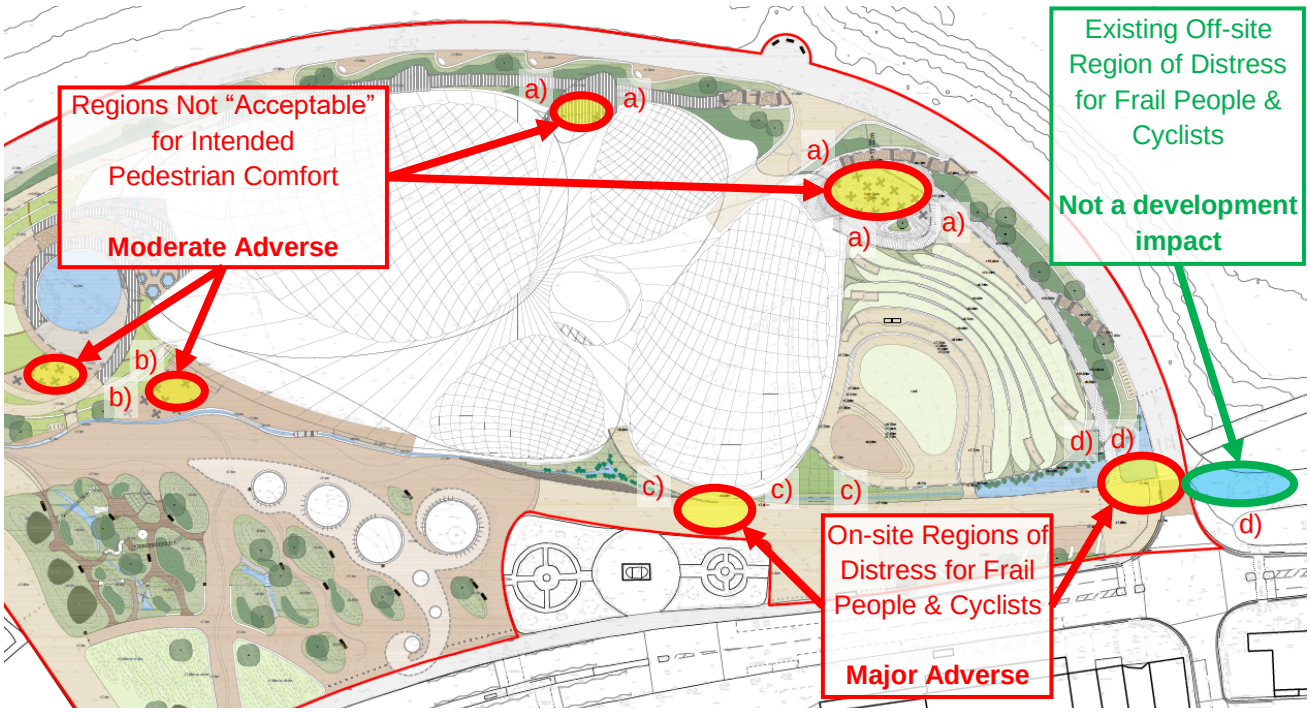
14.3.26. No aerodynamically significant cumulative developments were identified within the assessment area. As a result, no assessment of cumulative effects was undertaken.

WIND MITIGATION MEASURES

14.3.27. Additional local shelter through soft landscaping would provide improved wind microclimate conditions for each region where mitigation would be required, as summarised in **Image 14.6** below. Section 6.4 of **Appendix 14.2** provides details of these locations.

14.3.28. If sufficient local shelter is adopted during future development of the proposed landscaping strategy, the details of which will be reserved by planning condition, all remaining adverse impacts would be considered Negligible Impacts. Indeed, it is understood that the assessment findings have influenced the landscaping scheme, with the introduction of boundary treatment in the vicinity of some of the affected areas to provide additional shelter.

Image 14.6: Summary of Suggested Locations for Mitigation Requirements a), b), c), & d)



WIND RESIDUAL EFFECTS

14.3.29. Off-site regions of distress for frail pedestrians and cyclists will be significantly reduced as a result of the proposed development. This is a **Minor Beneficial Impact**.

14.3.30. If the mitigation described in this section is adopted, all other effects would be considered **Negligible Impacts.**

15

SOCIO-ECONOMICS

PUBLIC

15. SOCIO-ECONOMICS

15.1. INTRODUCTION

15.1.1. This chapter, produced by WSP, reports the outcome of the assessment of likely significant effects arising from the proposed development on socio-economic receptors within the site and surrounding area.

15.1.2. The remainder of this chapter describes the assessment methodology and the baseline conditions relevant to the assessment, which have been used to reach these conclusions, as well as a summary of the likely significant effects leading to the additional mitigation measures required to avoid, prevent, reduce or, if possible, offset any likely significant adverse effects, and the likely residual effects and any required monitoring after these measures have been employed.

15.2. POLICY CONTEXT

15.2.1. Planning policy documents relevant to this socio-economic assessment are as follows:

- National Planning Policy Framework (2021) (**Ref 15.1**);
- Lancaster District Local Plan Part One: Strategic Policies and Land Allocations DPD (2020) (**Ref 15.2**); and
- Lancaster District Local Plan Part Two: Development Management DPD (2020) (**Ref 15.3**).

15.3. ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

ASSESSMENT METHODOLOGY

Assessment of Baseline Conditions

15.3.1. In order to assess the socio-economic effects of the proposed development, WSP has identified and interpreted baseline information on a variety of socio-economic indicators. The indicators have been grouped into a number of subject areas. Taken together, these subject areas provide a robust indication of the socio-economic strengths and weaknesses of a local area.

15.3.2. WSP has obtained data on baseline socio-economic conditions from a variety of sources, including the 2011 Census (**Ref 15.4)**, the National Online Manpower Information Service (NOMIS) (**Ref 15.5**) and the Indices of Multiple Deprivation for 2019 (**Ref 15.6**) which allow consideration of socio-economic condition at very small local areas known as lower layer super output areas (LSOAs).

15.3.3. The main thematic areas considered within the baseline assessment are as follows:

- Population and demographic change;
- Economic activity;
- Health conditions; and
- Deprivation and poverty.

15.3.4. The baseline assesses the economic and social conditions at a range of spatial scales (impact areas), and across different time periods, utilising the most up-to-date data at the time of the assessment.

Construction Phase

Temporary Construction Employment

15.3.5. The temporary demolition and construction employment benefits have been assessed based on the anticipated build cost for the proposed development provided by the Applicant.

15.3.6. Data from the Annual Business Survey 2018 Revised Results published in May 2020 (**Ref 15.7**) reveals that total turnover in the construction sector during 2018 was £287,717 million. The average number of people employed in the construction sector during 2018 was 1.53 million, suggesting that average turnover per full time equivalent construction job in 2018 was £188,050.

15.3.7. The temporary construction employment benefits have been assessed based on the anticipated build cost for the development proposals of £125 million.

15.3.8. Using the build cost estimate and the average turnover per full time equivalent construction job in 2018 of £188,050, the number of person years of temporary construction employment has been estimated.

Net additional construction jobs

15.3.9. In order to calculate the net direct employment during the construction phase, adjustments have been made for several factors which, when considered together, allow an assessment of the net additional jobs that will be generated during the construction phase. The following adjustment factors have been considered:

- **Displacement effects** – would occur if some construction workers simply switch jobs from one location to another (and not at the proposed development);
- **Leakage effects** – would occur if some of the construction jobs created by the proposed development are taken up by people living outside the wider impact area;
- **An indirect multiplier effect** – is likely to create supply chain effects which would benefit local firms such as cleaning and maintenance contractors, training agencies and other suppliers of goods. This effect is known as a **supply linkage multiplier**; and
- **An induced multiplier effect** – is associated with increased expenditure in the local area by people deriving incomes from the direct and indirect effects of the construction employment. The induced effects of the scheme would bring benefits to local shops and other service providers. This effect is known as a **consumption multiplier**.

15.3.10. The following formula has been used to assess the net additional employment generated by the proposed development:

Gross on-site construction jobs x (1 – displacement) x (1 – substitution) x (1 – leakage) x Multiplier = net additional jobs

15.3.11. The assumptions outlined in **Table 15-1** below have been used to calculate the net additional construction jobs. To demonstrate the wider impacts of this scheme, assumptions have been made based at both the local level (Lancaster district) and at a regional level (the North West of England).

Table 15-1 – Assumptions used to calculate net additional construction jobs

	Local level (Lancaster district)	Regional level (North West)
Leakage	**20%** A low level of leakage at the local area has been assumed based on the HCA Additionality Guide (**Ref 15.8**).	**10%** A low level of leakage at the local area has been assumed based on the Additionality Guide (**Ref 15.8**).
Displacement	**20%** As of the 2011 Census (**Ref 15.9**), 4,501 persons across Lancaster worked in the construction industry. The potential for 332.5 jobs per year during the two-year construction of the proposed development would therefore represent 7.4% of this workforce. As such, it is likely that this employment would have a minor impact on the local workforce and therefore displacement would be minimal. A conservative displacement rate of 25% has therefore been applied, in accordance with the Additionality Guide.	**25%** This level of displacement is adopted to account for any potential local adverse effects and for consistency with the local level of displacement.
Substitution	**0%** It is not considered likely that any firms that will be operating within the construction industry will be substituting employment activities for other activities. Therefore, this has been considered to be negligible.	**0%** It is not considered likely that any firms that will be operating within the construction industry will be substituting employment activities for other activities. Therefore, this has been considered to be negligible.
Multiplier	**1.1** It is assumed that 'average' linkages will be evident in the supply chain. Based on this, the Additionality Guide recommends a multiplier of 1.1 at the local level (**Ref 15.8**).	**1.5** It is assumed that 'average' linkages will be evident in the supply chain. Based on this, the Additionality Guide recommends a multiplier of 1.5 at the regional level (**Ref 15.8**).

Gross Value Added (GVA) from Temporary Construction Employment

15.3.12. In order to estimate the gross value added by construction employment, the Annual Business Survey 2018 Revised Results provides estimates of the approximate GVA by different sectors of the UK economy. During 2018 the approximate GVA generated by the construction sector was £107,614 million.

15.3.13. With an average number of people employed in the construction sector during 2018 of 1.53 million, this suggests that the gross value added per full time equivalent construction job in 2018 was £70,336.

Complete and Operational Development

Gross, on-site Employment

15.3.14. The likely number of gross full-time equivalent (FTE) jobs that would be supported by the proposed development is based on evidence provided by Eden.

15.3.15. Net Additional Employment

15.3.16. In order to calculate the net direct employment of the complete and operational proposed development, adjustments have been made for several factors which, when considered together, allow an assessment of the net additional jobs that will be generated as a result of the proposed development. The following adjustment factors have been considered:

- **Displacement effects** – would occur if some employees simply switch jobs from one location to another (and not within the proposed development);
- **Leakage effects** – would occur if some of the jobs created by the proposed development are taken up by people living outside the wider impact area;
- **An indirect multiplier effect** – is likely to create supply chain effects which would benefit local firms such as cleaning and maintenance contractors, training agencies and other suppliers of goods and services to the proposed development. This effect is known as a **supply linkage multiplier**; and
- **An induced multiplier effect** – is associated with increased expenditure in the local area by people deriving incomes from the direct and indirect effects of the scheme. The induced effects of the scheme would bring benefits to local shops and other service providers. This effect is known as a **consumption multiplier**.

15.3.17. The following formula has been used to assess the net additional employment generated by the proposed development:

Gross on-site jobs x (1 – displacement) x (1 – substitution) x (1 – leakage) x Multiplier = net additional jobs

15.3.18. The assumptions used to calculate the net additional permanent employment are outlined in **Table 15-2**. To demonstrate the wider impacts of this scheme, assumptions have been made based at both the local level (Lancaster district) and at a regional level (the North West of England).

Table 15-2 – Assumptions used to calculate net additional permanent employment

	Local level (Lancaster district)	**Regional level** (North West)
Leakage	**23%** Out of 51,392 respondents residing within the LCC administrative boundary between the years of 2010-11, the 2011 Census recorded 11,592 residents commuted outside of the local authorities for work. This represents a leakage rate of 22.6% (**Ref 15.9**).	**10%** A low level of leakage has been assumed at the regional level, based on ready reckoner figures provided in the Additionality Guide (**15.8**) and professional judgement
Displacement	**15%**	**15%**

	Local level (Lancaster district)	Regional level (North West)
	As the proposed development is not considered to have a notably adverse effect on the existing businesses within LCC given the lack of local competitors, a low rate between 0% and the ready reckoner figure for 'low' displacement of 25% from the Additionality Guide (**Ref 15.8**) was adopted.	This level of displacement is adopted to account for any potential local adverse effects and for consistency with the local level of displacement.
Substitution	**0%** It is not considered likely that the proposed development will be substituting employment activities for other activities. Therefore, this has been considered to be negligible.	**0%** It is not considered likely that will be substituting employment activities for other activities. Therefore, this has been considered to be negligible.
Multiplier	**1.1** It is assumed that 'average' linkages will be evident in the supply chain. Based on this, the Additionality Guide recommends a multiplier of 1.1 at the local level (**Ref 15.8**).	**1.5** It is assumed that 'average' linkages will be evident in the supply chain. Based on this, the Additionality Guide recommends a multiplier of 1.5 at the regional level (**Ref 15.8**).

GVA from Net Additional Employment

15.3.19. In order to estimate the annual GVA created by the net additional employment generated by the completed proposed development, information from the Office for National Statistics (2021) Sub-regional Productivity tables (**Ref 15.10**) has been used.

15.3.20. Detailed information on GVA per filled job is provided by the Office for National Statistics Regional Economic Analysis Sub-Regional Productivity Tables. Table B3 reveals that GVA per filled job for Lancaster and Wyre was £44,842 in 2019, the most recent year for which data is currently available. Table B3 also indicates that the GVA per filled job for the North West region was £51,072 in 2019.

15.3.21. This analysis does not provide GVA per filled job by industry sector. The GVA per filled job for Lancaster and Wyre of £44,842 and North West of £51,072 in 2019 covers all sectors. This means that it will slightly understate the GVA for tourism-based employment which is typically higher than the values for other industries. Nevertheless, the proposed development will still make a significant positive contribution to the GVA in the Lancaster and the North West regional economy.

Additional visitor spending

15.3.22. An estimation of the additional visitor spending is based on information in the Eden Project North Outline Business Case (September 2020), prepared by Genecon and based on economic analysis undertaken by Grant Thornton.

Business Rates Revenue

15.3.23. Non-domestic business rates (also known as simply business rates) are a form of local taxation covering all property consisting of land and/or buildings not classed as domestic property or exempt from rating. Business rates apply to a wide range of property regardless of whether they are used for actual business purposes or not.

15.3.24. The assessment of business rates has been based on the average rateable value (per metre squared) for properties in LCC from the Valuation Office Agency (VOA) (**Ref 15.11**) using the non-domestic rating values from 2020, the relevant multipliers set by Central Government and the proposed commercial floorspaces in the proposed development. The 2020 non-domestic rating values for LCC used in this assessment are as follows:

- Retail: £104;
- Office: £74; and
- Other: 59.

15.3.25. The applicant has indicated that Eden receive an 80% charitable rate relief, which has been included in the assessment of business rates revenue.

SIGNIFICANCE CRITERIA

15.3.26. The socio-economic effects identified in this chapter have been categorised as adverse or beneficial depending on their expected effect. The identified effects have then been evaluated against four main criteria, drawing on the evaluation criteria typically used in environmental impact assessment.

15.3.27. The evaluation criteria used in this chapter are as follows:

- **Scale of the effect** – this includes the magnitude and likely severity of the impact;
- **Permanence of the effect** – this distinguishes between temporary impacts and those that will continue to have an effect in the long run;
- **Importance of the effect** – to the affected communities in the impact area; and
- **Compatibility of the effect** – with the outcomes sought by relevant regeneration and economic development policies.

15.3.28. The significance of the identified socio-economic effects has been assessed by considering both the magnitude of the impact and the sensitivity of the receptor. **Table 15-3** below shows the range of potential assessments for the significance of socio-economic effects.

Table 15-3 - Assessing the significance of socio-economic effects

Magnitude	Sensitivity		
	High	Moderate	Low
Major	Major Adverse / Beneficial	Major – Moderate Adverse / Beneficial	Moderate – Minor Adverse / Beneficial
Moderate	Major – Moderate Adverse / Beneficial	Moderate – Minor Adverse / Beneficial	Minor Adverse / Beneficial

Magnitude	Sensitivity		
	High	Moderate	Low
Minor	Moderate – Minor Adverse / Beneficial	Minor Adverse / Beneficial	Minor – Negligible
Negligible	Negligible	Negligible	Negligible

15.3.29. The geographical extent of an effect considers the appropriate policy / administrative boundary or geographical area of influence within which an effect occurs and is assessed at the following spatial scales:

- **Local**: the administrative boundary of Lancaster City Council; and
- **Regional**: the North West of England.

15.4. BASELINE CONDITIONS

15.4.1. This baseline assessment considers conditions at a range of spatial scales, including the local ward of Poulton and the local lower level super output area (LSOA) of Lancaster 006D. The local authority of Lancaster and the overall North West region is also considered.

POPULATION AND DEMOGRAPHIC CHANGE

Population

15.4.2. Lancaster's population in 2019 was estimated to be approximately 146,000, 63.3% of whom were aged 16-64 (**Ref 15.12**). Its population accounted for 2% of the wider North West region (**Ref 15.12**).

15.4.3. The number of 16 to 64-year olds residing in Poulton ward in was 4,625 based on ONS mid-year population estimates in 2019 (**Ref 15.13**). It should be noted that these population estimates are ONS Experimental Statistics, which are in the testing phase and not yet fully developed.

Age breakdown

15.4.4. The breakdown of the population between age groups in 2019 is outlined in **Table 15-4** (**Ref 15.14**). This indicates that Poulton ward had a lower proportion of working age residents compared to both Lancaster and the national average. Conversely, Poulton ward had a higher number of elderly residents (aged over 65 years) which made up 20.6% of its population, compared to the lower rates in Lancaster (19.9%) and England and Wales (18.5%). Similarly, Poulton's population of children aged under 15 years was higher than the other geographies, comprising 20.2% of the population, compared to 16.8% in Lancaster and 19.1% in England and Wales overall.

Table 15-4 - Breakdown of age groups (2019)

Age Group	Poulton ward (%)	Lancaster (%)	England and Wales (%)
Children (0-15 years)	20.2	16.8	19.1
Working age (16-64 years)	59.2	63.2	62.3
Older people (65+ years plus)	20.6	19.9	18.5

ECONOMIC ACTIVITY

15.4.5. In 2011, 75.1% of the usual resident population aged 16-64 in Poulton ward were economically active (i.e. full or part time employment, self-employed or unemployed). This was higher than the proportion for Lancaster (72.5%) but remained lower than the national average of 76.8% (**Ref 15.13**).

15.4.6. In 2011, 10.4% of people in Poulton ward were unemployed, which was higher than Lancaster's average of 6.7% and the England and Wales average of 7.6% respectively (**Ref 15.13**).

DEPENDENCE ON OTHER BENEFITS

15.4.7. As of March 2021, the proportion of the resident population who were claiming out-of-work benefits in Poulton ward was 11.0%. This was higher than the rate for Lancaster (5.4%) and Great Britain as a whole (6.1%) (**Ref 15.15**).

EMPLOYMENT BY OCCUPATION

15.4.8. The Standard Occupational Classification (SOC) is a classification system adopted by the Office for National Statistics (ONS) and other institutions to classify jobs in terms of skill level, with "Managers and Senior Officials" representing the most skilled occupation and "Elementary Occupations" the least skilled occupations.

15.4.9. **Table 15-5** below demonstrates that the proportion of people employed in higher skilled occupations (Classes 1 to 3) in Poulton ward as of the 2011 census was 26.5%. This is lower than the proportion across Lancaster, which stands at 38.1%, whilst it is significantly lower than the comparative figure for England and Wales as a whole (40.9%) (**Ref 15.13**).

15.4.10. Concurrently, Poulton ward had a much higher proportion of people employed in lower skilled occupations (SOC Classes 7-9) with 36.8% of residents employed in these occupation classes, compared to 27.8% in Lancaster and 26.8% in England and Wales (**Ref 15.13**).

Table 15-5 - Employment by occupation group (2011)

Occupation group	Poulton ward (%)	Lancaster (%)	England and Wales (%)
1. Managers and Senior Officials	9	9.3	10.8
2. Professional occupations	8.7	18.1	17.4
3. Associate professional and technical occupations	8.8	10.7	12.7
4. Administrative and secretarial occupations	8.6	9.7	11.4
5. Skilled trades occupations	12.6	12.3	11.5
6. Personal Services	15.6	12	9.4
7. Sales and customer services occupations	11.3	8.9	8.4
8. Process, plant and machine operatives	8.5	6.9	7.2
9. Elementary occupations	17	12	11.2

15.4.11. In general, the England and Wales and Lancaster employment profiles are more heavily skewed towards higher skilled occupations overall, however Poulton ward is more heavily skewed towards lower skilled occupations. Personal Services occupations (SOC 6) are accountable for the greatest share of employment at the ward level (15.6%) (**Ref 15.13**).

BUSINESS SIZE

15.4.12. In 2020 there were 4,700 enterprises across Lancaster, accounting for approximately 1.8% of all business in the North West (267,055). The vast majority of these businesses (88.3%) were micro businesses, employing between 0 and 9 employees. This was a similar trend seen across the North West as a whole (**Ref 15.12**).

15.4.13. There were only 15 large businesses in Lancaster (employing 250 people or more), accounting for 0.3% of the total businesses in the local authority area (see **Table 15-6**) (**Ref 15.12**).

Table 15-6 - Size of businesses across impact areas (2020)

Size of Business	Lancaster (%)	North West (%)
Micro (0 – 9 employees)	88.3	88.8
Small (10 – 49 employees)	9.7	9.2
Medium (50 – 249 employees)	1.6	1.7
Large (250 + employees)	0.3	0.4

JOB DENSITY

15.4.14. In Lancaster in 2019, there was a total of 66,000 jobs. This equates to a job density (number of jobs per working age person) of 0.71, which is lower than the job densities for the North West (0.86) and the average for Great Britain as a whole (0.8) (**Ref 15.12**).

EARNINGS BY PLACE OF RESIDENCE

15.4.15. The average gross weekly pay in 2020 for full-time workers was lower in Lancaster at £550.20 compared to the average across the North West at £560.30 and Great Britain at £587.10 (**Ref 15.12**).

EDUCATION AND SKILLS

Proportion of people with no qualifications

15.4.16. The 2011 Census indicates that Poulton ward had a higher proportion of people with no qualifications (17.3%) than Lancaster (12.5%) and England and Wales as a whole (15%) (**Ref 15.13**).

Proportion of people with higher level qualifications

15.4.17. In 2011, the proportion of people with higher qualifications (Level 4 or above) in Poulton ward (17.5%) was lower than the average for Lancaster (29.1%) and England and Wales (29.7%) (**Ref 15.13**).

HEALTH

15.4.18. The health of people in Lancaster is generally worse than the English average.

15.4.19. Life expectancy at birth (for the period 2017-2019) for men was marginally higher in Lancaster (78.7 years) than the North West region (78.4 years). These values remained lower than the national average (79.8 years). This trend is the same for female life expectancy which was marginally higher in Lancaster (82.5 years) compared to the North West (82.1 years), however still remained worse than the national rate (83.4 years) (**Ref 15.16**).

15.4.20. The under 75 mortality rate from all causes, along with cardiovascular diseases and cancer is lower in Lancaster compared to the regional average. For suicide rates however, Lancaster has a higher rate (15.3) compared to both the North West (10.6) and England (10.1).

15.4.21. In all metrics, the local and regional mortality rates and life expectancies perform worse than the national averages. Further details are outlined in **Table 15-7** (**Ref 15.16**).

Table 15-7 - Health profile of Lancaster and the North West compared against national average (2017-2019)

Health Indicator (per 100,000)	Lancaster	North West	England
Male Life Expectancy (at birth)	78.7	78.4	79.8
Female Life Expectancy (at birth)	82.5	82.1	83.4
Under 75 mortality rate from all causes	370	383	326
Under 75 mortality rate from all cardiovascular diseases	79.1	86.1	70.4
Under 75 mortality rate from cancer	135.8	142.4	129.2
Suicide rate	15.3	10.6	10.1

DEPRIVATION

15.4.22. The English Indices of Deprivation (EID 2019) enables comparisons to be made for a range of deprivation indicators at the small area level. The small areas, or neighbourhoods, are known as LSOAs which on average contain around 1,500 people (**Ref 15.17**).

15.4.23. The EID 2019 provides an overall index of multiple deprivation which is based on seven separate deprivation domains. Each deprivation domain is weighted, as shown below:

- **Income deprivation** – with a weighting of 22.5%;
- **Employment deprivation** – with a weighting of 22.5%;
- **Education, skills and training deprivation** – with a weighting of 13.5%;
- **Health deprivation and disability** – with a weighting of 13.5%;
- **Crime** – with a weighting of 9.3%;
- **Barriers to housing and services** – with a weighting of 9.3%; and
- **Living environment deprivation** – with a weighting of 9.3%.

15.4.24. The Site is located within Lancaster 006D, an LSOA which forms part of the Poulton ward. The area is ranked 896 out of 32,844 LSOAs in England, where 1 is the most deprived. This places it amongst the 3% most deprived neighbourhoods in England (**Ref 15.17**).

15.4.25. **Table 15-8** shows how the LSOA within which the Site falls (Lancaster 006D), is ranked, both overall and by each different domain, against all the LSOAs within England (**Ref 15.17**).

Table 15-8 - Deprivation ranking for LSOA covering the site

Domain of Deprivation	Lancaster 006D (Rank out of 32,844 where 1 is most deprived)
Overall IMD Rank	896
IMD % Decile	2.7% most deprived
Income Rank	2,420
Income % Decile	7.4% most deprived
Employment Rank	1,574
Employment % Decile	4.8% most deprived
Education, Skills and Training Rank	2,806
Education % Decile	8.5% most deprived
Health Deprivation and Disability Rank	1,374
Health % Decile	4.2% most deprived
Crime Rank	774
Crime % Decile	2.4% most deprived
Barriers to Housing and Services Rank	23,560
Barriers to Housing % Decile	28.3% least deprived
Living Environment Rank	86
Living Environment % Decile	0.3% most deprived

15.4.26. **Table 15-8** illustrates that Lancaster 006D on the whole performs poorly in terms of deprivation, ranking in the 10% most deprived neighbourhood across all but one deprivation domain. This is most pronounced with regards to Living Environment which measures the quality of both the 'indoor' and 'outdoor' local environment including metrics on housing quality and local air quality. The second worst performing indicator for Lancaster 006D was Crime which measures the risk of personal and material victimisation at the local level.

15.4.27. Taken together, the LSOA's performance across all domains results in it being classed as one of the most significantly deprived neighbourhoods in the country (**Ref 15.17**).

SUMMARY

15.4.28. The key findings from the baseline assessment are summarised below:

- **Population –** Poulton ward has a lower proportion of residents who are of working age compared to both the North West and England and Wales overall with higher rates of both children and older people.

- **Economic Activity –** In general, economic activity levels are higher at ward level than regional level but remain lower than the national level. The proportion of the working age resident population who were claiming out of work benefits in Poulton ward was significantly higher than the rates for Lancaster and Great Britain as a whole.
- **Employment Structure –** The proportion of people employed in higher skilled occupations in Poulton ward was notably lower than the comparative figures for Lancaster and England and Wales as a whole.
- **Education –** At the ward level, the proportion of people with no qualifications was higher than the rates in Lancaster and across the country as a whole. Concurrently, the proportion of residents within Poulton ward with higher level qualifications was lower than Lancaster and England and Wales averages.
- **Health –** Male and female life expectancy at birth (for the period 2017-2019) was lower in Lancaster and the North West when compared to England.
- **Deprivation –** The neighbourhood impact area (Lancaster 006D) is ranked among the 3% most deprived areas in England. Overall, the area has significant levels of deprivation.

ASSESSMENT OF POTENTIAL EFFECTS, MITIGATION AND RESIDUAL EFFECTS

CONSTRUCTION PHASE - TEMPORARY SOCIO-ECONOMIC EFFECTS

Construction Employment

15.4.29. The UK construction sector is characterised by an extensive network of supply chains and contracting relationships covering a very wide range of trades and skills. As a result, the spin off benefits from new construction projects are greater than for many other economic sectors in the UK.

15.4.30. The proposed development would include a significant construction period (approximately two years) which would generate turnover and temporary employment for construction firms and related trades, as well as construction training opportunities.

15.4.31. There will be opportunities to provide training, apprenticeships and work experience in a range of construction trades. For example, there will be opportunities for local young people to gain NVQ Level 2 and Level 3 training and practical experience in a range of different construction and engineering trades. Initiatives of this sort are typically run by a training provider in partnership with the main contractor for the construction programme.

15.4.32. It is estimated that the Development would generate 665 person years of temporary construction employment. This is equivalent to 665 construction workers being employed on a full-time basis for twelve months.

Net additional construction employment

15.4.33. Based on the assumptions outlined in **Table 15-1**, the total number of temporary jobs arising from the construction of the proposed development are detailed in **Table 15-9** below.

Table 15-9 – Additionality of construction jobs

Step involved	LCC	North West
1. Construction workers (gross, total)	**665**	
2. Leakage to workers from outside impact area	-133	-66
3. Displacement of other activities	-133	-150
4. Construction workers on-site (net, direct)	399	449
5. Employment off-site induced by construction employment (net, indirect)	40	224
6. Total additional employment from construction of proposed development	439	673

15.4.34. As demonstrated in **Table 15-9**, after allowing for leakage, displacement and multiplier effects, the net additional construction employment for the local area would be 439 person years, with an additional 234 person years at the regional level. Taken together, the construction phase of the development could support 673 person years of employment.

15.4.35. The construction employment been assessed as a direct, temporary, medium-term, **moderate beneficial** effect at the **local level** and a **minor beneficial** effect at the **regional level**.

Gross Value Added by Construction Employment

15.4.36. Based on gross value added per full time equivalent construction job in 2018 of £70,336, it is estimated that the 673 net additional years of temporary construction employment generated by the proposed development will create GVA to the regional economy of around £47.3 million, of which £30.9 million will be within the local economy.

15.4.37. The total amount of GVA generated within Lancaster in 2016 was £2.5 billion (**Ref 15.18**). As such, the anticipated £30.9 million of GVA at the local level would represent approximately 1.2% of the total GVA for the local area.

15.4.38. The GVA from construction employment been assessed as a direct, temporary, medium-term **minor beneficial** effect at the **local level** and **regional level**.

Construction training opportunities

15.4.39. The proposed development will involve a significant construction programme. Given the scale of building activity, there is considerable scope to provide training, apprenticeships and work experience in a range of construction trades.

15.4.40. For example, there will be opportunities for local young people to gain NVQ Level 2 and Level 3 training and practical experience in a range of different construction and engineering trades, with Eden working in partnership with Lancaster and Morecambe College to facilitate apprenticeships.

15.4.41. Eden is committed to working with its suppliers and contractors to try and maximise the opportunities for local residents to take advantage of the construction training opportunities created by the proposed development. It is anticipated that a condition requiring a Local Labour Statement (covering the construction period) will be attached to the planning permission.

15.4.42. The construction training opportunities generated by the proposed development has been assessed as a direct, temporary, medium-term **moderate beneficial** effect at the **local level** and **minor beneficial** effect at the **regional level**.

OPERATIONAL PHASE – PERMANENT SOCIO-ECONOMIC EFFECTS

Gross, on-site Employment

15.4.43. Eden has provided evidence, based on its detailed knowledge of the business, indicating that the proposed development is anticipated to generate 389 FTE gross, on site jobs.

Net Additional Employment

15.4.44. Given that the site does not currently support any employment, the 389 FTE jobs that would be created by the proposed development once complete and operational represent a gross employment figure.

15.4.45. Based on the assumptions outlined in the Assessment Methodology, the total number of jobs arising from the proposed development is detailed in **Table 15-10** below.

Table 15-10 – Additionality of permanent employment

Step involved	LCC	North West
1. Operational workers (gross, direct)	**389**	
2. Leakage to workers from outside impact area	-89	-39
3. Displacement of other activities	-45	-53
4. Operational workers on-site (net, direct)	255	298
5. Employment off-site induced by operational employment (net, indirect)	25	149
6. Total additional employment from operation of proposed development	280	446

15.4.46. As outlined in **Table 15-10**, whilst the proposed development itself will provide 389 gross jobs on site, this will be supported by up to 25 jobs in the supply chain at the local level and up to 149 at the regional level.

15.4.47. Allowing for displacement, leakage and multiplier effects, it is estimated that the proposed development would create 280 FTE net additional jobs at the local level with an additional 166 FTE jobs at the regional level. Taken together, the development could support 446 gross FTE permanent jobs.

15.4.48. Eden's own evidence also indicates that 28 gross, FTE staff would also be directly employed by the proposed development but would work remotely or in Cornwall, further increasing the employment associated with the proposed development.

15.4.49. There is likely to be a direct, permanent, long-term, **moderate beneficial** effect at the **local level** and a **minor beneficial** effect at the **regional level** from the net additional employment.

Gross Value Added from Net Additional Employment

15.4.50. The net additional employment created by the development will have wider economic effects by generating GVA to the regional and local economies.

15.4.51. It is estimated that the jobs to be supported by both the proposed development and the supply chain linkages could contribute approximate GVA to the North West economy of up to £21 million annually in perpetuity, £12.6 million of which would be within the local (Lancaster) economy (based on 280 FTE net additional jobs identified in **Table 15-10**).

15.4.52. The total amount of GVA generated within Lancaster in 2016 was £2.5 billion (**Ref 15.18**). As such, the anticipated £12.6 million of GVA per annum at the local level would represent approximately 0.5% of the total GVA for the local area.

15.4.53. There is likely to be a direct, permanent, long-term, **minor beneficial** effect at the **local level** and **regional level** from the GVA created by the net additional permanent employment.

Business Rates Revenue

15.4.54. Based on the commercial floorspace in the proposed development, the total business rates to be generated each year could be approximately £116,000.

15.4.55. This figure should be used as a guide as the rateable value for each of the uses as part of the scheme will be subject to different pricing to be determined by the Council once operational. Furthermore, as this is based on 2020 values, it is highly likely that this will alter by the time the proposed development is operational.

15.4.56. As this assumption is made based on an average figure, the £116,000 in business rates generation should be used as a guide as the rateable value for each of the uses included in the proposed development will be subject to different pricing to be determined by LCC once operational.

15.4.57. There is likely to be a direct, permanent, long-term, **minor beneficial** effect at the **local level** from the additional business rates revenue.

Additional Visitor Spending

15.4.58. Information provided by the applicant indicates that the total annual overall spend in England by visitors to Eden Project North is estimated to be £233 million, based on approximately one million visitors annually. This additional spend by visitors will further stimulate employment through supply chain linkages.

15.4.59. There is likely to be a direct, permanent, long-term, **major beneficial** effect at the **local level** and a **moderate beneficial** effect at the **regional level** from the additional visitor spending.

MITIGATION MEASURES

15.4.60. All of the socio-economic effects identified in this chapter are anticipated to be beneficial and, as such, no mitigation measures are proposed.

RESIDUAL EFFECTS

15.4.61. The following residual effects have been identified:

- There is likely to be a direct, temporary, medium-term, **moderate beneficial** effect at the **local level** and a **minor beneficial** effect at the **regional level** from the construction employment;
- There is likely to be a direct, temporary, medium-term **minor beneficial** effect at the **local level** and **regional level** from the GVA from construction employment;
- There is likely to be a direct, temporary, medium-term **moderate beneficial** effect at the **local level** and **minor beneficial** effect at the **regional level** from the construction training opportunities;
- There is likely to be a direct, permanent, long-term, **moderate beneficial** effect at the **local level** and **minor beneficial** effect at the **regional level** from the net additional employment;
- There is likely to be a direct, permanent, long-term, **minor beneficial** effect at the **local level** and **regional level** from the GVA created by the net additional permanent employment;
- There is likely to be a direct, permanent, long-term, **minor beneficial** effect at the **local level** from the additional business rates revenue; and
- There is likely to be a direct, permanent, long-term, **major beneficial** effect at the **local level** and a **moderate beneficial** effect at the **regional level** from the additional visitor spending.

16

POPULATION AND HUMAN HEALTH

PUBLIC

16. POPULATION AND HUMAN HEALTH

16.1. INTRODUCTION

16.1.1. This chapter, produced by WSP, reports the outcome of the assessment of likely significant effects arising from the proposed development upon Population and Health.

16.1.2. The remainder of this chapter describes the assessment methodology and the baseline conditions relevant to the assessment, which have been used to reach these conclusions, as well as a summary of the likely significant effects leading to the additional mitigation measures required to avoid, prevent, reduce or, if possible, offset any likely significant adverse effects, and the likely residual effects.

16.2. POLICY CONTEXT

16.2.1. Planning policy documents relevant to this Population and Health assessment are as follows:

- National Planning Policy Framework (2021) (**Ref 16.1**);
- Lancaster District Local Plan Part One: Strategic Policies and Land Allocations DPD (2020) (**Ref 16.2**); and
- Lancaster District Local Plan Part Two: Development Management DPD (2020) (**Ref 16.3**).

16.3. ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

SCOPE OF THE ASSESSMENT

16.3.1. The scope of this assessment has been established through an ongoing scoping process. Further information can be found in ***Chapter 5: Approach to EIA***. The Lancaster City Council (LCC) Scoping Opinion (dated 30 August 2019) states that the Population and Human Health chapter should follow the same approach as Health Impact Assessments (HIAs).

16.3.2. This Population and Health assessment does not solely focus on human health, but the wider factors that can influence the health of a population. These are called 'health determinants', and include an individual's lifestyle, their living and working environments, other societal considerations and the way these factors interact with each other. The World Health Organisation also emphasises the importance of recognising health inequalities; the *"differences in health status or in the distribution of health determinants between different population groups"* (**Ref 16.4**). This Population and Health assessment has taken account of these factors and considered how the proposed development may influence the physical and mental health and wellbeing of local residents.

ELEMENTS SCOPED INTO THE ASSESSMENT

16.3.3. The scope of this Population and Health assessment has been established by identifying the likely health determinants and receptors (an affected individual or community), and consideration of opportunities to enhance the positive effects and mitigate any negative effects of the proposed development on Population and Health. The London Healthy Urban Development Unit (HUDU) Planning for Health Rapid HIA Tool, Fourth Edition (October 2019) (**Ref 16.5**) recommends the assessment of potential health impacts under 11 topics or broad determinants of health. However, the proposed development is entirely commercial and the topic relating to 'housing design and affordability' recommended by the HUDU Rapid Health Impact Assessment Tool is therefore not relevant to this assessment and has been omitted.

16.3.4. This scope follows the principles of rapid health assessment, as appropriate for a development of this size (HUDU Rapid Health Impact Assessment Tool, page 13). These are listed in **Table 16-1** below, together with the key potential health impacts associated with each.

Table 16-1 – Health Determinants and Potential Impacts

Health Determinant	Potential Health Impact
Access to health and social care services and other social infrastructure	Access to essential services such as GP services, and other social infrastructure (including education and community centres) is important in ensuring good health. Social infrastructure and related services are key components of 'lifetime neighbourhoods', and the creation of sustainable, cohesive, and healthy communities. These types of infrastructure also have a direct positive influence on physical and mental health and wellbeing, with accessibility, transport, range and quality of services being influencing factors in their use.
Access to open space and nature	Access to open space and play space encourages physical activity, particularly if these spaces are readily accessible and of good quality. There is also evidence that outdoor recreation can improve mental health; offering opportunities for relaxation and social interaction as well as recreation. Enabling children to establish positive patterns of behaviour by using outdoor recreational facilities can also lead to similar patterns of behaviour in adulthood.
Air quality, noise and neighbourhood amenity	Environmental factors such as air quality and noise can be influenced by construction, background pollution, and vibration, and these can impact both physical and mental health. Health conditions such as asthma and bronchitis can be adversely impacted by poor air quality, whilst noise pollution can affect mental health, quality of life and sleep. Effective management of construction and well-designed spaces are important to ensure neighbourhood amenity is not detrimentally affected.
Accessibility and active travel	Convenient access to a range of services and facilities minimises the need to travel, and this can be achieved by creating well designed spaces. Providing active travel options such as walking and cycling and discouraging car use can increase access to the local area and improve physical and mental health.
Crime reduction and community safety	Thoughtful planning and urban design can help to promote natural surveillance and social interaction; both of which can help to reduce crime and the 'fear of crime'. By addressing fear of crime, the mental wellbeing of residents can be improved, and this is particularly important for people who may suffer from isolation, have a disability, or are older or younger. Community engagement in the development process, ensuring the security of sites, and creating well-lit spaces can also help to reassure residents and encourage feelings of safety within the community.
Access to healthy food	Access to healthy food can improve the physical and mental health of residents and help to tackle chronic disease and obesity. Opportunities to purchase healthy food locally and limiting concentrations of hot food takeaways can change eating behaviour and improve physical and mental health. Providing opportunities for people to grow their own food can also contribute positively to this and encourage education about access to healthy and sustainable food sources.

Health Determinant	Potential Health Impact
Access to work and training	Employment and income are a key determinant of health and wellbeing, leading to greater financial security, improved mental health and benefits such as self-esteem and opportunities for social interaction. Unemployment has the potential to lead to poverty, illness and a reduction in personal and social esteem.
Social cohesion and inclusive design	Social cohesion and the opportunity for social interaction can help to improve wellbeing, create social networks, and reduce isolation, particularly for younger people and older people. Through careful design, neighbourhoods can be areas for interaction where people of all ages and abilities can access and feel safe within the community.
Minimising the use of resources	Reducing waste generation and encouraging the use of sustainable materials, as well as good practices such as recycling and accessing local goods and services, can improve health directly and indirectly while minimising environmental impacts.
Climate change	Developments that take advantage of sunlight, tree planting and accessible green/brown roofs also have the potential to contribute towards the mental wellbeing of users. The sustainability of developments can be improved through incorporating renewable energy, enhancing biodiversity and incorporating sustainable urban drainage techniques, which in turn help to create healthy living environments.

EXTENT OF THE STUDY AREA

16.3.5. The geographical extent of the impacts assessed within this chapter is dependent upon the type of effects and receptors. Catchments identified are proportionate to describe the likely Population and Health effects and are based on published guidance, professional judgement and best practice. Given that the assessment of Population and Health impacts is a qualitative assessment rather than quantitative, the majority of the health determinants assessed in the HUDU approach (as outlined in **Table 16-1**) do not have specific geographical parameters.

16.3.6. For the purposes of establishing a baseline of demographic data, where possible (and relevant), ward level data has been presented as the lowest geographical level of information. Datasets for larger geographical areas have been used where ward level data are not available, and for means of comparison against the ward. The various area profiles are as follows:

- National: England, England and Wales or Great Britain depending on the particular dataset;
- Regional: North West;
- Local Authority: Lancaster City; and
- Ward: Poulton.

METHOD OF BASELINE DATA COLLATION

DESK STUDY

16.3.7. A desk-based baseline data collection exercise has been undertaken which included a review of available information to determine the baseline conditions in the relevant geographical areas of effect. The following data sources have been reviewed:

- Office for National Statistics (ONS) NOMIS (**Ref 16.6**);
- English Indices of Deprivation 2019 (**Ref 16.7**);
- Public Health England – Local Authority Health Profiles (**Ref 16.8**); and
- ONS Population Estimates for 2019 Wards in England (**Ref 16.9**).

ASSESSMENT METHODOLOGY

16.3.8. The HUDU assessment matrix identifies 11 broad health determinants and encourages assessors to consider the planning issues which are likely to influence health and wellbeing associated with these determinants. However, as previously noted, the proposed development is entirely commercial and the topic relating to 'housing design and affordability' recommended by the HUDU Rapid Health Impact Assessment Tool is therefore not relevant to this assessment and has been omitted. As such, this assessment focuses on 10 broad health determinants (listed in **Table 16-1**).

16.3.9. The HUDU Rapid Health Impact Assessment Tool states: *"it may not be possible to quantify the impacts as many of the effects on an individual's or community's health are not easily measurable and many health effects are indirect and take many years to manifest themselves… Health impacts may be short-term or temporary, related to construction or longer-term, related to the operation and maintenance of a development and may particularly affect vulnerable or priority groups of the population. Where an impact is identified, actions should be recommended to mitigate a negative impact or enhance or secure a positive impact".* (**Ref 16.5**).

16.3.10. The assessment of potential effects on Population and Health considers the number of people affected, the duration of the change, its frequency and permanence. The vulnerability of the population experiencing the impact and their ability to absorb the impacts is considered. Where specific population groups are predicted to be particularly affected by a health impact, this is identified.

SIGNIFICANCE CRITERIA

16.3.11. This is a qualitative rather than quantitative assessment, due to the diverse nature of health determinants and health outcomes which are assessed. Although this chapter describes the likely qualitative health impacts through the use of the HUDU assessment matrix, it is not possible to quantify the severity or extent of the effects which give rise to these impacts.

16.3.12. As a result, the potential impacts on Population and Health during construction and operation are described as outlined in **Table 16-2** below, based on broad categories for the health determinants outlined in the HUDU assessment matrix.

16.3.13. Where an impact has been identified, recommendations are outlined to mitigate any negative impacts on health, and any opportunities to enhance health benefits are identified.

Table 16-2 – Population and Health Impacts

Impact	Impact symbol	Description
Positive	+	A beneficial impact is identified
Neutral	0	No or negligible health impact is identified
Negative	-	An adverse impact is identified

Uncertain	?	Uncertainty exists as to the overall impact

16.4. BASELINE CONDITIONS

POPULATION AND DEMOGRAPHIC CHANGE

POPULATION

16.4.1. Lancaster district's population in 2019 was estimated to be approximately 146,000, 63.3% of whom were aged 16-64 (**Ref 16.10**). Its population accounted for 2% of the wider North West region's population (**Ref 16.10**).

16.4.2. The number of 16 to 64-year olds residing in Poulton ward in was 4,625 in 2019 (**Ref 16.11**). It should be noted that these population estimates are ONS Experimental Statistics, which are in the testing phase and not yet fully developed.

AGE BREAKDOWN

16.4.3. The breakdown of the population between age groups in 2019 is outlined in **Table 16-3** (**Ref 16.12**). This indicates that Poulton ward had a lower proportion of working age residents compared to both Lancaster district and the national average. Conversely, Poulton ward had a higher number of elderly residents (aged 65 years and over) which made up 20.6% of its population, compared to the lower rates in Lancaster district (19.9%) and England and Wales (18.5%). Similarly, Poulton's population of children aged up to 15 years was higher than the other geographies, comprising 20.2% of the population, compared to 16.8% in Lancaster district and 19.1% in England and Wales overall.

Table 16-3 - Breakdown of age groups (2019)

Age Group	Poulton ward (%)	Lancaster district (%)	England and Wales (%)
Children (0-15 years)	20.2	16.8	19.1
Working age (16-64 years)	59.2	63.2	62.3
Older people (65+ years plus)	20.6	19.9	18.5

ETHNICITY

16.4.4. Based on the 2011 Census data, from a total count of 7,623 people in Poulton ward, 96.5% of people identified themselves as white, 1.1% of people identified themselves as mixed/multiple ethnic groups, 1.5% of people identified themselves as Asian/Asian British, whilst only 0.6% of people identified themselves as Black/African/Caribbean/Black British. Less than 0.2% of the population identified themselves as part of another ethnic group (see **Table 16-4**) (**Ref 16.13**).

Table 16-4 - Ethnic Groups in Poulton Ward

Ethnic Group	Count	%
White	7,357	96.5
Mixed/multiple ethnic groups	84	1.1
Asian/Asian British	118	1.5
Black/African/Caribbean/Black British	48	0.6
Other ethnic group	16	0.2
TOTAL	**7,623**	**100**

RELIGION

16.4.5. In 2011, a total of 5,073 people (66.5%) in Poulton ward stated they had a religion, whilst 1,989 people (26.1%) stated they did not. A total of 561 people (7.4%) did not state their religion (**Ref 16.13**).

16.4.6. **Table 16-5** provides a more detailed breakdown of religions in Poulton ward at the time of the 2011 Census.

Table 16-5 - Religions in Poulton Ward

Religion	Count	%
Has religion	5,073	66.5
Christian	4,912	64.4
Buddhist	33	0.4
Hindu	7	0.1
Jewish	0	0
Muslim	67	0.9
Sikh	0	0
Other religion	54	0.7

No religion	1,989	26.1
Religion not stated	561	7.4
TOTAL	**7,623**	**100**

ECONOMIC ACTIVITY

16.4.7. In 2011, 75.1% of the usual resident population aged 16-64 in Poulton ward were economically active (i.e. full or part time employment, self-employed or unemployed). This was higher than the proportion in Lancaster district (72.5%) but remained lower than the national average of 76.8% (**Ref 16.11**).

16.4.8. In 2011, 10.4% of people in Poulton ward were unemployed, which was higher than Lancaster district's average of 6.7% and the England and Wales average of 7.6% respectively (**Ref 16.11**).

DEPENDENCE ON OTHER BENEFITS

16.4.9. As of March 2021, the proportion of the resident population who were claiming out-of-work benefits in Poulton ward was 11%. This was higher than the rate for Lancaster district (5.4%) and Great Britain as a whole (6.1%) (**Ref 16.11**).

EMPLOYMENT BY OCCUPATION

16.4.10. The Standard Occupational Classification (SOC) is a classification system adopted by the ONS and other institutions to classify jobs in terms of skill level, with "Managers and Senior Officials" representing the most skilled occupation and "Elementary Occupations" the least skilled occupations.

16.4.11. **Table 16-6** below demonstrates that the proportion of people employed in higher skilled occupations (Classes 1 to 3) in Poulton ward as of the 2011 census was 26.5%. This is lower than the proportion across Lancaster district, which stands at 38.1%, whilst it is significantly lower than the comparative figure for England and Wales as a whole (40.9%) (**Ref 16.11**).

16.4.12. Concurrently, Poulton ward had a much higher proportion of people employed in lower skilled occupations (SOC Classes 7-9) with 36.8% of residents employed in these occupation classes, compared to 27.8% in Lancaster district and 26.8% in England and Wales (**Ref 16.11**).

Table 16-6 - Employment by occupation group (2011)

Occupation group	Poulton ward (%)	Lancaster district (%)	England and Wales (%)
1. Managers and Senior Officials	9	9.3	10.8
2. Professional occupations	8.7	18.1	17.4
3. Associate professional and technical occupations	8.8	10.7	12.7

4. Administrative and secretarial occupations	8.6	9.7	11.4
5. Skilled trades occupations	12.6	12.3	11.5
6. Personal Services	15.6	12	9.4
7. Sales and customer services occupations	11.3	8.9	8.4
8. Process, plant and machine operatives	8.5	6.9	7.2
9. Elementary occupations	17	12	11.2

16.4.13. In general, the England and Wales and Lancaster district employment profiles are more heavily skewed towards higher skilled occupations overall, however Poulton ward is more heavily skewed towards lower skilled occupations. Personal Services occupations (SOC 6) are accountable for the greatest share of employment at the ward level (15.6%) (**Ref 16.11**).

JOB DENSITY

16.4.14. In Lancaster district in 2019, there was a total of 66,000 jobs. This equates to a job density (number of jobs per working age person) of 0.71, which is lower than the job densities for the North West (0.86) and the average for Great Britain as a whole (0.8) (**Ref 16.10**).

EARNINGS BY PLACE OF RESIDENCE

16.4.15. The average gross weekly pay in 2020 for full-time workers was lower in Lancaster district at £550.20 compared to the average across the North West at £560.30 and Great Britain at £587.10 (**Ref 16.10**).

EDUCATION AND SKILLS

PROPORTION OF PEOPLE WITH NO QUALITIFCATIONS

16.4.16. The 2011 Census indicates that Poulton ward had a higher proportion of people with no qualifications (17.3%) than Lancaster district (12.5%) and England and Wales as a whole (15%) (**Ref 16.11**).

PROPORTION OF PEOPLE WITH HIGHER LEVEL QUALIFICATIONS

16.4.17. In 2011, the proportion of people with higher qualifications (Level 4 or above) in Poulton ward (17.5%) was lower than the average for Lancaster district (29.1%) and England and Wales (29.7%) (**Ref 16.11**).

HEALTH CONDITIONS IN LANCASTER

LIFE EXPECTANCY AND MORTALITY

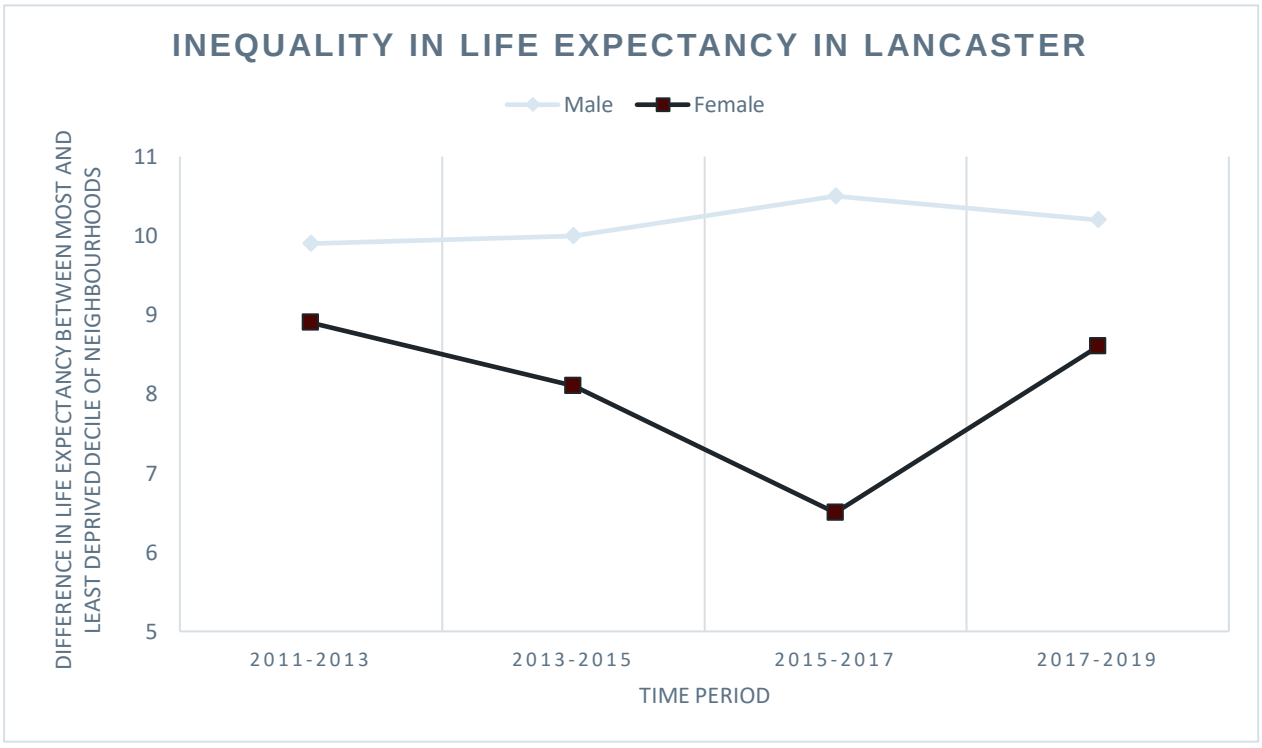
16.4.18. Both male and female life expectancies are higher in Lancaster district compared to the regional average, however, remain lower than the national averages, as shown in **Table 16-7** below. Male life expectancy at birth in 2017-19 was 78.7 years in Lancaster district compared to the national average of 79.8 years. Female life expectancy during the period 2017-19 in Lancaster district was 82.5 years compared to the national average at 83.4 years (**Ref 16.14**).

Table 16-7 - Life expectancy at birth, 2017-2019 (Public Health England, 2020)

Gender	Lancaster district	North West region	England
Male	78.7	78.4	79.8
Female	82.5	82.1	83.4

16.4.19. Significant life expectancy inequalities exist between the most and least deprived neighbourhoods. There was a life expectancy gap of 10.2 years for males and 8.6 years for females in 2017-19. As shown in **Image 16-1**, this gap has remained consistent since 2011 for males. Between 2011 and 2015 however, the gap for women decreased with a low of 6.5 years in the time period 2013-2015. As shown in results from 2015-2017 however, this increased to a level similar to 2011 at 8.6 years.

Image 16-1 - Inequalities in life expectancy at birth in Lancaster district



[1](Y-axis refers to the years gap in life expectancy between the most deprived and least deprived decile of lower layer super output areas)

GENERAL HEALTH

16.4.20. Lancaster district has a lower rate of early deaths (defined as under-75 mortality rate), at 370 per 100,000 compared with the North West region's average of 383. Despite performing better than the regional benchmark, Lancaster district remained higher than the national average of 326 per 100,000 in 2017-19 (**Ref 16.15**). This trend can also be seen for mortality rates from cancer in 2017-19 (135.8 per 100,000 against the North West's average of 142.4 per 100,000 and national average of 129.2 per 100,000). The same trend also applies to mortality rates from cardiovascular diseases in 2017-19 (79.1 per 100,000 against the North West's average of 86.1 per 100,000 and national average of 70.4 per 100,000).

16.4.21. This trend differs for suicide rates, where Lancaster district has a significantly higher rate of deaths (15.3 per 100,000) compared to the region (10.6) and national (10.1) rates (**Ref 16.15**).

16.4.22. The general health of the resident population of Lancaster district residents fluctuates with the level of general health across North West England when assessed via various metrics. In some respects, Lancaster district's population is marginally less healthy than the England-wide average. The share of residents who were overweight or obese across the adult population of Lancaster district as of 2019-20 was higher than national figures, at 66.2% of all adults compared to 65.9% across the North West and 62.8% across England. However, the percentage of adults who were recorded as being physically active in the period 2019-20 in Lancaster district (64.5%) was slightly higher than the North West (63.9%), but lower than England (66.4%) (**Ref 16.16**).

16.4.23. As of 2019, the local authority has a lower rate of smoking prevalence amongst adults (11.2% of all adults) compared to England (13.9%) and most significantly when compared to the wider North West region (14.5%) (**Ref 16.16**).

16.4.24. Emergency hospital admissions for intentional self-harm were also significantly lower in Lancaster district in 2019-20 (173.7 admissions per 100,000) compared to the North West (237.6 admissions per 100,000) and England (192.6 admissions per 100,000) (**Ref 16.16**).

16.4.25. Despite these lower rates of hospital admissions for self-harm, when considering admissions to hospital for alcohol-related conditions, Lancaster district performs worse than the region and England as whole, with 774 admissions per 100,000 compared to the North West rate of 742 and the national rate of 664. Similarly, the rate of persons killed and seriously injured on England's roads is significantly higher for residents of Lancaster district (64.8 per 100,000) compared to the North West (38.4 per 100,000) and England overall (42.6 per 100,000) (**Ref 16.16**).

16.4.26. Similarly, Lancaster district had a lower than average rate of hospital admissions for violent crimes during 2016/17 to 2018/19 at 15.9 per 100,000 compared to a regional rate of 31.2 and a national rate of 44.9 (**Ref 16.16**).

16.4.27. Regarding wider determinants of health, Lancaster district had a lower than average proportion of children who are in low income families in 2016 (14.9% of all local children) relative to rates across England (17% of all children) and the North West region (18% of all children) (**Ref 16.17**).

CHILD HEALTH

16.4.28. The health of children and young people across Lancaster district is, on average, poorer than the England average. Infant mortality rates in 2017-19, for example, are slightly above the national average, at 3.2 per 100,000 live births in Lancaster district compared with 4.5 in the North West and 3.9 in England. The under 18 conception rate per 1,000 population (in 2018) is also higher across the Lancaster district population (23.9 per 1,000) than across the North West (21.7 per 1,000) and significantly higher than national rates (16.7 per 1,000) (**Ref 16.17**).

16.4.29. The prevalence of child obesity among children in Year 6 within Lancaster district is below both the regional and national rates at 20% in 2019-20 compared to 22.8% for the North West region and 21% nationally (**Ref 16.17**).

16.4.30. The proportion of the population who smoked that the time of giving birth in 2019-2020 was also lower than both the regional and national averages. In Lancaster district, 9.6% of mothers smoked at the time of delivery, compared to 12.2% in the North West and 10.4% across England (**Ref 16.17**).

HEALTH CONDITIONS IN THE LOCAL AREA

WARD-LEVEL HEALTH DATA

16.4.31. Comprehensive health data is provided at the electoral ward level through Public Health England's Local Health Tool (**Ref 16.18**).

16.4.32. Male life expectancy at birth in Poulton ward in 2013-2017 was 72.8 years, significantly lower than the Lancaster district average of 78.5 years and the England average of 79.5 years. During the same period, female life expectancy was 77.5 years in Poulton ward, lower than both the Lancaster district average of 82.1 and the England average of 83.1. These results mean that the Poulton ward has the lowest life expectancy for both males and females across the Lancaster local authority area (**Ref 16.18**).

16.4.33. Poulton ward also performs poorly with regards to the Standardised Mortality Ratio (SMR) which was significantly higher for deaths from all causes at a rate of 189.9 compared to 111.2 for Lancaster district (**Ref 16.18**).

16.4.34. The standardised admission ratio to hospital for emergency reasons for Poulton ward between 2013/14 and 2017/18 was 141.6, significantly higher than the Lancaster district average of 109.8 and the national benchmark of 100. This trend was similar across all reasons for emergency hospital admissions, for example hospital admissions for heart attacks between 2013/14 and 2017/18 for Poulton ward was 176.5 and Lancaster district was 158.7 against the national index of 100 (**Ref 16.18**).

16.4.35. Higher than average proportions of people in Poulton ward also reportedly had a limiting long-term illness or disability in 2011 (28%), as opposed to 19.5% in Lancaster district and 17.6% nationally (**Ref 16.18**).

16.4.36. Child obesity levels in Poulton ward are also higher for both children in reception and Year 6. The three-year average of obesity among children in Reception Year in 2015/16 to 2017/18 was 23.1% in Poulton ward, which was higher than the Lancaster district average of 18.5% and the England average of 20% during this period. In the same period, the obesity rate amongst reception aged children was 11.4% in Poulton ward which was higher than the Lancaster district average of 9.8% and the national average of 9.5% (**Ref 16.18**).

16.4.37. Issues relating to mental health are prevalent within the local area, with a high rate of hospital stays for self-harm in Poulton. The standardised admission ratio for hospital stays for self-harm in Poulton ward during the period 2015/16 to 2019/20 was 199.8, which is almost double both the Lancaster district rate (102.6) and the national index of 100 (**Ref 16.18**).

DEPRIVATION

16.4.38. The English Indices of Deprivation (EID 2019) enables comparisons to be made for a range of deprivation indicators at the small area level. The small areas, or neighbourhoods, are known as LSOAs which on average contain around 1,500 people (**Ref 16.19**).

16.4.39. The EID 2019 provides an overall index of multiple deprivation which is based on seven separate deprivation domains. Each deprivation domain is weighted, as shown below:

- **Income deprivation** – with a weighting of 22.5%;
- **Employment deprivation** – with a weighting of 22.5%;
- **Education, skills and training deprivation** – with a weighting of 13.5%;
- **Health deprivation and disability** – with a weighting of 13.5%;
- **Crime** – with a weighting of 9.3%;
- **Barriers to housing and services** – with a weighting of 9.3%; and
- **Living environment deprivation** – with a weighting of 9.3%.

16.4.40. The Site is located within Lancaster 006D, an LSOA which forms part of the Poulton ward. When considering the overall deprivation rank, the area is ranked 896 out of 32,844 LSOAs in England where 1 is the most deprived. This places it amongst the 3% most deprived neighbourhoods in England (**Ref 16.19**). In comparison, Lancaster district as a whole is ranked 112 out of 317 local authority areas in England for the overall deprivation rank, placing it among the 36% most deprived local authority areas in England. The difference in deprivation at the local authority level compared to local neighbourhood level underlines the significant inequalities that exist in Lancaster district.

16.4.41. **Table 16-8** shows how the LSOA within which the Site falls (Lancaster 006D), is ranked, both overall and by each different domain, against all the LSOAs within England (**Ref 16.19**).

Table 16-8 - Deprivation ranking for LSOA covering the site

Domain of Deprivation	Lancaster 006D (Rank out of 32,844 where 1 is most deprived)
Overall IMD Rank	896
IMD % Decile	2.7% most deprived
Income Rank	2,420
Income % Decile	7.4% most deprived
Employment Rank	1,574
Employment % Decile	4.8% most deprived
Education, Skills and Training Rank	2,806

Domain of Deprivation	Lancaster 006D (Rank out of 32,844 where 1 is most deprived)
Education % Decile	8.5% most deprived
Health Deprivation and Disability Rank	1,374
Health % Decile	4.2% most deprived
Crime Rank	774
Crime % Decile	2.4% most deprived
Barriers to Housing and Services Rank	23,560
Barriers to Housing % Decile	28.3% least deprived
Living Environment Rank	86
Living Environment % Decile	0.3% most deprived

16.4.42. **Table 16-8** illustrates that Lancaster 006D on the whole performs very poorly in terms of deprivation, ranking in the 10% most deprived neighbourhood across all but one deprivation domain. This is most pronounced with regards to Living Environment which measures the quality of both the 'indoor' and 'outdoor' local environment including metrics on housing quality and local air quality. The second worst performing indicator for Lancaster 006D was Crime which measures the risk of personal and material victimisation at the local level.

16.4.43. Taken together, the LSOA's performance across all domains results in it being classed as one of the most significantly deprived neighbourhoods in the country (**Ref 16.19**).

SELF-ASSESSMENT OF HEALTH

16.4.44. The 2011 Census included a question that asks people to assess their general health over the preceding 12 months from five possible options ranging from 'very good to 'very bad'. Although subjective, the question is useful in illustrating the perceived health of the population of the local area in which the site is located. **Table 16-9** compares the results of this question with the local neighbourhood of Lancaster 006D to those populations in Poulton ward, Lancaster district, North West and England as a whole (**Ref 16.20**).

16.4.45. Residents in Lancaster 006D consider themselves to be less healthy than their counterparts at wider geographies, with 74.5% of residents considering themselves to be in 'very good' or 'good' health. The percentage is lower than Poulton ward (75.6%), Lancaster district (80.5%), the North West (79.3%) and the average across England (81.4%) as of the 2011 census (**Ref 16.20**).

16.4.46. In terms of self-reporting 'bad' or 'very bad' levels of health, rates across Lancaster 006D reflect poorer health, with 9% reporting 'bad' or 'very bad' health at the neighbourhood level. This proportion is much higher than others across all geographic scales, most notably the England average of 5.4% (**Ref 16.20**).

Table 16-9 - Self-assessment of individual health at LSOA, ward, borough, North West and national levels (2011 Census)

Area	Lancaster 006D	Poulton (Ward)	Lancaster district	North West	England
Very good health	40.7%	41.8%	46.7%	46.5%	47.2%
Good health	33.8%	33.8%	33.8%	32.8%	34.2%
Good or very good	74.5%	75.6%	80.5%	79.3%	81.4%
Fair health	16.5%	16.5%	13.7%	13.9%	13.1%
Bad health	5.9%	6.1%	4.5%	5.3%	4.2%
Very bad health	3.1%	1.8%	1.3%	1.5%	1.2%
Bad or very bad	9.0%	7.9%	5.8%	6.8%	5.4%

16.4.47. The key findings from the baseline assessment are summarised below:

- Poulton ward has a lower proportion of residents of working age (16 to 64 years) and a higher proportion of children (under 16 years) and elderly people (aged over 65 years) than across Lancaster district and England and Wales.
- In general, economic activity levels are higher at ward level than regional level but remain lower than the national level. The proportion of the working age resident population who were claiming out of work benefits in Poulton ward (11% in March 2021) was significantly higher than the rates for Lancaster district (5.4%) and Great Britain (6.1%) as a whole.
- The proportion of people employed in higher skilled occupations in Poulton ward was notably lower than the comparative figures for Lancaster district and England and Wales as a whole. At the ward level, the proportion of people with no qualifications (17.3% as of the 2011 Census) was higher than the rates in Lancaster district (12.5%) and across England and Wales as a whole (15%). Concurrently, the proportion of residents within Poulton ward with higher level qualifications (17.5% as of the 2011 Census) was lower than Lancaster district (29.1%) and England and Wales average (29.7%).
- Life expectancies in Lancaster district are lower than the national averages. In addition, there are significant health inequalities in Lancaster district, with significant life expectancy gaps between the most and least deprived members of the population (10.2 years for males and 8.6 years for females in 2017-19). This is most pronounced in Poulton ward, which has the lowest life expectancy in Lancaster district. Life expectancies in Poulton ward were 72.8 years for males and 77.5 years for females in the period 2013-17, compared to the Lancaster district average of 78.5 years for males and 82.1 years for females.
- The overall health profile of Lancaster district is mixed. On the whole, Lancaster district performs better than the North West region, however, remains below national benchmarks for a range of

indicators, including the under-75 mortality rate, mortality rates from cancer and mortality rates from cardiovascular diseases. However, obesity rates among children in Year 6 are lower across Lancaster district (20%) than the regional (22.8%) and England (21%) average).

- At the more local ward-level, the health of residents is generally worse than the Lancaster district and national average. Poulton ward performs poorly with regards to the SMR for deaths from all causes and the standardised admissions ratio to hospital for emergency reasons. The ward also has higher levels of disability and poor health, along with rates of childhood obesity in both Reception and Year 6 aged children.
- This poor health profile is mirrored in the self-assessment of health undertaken in the 2011 Census. Lancaster 006D LSOA and the Poulton ward both had lower proportions of residents who rated their health as 'good' or 'very good' and therefore higher proportion of residents who considered themselves to have 'bad' or 'very bad' health.
- Unsurprisingly, extreme levels of deprivation are also evident in the local neighbourhood area. Lancaster 006D is ranked among the 3% most deprived areas in England. Deprivation is most pronounced for the Living Environment and Crime domain, with the local neighbourhood among the 0.3% most deprived in England.

16.5. IDENTIFICATION AND VALUATION OF KEY IMPACTS (CONSTRUCTION AND OPERATIONAL)

16.5.1. The following assessment matrix (**Tables 16.10 – 16.19**) sets out the potential Population and Health impacts associated with the proposed development, during construction and operation phases. This assessment approach and the ten health determinants are in line with the HUDU guidance (**Ref 16.5**) on rapid health assessments.

Table 16-10 – Health Determinant – Access to health and social care services and other social infrastructure

Assessment Criteria	Relevant to the proposed development?	Details and evidence	Potential Population and Health Impact	Population affected	Duration of change	Frequency or permanence	Further actions or mitigation?
Does the proposal retain or re-provide existing social infrastructure?	Yes	The site does not currently contain any social infrastructure, however the proposal will lead to significant opportunities and partnerships in education and training, enabled by on-site facilities. Further details of which are outlined in the Planning Statement, which supports the planning application.	N/A during construction + during operation	Local residents and visitors	N/A during construction Long-term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.
Does the proposal assess the impact on health and social care services and has local NHS organisations been contacted regarding existing and planned healthcare capacity?	No	The proposed development does not include any residential accommodation and therefore will not increase demand for local health and social care services.	N/A during construction N/a during operation	N/A	N/A during construction N/A during operation	N/A during construction N/A during operation	No measures are considered necessary.
Does the proposal include the provision, or replacement of a healthcare facility and does the facility meet NHS requirements?	No	There are no existing healthcare facilities at the site, nor does the proposed development include any new provision. As stated above, the proposed development will not increase demand for local health services.	N/A during construction N/A during operation	N/A	N/A during construction N/A during operation	N/A during construction N/A during operation	No measures are considered necessary.
Does the proposal assess the capacity, location and accessibility of other social infrastructure, e.g. primary, secondary and post 19 education needs and community facilities?	No	The proposed development does not include any residential accommodation and therefore will not increase demand for social infrastructure, such as schools.	N/A during construction N/A during operation	N/A	N/A during construction N/A during operation	N/A during construction N/A during operation	No further measures are considered necessary.
Does the proposal explore opportunities for shared community use and co-location of services?	Yes	Eden Project North will connect with the local community through its on-site and outreach activities, helping to raise the level of aspirations and ambition among local people to help support positive social and inclusive change. The significant enhancements to the underutilised existing public realm included in the proposed development will provide substantial areas outside the paid boundary with permissive access for the community.	N/A during construction + during operation	Local residents	N/A during construction Long-term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.

Table 16-11 – Health Determinant – Access to open space and nature

Assessment Criteria	Relevant to the proposed development?	Details and evidence	Potential Population and Health Impact	Population affected	Duration of change	Frequency or permanence	Further actions or mitigation?
Does the proposal retain and enhance existing open and natural spaces?	Yes	Heavily underutilised and poor quality existing open space will be lost to facilitate the development. The open spaces to be retained will be significantly enhanced by a comprehensive landscaping and public realm scheme. Surrounding natural spaces (the beach and the bay) will be unaffected by the proposals.	- during construction + during operation	Local residents	Short-term during construction Long-term during operation	Temporary during construction Permanent during operation	No further measures are considered necessary.
In areas of deficiency, does the proposal provide new open or natural space, or improve access to existing spaces?	Yes	The proposal will provide a range of open and natural spaces, including significant enhancements to the existing and underutilised public realm at the site. The public realm will include landscaped	N/A during construction + during operation	Local residents	N/A during construction	N/A during construction	No further measures are considered necessary.

Assessment Criteria	Relevant to the proposed development?	Details and evidence	Potential Population and Health Impact	Population affected	Duration of change	Frequency or permanence	Further actions or mitigation?
		areas and planting, creating inviting spaces which the local community can enjoy. In addition, a re-located pedestrian crossing on Marine Drive Central (directly opposite the main approach to the venue) will be provided which will significantly improve pedestrian access to the existing and retained spaces. The assessment of baseline conditions identified that self-harm rates in the local ward (Poulton) are significantly higher than both the Lancaster district and national averages, indicating a relatively high level of mental health issues among the local population. It is widely recognised that access to green space is beneficial for mental and physical health, resulting from relaxation and stress alleviation, increased physical activity and helping to reduce noise and excess heat (**Ref 16.21**). As such, it is anticipated that the proposed landscaped areas of public realm will have a positive impact on people who suffer from mental health problems in the local area, through providing additional green space in which people can socialise or simply relax.			Long term during operation	Permanent during operation	
Does the proposal provide a range of play spaces for children and young people?	Yes	The underutilised and poor quality existing open space will be enhanced to provide spaces for informal play, however equipped play will not form part of the proposals.	N/A during construction + during operation	Local residents and visitors	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.
Does the proposal provide links between open and natural spaces and the public realm?	Yes	The proposal will provide links via the existing promenade and cycle routes being retained post-development. In addition, the new pedestrian crossing on Marine Drive Central will enhance access further.	N/A during construction + during operation	Local residents and visitors	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.
Are the open and natural spaces welcoming and safe and accessible for all?	Yes	The permissive areas of open spaces/public realm will create an inviting and accessible space for all, significantly improving the existing poor quality and underutilised public realm. Re-surfacing of the hard landscaped areas and the installation of retractable bollards will simultaneously provide accessibility and security for future users of the site.	N/A during construction + during operation	Local residents and visitors	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.
Does the proposal set out how new open space will be managed and maintained?	Yes	The site will be controlled by Eden and, as such, public access to landscaped/public realm areas will be permissive (ie open for use at Eden's discretion, which in any case will be most of the time). Eden will also be responsible for maintaining the site.	N/A during construction + during operation	Local residents and visitors	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.

Table 16-12 – Health Determinant – Air quality, noise and neighbourhood amenity

Assessment Criteria	Relevant to the proposed development?	Details and evidence	Potential Population and Health Impact	Population affected	Duration of change	Frequency or permanence	Further actions or mitigation?
Does the proposal minimise construction impacts such as dust, noise, vibration and odours?	Yes	A Construction Traffic Management Plan (including shuttle transport for construction staff) and Construction Environmental Management Plan will ensure the temporary impacts from construction are mitigated and managed as far as practicable. It is anticipated that these reports will be required by planning condition.	0 during construction N/A during operation	Local residents	Medium term during construction N/A during operation	Temporary during construction N/A during operation	No further measures are considered necessary.
Does the proposal minimise air pollution caused by traffic and energy facilities?	Yes	Construction traffic generated by the proposed development will be low in comparison to the existing baseline flows. Furthermore, embedded mitigation includes travel routes, which will be minimised and controlled using an offsite deliveries hub (approximately 600m from the application site), and a comprehensive construction logistics plan to manage vehicular movements and delivery routes. The traffic data provided by the project's transport consultant (WSP) also takes into account flows from local committed developments, considering the cumulative impacts of the proposals. Given the overall operational stage impacts are considered to be negligible with these committed developments included, there are no cumulative operational impacts anticipated. The proposals allow for the full provision of health from air source heat pumps, which will be housed in bespoke energy pods to celebrate the clean energy source. The pods will also aim to educate visitors and local residents about the sustainable energy used at the site. Further details of the energy facilities in the proposed development are included in the Sustainability Statement, prepared by Buro Happold, which accompanies the planning application.	0 during construction 0 during operation	Local residents	Medium term during construction Long term during operation	Temporary during construction Permanent during operation	No further measures are considered necessary.
Does the proposal minimise noise pollution caused by traffic and commercial uses?	Yes	The proposed development would utilise existing car parks in the area surrounding the site instead of building new car parks, which will help to reduce additional traffic noise in the site's vicinity. In addition, the key principle of the Eden Transport Strategy is to encourage people to arrive by non-car modes, particularly for the last mile of their journey. In terms of commercial uses, the restaurant and retail areas are to be located indoors and will therefore result in negligible noise impacts. The outdoor arena space will be limited to up to eight music events per calendar year (and will take place during summer months) with a comprehensive noise management plan and mitigation measures to be adopted (secured by planning condition) to mitigate noise pollution during the events.	N/A during construction 0 during operation	Local residents	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.

Table 16-13 – Health Determinant – Accessibility and active travel

Assessment Criteria	Relevant to the proposed development?	Details and evidence	Potential Population and Health Impact	Population affected	Duration of change	Frequency or permanence	Further actions or mitigation?
Does the proposal address the ten Healthy Streets indicators?	Yes	A time controlled and advance ticketing system, in conjunction with the Transport Strategy and the different public realm proposals, address all ten indicators in a positive manner in comparison to the existing use of the site. The Transport Strategy is outlined in the Transport Assessment, prepared by WSP, which supports the planning application.	N/A during construction + during operation	Local residents and visitors	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.
Does the proposal prioritise and encourage walking, for example through the use of shared spaces?	Yes	The proposals include public realm enhancements, including a relocated and upgraded pedestrian crossing to improve pedestrian accessibility. Further details of which are outlined in the Transport Assessment, prepared by WSP, which accompanies the application.	N/A during construction + during operation	Local residents and visitors	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.
Does the proposal prioritise and encourage cycling, for example by providing secure cycle parking, showers and cycle lanes?	Yes	The proposals include the provision of a range of facilities to encourage the use of active travel for both staff and visitors. These facilities include secure cycle parking, showers and changing rooms, locker facilities and free e-bike battery charging while visiting Eden. Furthermore, visitors to the site arriving by active travel modes will have certain benefits over car visitors, such as ticket discounts and Eden vouchers.	N/A during construction + during operation	Local residents, visitors and staff at the site	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.
Does the proposal connect public realm and internal routes to local and strategic cycle and walking networks?	Yes	The proposal will connect effectively with surrounding walking and cycling networks. The proposals include the provision of a relocated and upgraded pedestrian crossing across Marine Road Central to improve the pedestrian experience and safety. National Cycle Network (NCN) Routes 69 and 700 currently run through the site and, through engagement with Sustrans, it has been agreed to introduce changes to both routes to avoid duplication and possible confusion for cyclists. The proposal will connect new areas of public realm with these cycling networks. The assessment of baseline conditions identified that there are higher levels of obesity in Lancaster district than the North West and national averages. The proposed development will connect with existing cycling routes and provide facilities on site to encourage staff and visitors to arrive by bicycle (including showers and changing rooms). The proposed development will therefore help to encourage the uptake of active travel modes to access the site, with helping to facilitate healthier lifestyles for local people who work in Eden Project North.	N/A during construction + during operation	Local residents, visitors and staff at the site	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.
Does the proposal include traffic management and calming measures to help reduce and minimise road injuries?	Yes	It is proposed to reduce the speed limit on Marine Road Central to 20mph, helping to reduce the speed of traffic in this area and improve road safety. In addition, the relocated and upgraded signalised pedestrian crossing will act as a traffic calming measure.	N/A during construction + during operation	Local residents and visitors	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.
Is the proposal well connected to public transport, local services and facilities?	Yes	The site is well connected to local and regional transport networks, including several bus stops, Morecambe Bus Station and Morecambe Railway Station (just 300m away), as well as the entirety of Morecambe town centre and key assets within it, including:	N/A during construction + during operation	Visitors and staff at the site	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.

		▪ The Morecambe promenade; ▪ The Stone Jetty; ▪ Festival Market; ▪ Winter Gardens; and ▪ Morecambe Town Hall Gardens. The proposals also include the provision of a coach drop off adjacent to the site, allowing larger groups to easily access the site.					
Does the proposal seek to reduce car use by reducing car parking provision, supported by the controlled parking zones, car clubs and travel plans measures?	Yes	The key principle of the Eden Transport Strategy is to encourage people to arrive by non-car modes, particularly for the last mile of their journey. A key element of the Parking Strategy is to intercept a significant proportion of vehicles travelling to the site using M6 Junction 34 Caton Road Park and Ride, where an underutilised recently constructed Park and Ride site provides parking capacity for 650 vehicles. The proposals would also utilise a number of town centre car parks, rather than building new ones. The booking system for the proposed development will allow Eden to limit the number of car visitors per hour and day, whilst the Transport Strategy considers how car modal split will reduce over time, in favour of public transport and active travel. Further details of the Parking Strategy and Transport Strategy are outlined in the Transport Assessment, prepared by WSP, which accompanies the application.	N/A during construction + during operation	Local residents and visitors	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.
Does the proposal allow people with mobility problems or a disability to access buildings and places?	Yes	In terms of horizontal circulation, all areas of the proposed development will benefit from level access. Vertical circulation will be achieved via internal ramps and lifts within the building to provide access to the individual shells and to the ancillary uses (restaurant, café and outdoor arena).	N/A during construction + during operation	Visitors and staff at the site	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.

Table 16-14 – Health Determinant – Crime reduction and community safety

Assessment Criteria	Relevant to the proposed development?	Details and evidence	Potential Population and Health Impact	Population affected	Duration of change	Frequency or permanence	Further actions or mitigation?
Does the proposal incorporate elements to help design out crime?	Yes	The scheme design has been developed with input from Lancashire Police, its Counter Terrorism Unit and LCC Public Realm and Civils Contingencies Officers. Designing out crime measures include the provision of passive counter-terrorism features to obstruct ingress of vehicles (landscape bunding), retractable bollards/street furniture to obstruct ingress of vehicles mounting the pedestrian route towards the main entrance whilst allowing the ability for the attraction to be serviced, fixed bollards/street furniture, heavy duty flood gate doubling as service gate, sloping wall to north of arena to prevent vehicle ingress into the arena bowl, CCTV surveillance and external lighting across the site. The assessment of baseline conditions identified that the local neighbourhood suffers from high levels of crime deprivation (ranked among the 2.4% most deprived areas in England. The careful design of the proposed development, in consultation with relevant bodies, will help to create a safe an inviting environment with discourages crime.	N/A during construction + during operation	Local residents, visitors and staff at the site	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.

Assessment Criteria	Relevant to the proposed development?	Details and evidence	Potential Population and Health Impact	Population affected	Duration of change	Frequency or permanence	Further actions or mitigation?
Does the proposal incorporate design techniques to help people feel secure and avoid creating 'gated communities'?	Yes	The aforementioned security and crime prevention measures (detailed above) coupled with the clear sightlines throughout the pedestrian and cycle walkways through the site will ensure employees and visitors alike will have a sense of security and safety within the site confines.	N/A during construction + during operation	Local residents, visitors and staff at the site	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.
Does the proposal include attractive, multi-use public spaces and buildings?	Yes	The proposed development will comprise a major mixed-use leisure development including use classes E, F1, F2 and Sui Generis. An outdoor arena will host ticketed music events up to eight times per calendar year, whilst two outdoor gardens will be publicly permissible. The proposals include the provision of a restaurant that will be open to the public without the need for a ticket to the venue. Landscaped gardens to the south and west of the site will provide significant public realm enhancements. The design of the proposed development will be state-of-the-art, creating an attractive and focal development in Morecambe.	N/A during construction + during operation	Local residents and visitors	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.
Has engagement and consultation been carried out with the local community and voluntary sector?	Yes	Extensive community, stakeholder and consultee engagement has been undertaken since March 2019. A number of community consultation events were held in October 2019 across Morecambe, attracting over 2,000 attendees who provided ideas that helped shape the design of the proposals. In 2021, five 'Community Conversation' briefing sessions were undertaken between February and June, providing detailed information on a range of topics, including how the project could work together with local businesses and how it could benefit the environment. The sessions were available for anyone to attend and have since been uploaded to the Eden Project website and YouTube, helping to reach a wider audience than just those who could attend the live events. A three week virtual consultation event was also held between 21 July and 6 August 2021, allowing people to find out more about the proposed development, meet the team and provide feedback on the proposals. Full details of the public consultation are outlined in the Statement of Community Engagement, prepared by WSP, which supports the planning application.	N/A during construction + during operation	Local residents and the wider population	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.

Table 16-15 – Health Determinant – Access to healthy food

Assessment Criteria	Relevant to the proposed development?	Details and evidence	Potential Population and Health Impact	Population affected	Duration of change	Frequency or permanence	Further actions or mitigation?
Does the proposal facilitate the supply of local food, for example allotments, community farms and farmers' markets?	Yes	The canopy-like structure within the public realm to the south of the main building will provide a sheltered space for temporary food, beverage and merchandise stalls which could provide opportunities for local individuals and businesses to showcase and sell local produce, crafts and other merchandise. In addition, Eden Project North will aim to source its produce/food from sustainable and local suppliers.	N/A during construction + during operation	Local residents	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.
Is there a range of retail uses, including food stores and smaller affordable shops for social enterprises?	Yes	The proposed development will include a visitor centre, retail store and restaurant. As noted above, the canopy-like structure within the public realm to the south of the main building will provide a sheltered space for temporary food, beverage and merchandise stalls which could provide opportunities for local individuals and businesses to showcase and sell local produce, crafts and other merchandise.	N/A during construction + during operation	Local residents and visitors	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.
Does the proposal avoid contributing towards an over-concentration of hot food takeaways in the local area?	No	The proposal does not include the provision of hot food takeaways.	N/A during construction N/A during operation	N/A	N/A during construction N/A during operation	N/A during construction N/A during operation	No measures are considered necessary.

Table 16-16 – Health Determinant – Access to work and training

Assessment Criteria	Relevant to the proposed development?	Details and evidence	Potential Population and Health Impact	Population affected	Duration of change	Frequency or permanence	Further actions or mitigation?
Does the proposal provide access to local employment and training opportunities, including temporary construction and permanent 'end-use' jobs?	Yes	Eden is committed to employing and training local people both during construction and once the proposed development is operational. There will be opportunities for local young people to gain NVQ Level 2 and Level 3 training and practical experience in a range of different construction and engineering trades, with Eden working in partnership with Lancaster and Morecambe College to facilitate apprenticeships. It is anticipated that a condition requiring a Local Labour Statement (covering the construction period) will be attached to the planning permission. Eden has provided evidence, based on its detailed knowledge of the business, indicating that the proposed development is anticipated to generate 389 FTE gross, on site permanent jobs. Chapter 15 (Socio-economics) of this ES estimates that the construction of the proposed development would create 439 person years of temporary, net additional construction employment for the local area, with an additional 234 person years at the regional level. Chapter 15 also includes an assessment of the permanent employment associated with the proposed development. It is estimated that the proposed development would create 280 FTE	+ during construction + during operation	Local residents and regional workforce	Medium during construction Long-term during operation	Temporary during construction Permanent during operation	No further measures are considered necessary.

Assessment Criteria	Relevant to the proposed development?	Details and evidence	Potential Population and Health Impact	Population affected	Duration of change	Frequency or permanence	Further actions or mitigation?
		net additional jobs at the local level with an additional 166 FTE jobs at the regional level. Taken together, the development could support 446 gross FTE permanent jobs. Further details on the anticipated employment during both construction and operation are provided in Chapter 15. The assessment of baseline conditions identified that the local ward of Poulton experiences high levels of unemployment, with 11% of the population claiming out-of-work benefits as of March 2021. This figure is nearly double the rate of Lancaster district (5.4%) and significantly higher than the rate across Great Britain as a whole (6.1%). The proposed development has the potential to reduce unemployment locally, through providing new opportunities across a range of levels, during both the construction and operation and the proposal.					
Does the proposal provide childcare facilities?	No	The proposals do not include childcare facilities, however the proposed development does not provide any residential units which would increase demand for child care facilities, nor does the proposal result in the loss of any existing child care facilities.	N/A during construction N/A during operation	N/A	N/A during construction N/A during operation	N/A during construction N/A during operation	No measures are considered necessary.
Does the proposal include managed and affordable workspace for local businesses?	No	The proposed development is a mixed-use leisure facility, which does not include office floorspace (other than that to be used by Eden itself).	N/A during construction N/A during operation	N/A	N/A during construction N/A during operation	N/A during construction N/A during operation	No measures are considered necessary.
Does the proposal include opportunities for work for local people via local procurement arrangements?	Yes	Both the construction and operational phases of Eden Project North will offer direct employment opportunities, generate turnover in local supply chains and rejuvenate investment confidence. Over the longer term, it has the potential to have a transformational impact on the North West's tourism economy, a sector that has been particularly adversely impacted in 2020. As a year-round attraction, it will support new long-term sustainable employment, in contrast to the seasonal jobs normally supported by visitors to coastal towns. It is anticipated that a condition requiring a Local Labour Statement (covering the construction period) will be attached to the planning permission.	+ during construction + during operation	Local residents	Medium during construction Long-term during operation	Temporary during construction Permanent during operation	No further measures are considered necessary.

Table 16-17 – Health Determinant – Social cohesion and inclusive design

Assessment Criteria	Relevant to the proposed development?	Details and evidence	Potential Population and Health Impact	Population affected	Duration of change	Frequency or permanence	Further actions or mitigation?
Does the proposal consider health inequalities by addressing local needs through community engagement?	Yes	The proposals have been subject to extensive public consultation since March 2019. Full details of the public consultation are outlined in the Statement of Community Engagement, prepared by WSP, which supports the planning application. The proposed development will help to address health inequalities in several ways. The proposal will be a major employer, creating around 389 full-time equivalent jobs at the site and many more in the supply chain (further details of which are included in the Socio-economic chapter of this Environmental Statement). Furthermore, the construction period will generate significant employment. Eden is committed to employing and training local people both during the construction and operation of the proposal. The local neighbourhood in which the site is located has very high levels of income deprivation (among the 7.4% most deprived in England), whilst the local ward has high levels of unemployment. The employment generated by the proposed development will help to address these issues, through providing employment opportunities across a range of levels, with training opportunities also provided to improve the skills of the local workforce. The local area also experiences high levels of education, skills and training deprivation, with the local neighbourhood among the 8.5% most deprived areas in England. Education inequality in the area is evident when comparing the proportion of people with higher level qualifications in the local ward of Poulton (17.5%) to Lancaster district as a whole (29.1%), as of the 2011 Census. The proposed development seeks to improve education and skills among the local population, through collaborating with Lancaster University to devise and implement the innovative Morecambe Bay Curriculum for local primary schools. The curriculum aims to prepare local people for employment at Eden Project North and within the supply chain, whilst it will also focuses on the health of the Morecambe Bay ecosystem and the health of the local community, to provide new and inclusive opportunities for all. The curriculum seeks to achieve significant and lasting improvements to the lives of those living in the Morecambe Bay area and will ensure that the different stages of the education system provide the skills, knowledge and behaviours required for the future. A virtual community consultation session dedicated to the Morecambe Bay Curriculum on 24 February 2021, providing an overview of the curriculum and explaining its importance, whilst allowing attendees to ask questions. A key objective of the Eden Project North is positively contributing to improving the health and wellbeing of local people. There is an expanding evidence base that highlights the role that green space and nature can play in improving people's health and wellbeing, which is something that is echoed through the experiences of the Eden Project in Cornwall.	N/A during construction + during operation	Local residents	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.
Does the proposal connect with existing communities, i.e. layout and movement which avoids	Yes	The existing publicly accessible promenade and cycle routes will be retained to ensure permeability of the site is unaffected.	N/A during construction + during operation	Local residents and visitors	N/A during construction	N/A during construction	No further measures are

Assessment Criteria	Relevant to the proposed development?	Details and evidence	Potential Population and Health Impact	Population affected	Duration of change	Frequency or permanence	Further actions or mitigation?
physical barriers and severance and land uses and spaces which encourage social interaction?		The proposals include significant improvements to the public realm and landscaped areas surrounding the venue which will help to encourage greater social interaction and cohesion through providing spaces in which local residents can meet and socialise with one another. The public realm and open space will include seating areas, encouraging people to stop and interact with one another rather than simply passing through the space.			Long term during operation	Permanent during operation	considered necessary.
Does the proposal include a mix of uses and a range of community facilities?	Yes	The proposed development comprises a major mixed use leisure development including use classes E, F1, F2 and Sui Generis. The proposals include new areas of public realm and open space, including two outdoor gardens, for use by the public for free, serving as an asset for the local community. Landscaped gardens to the south and west of the site will provide significant public realm enhancements. The proposed development will also host ticketed music events up to eight times per calendar year. In addition, a restaurant will be accessible by the public without the need for a ticket to the venue.	N/A during construction + during operation	Local residents and visitors	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.
Does the proposal provide opportunities for the voluntary and community sectors?	Yes	Providing opportunities for volunteering is an aim of the Eden Project North development and it builds on its principle to become a core part of the local community. Although people choose to volunteer for a variety of reasons, from giving back to the community to learning a new skill, there is a growing body of evidence to suggest that volunteering improves mental health and more broadly has a positive impact on depression, life satisfaction and wellbeing. Given Eden Project North's focus on inclusivity, there is an opportunity to engage people across a broad range of different socio-economic and demographic groups, particularly the most disadvantaged members of the public.	N/A during construction + during operation	Local residents	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.
Does the proposal take into account issues and principles of inclusive and age-friendly design?	Yes	The development has been designed to enable access for all, including the provision level access to all entrances with ramps and lifts to provide vertical circulation to assist those with disabilities and the elderly.	N/A during construction + during operation	Visitors and staff at the site	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.

Table 16-18 – Health Determinant – Minimising the use of resources

Assessment Criteria	Relevant to the proposed development?	Details and evidence	Potential Population and Health Impact	Population affected	Duration of change	Frequency or permanence	Further actions or mitigation?
Does the proposal make best use of existing land?	Yes	The proposed development makes the best use of the land whilst working within the existing site constraints, including working with the existing levels and hard boundaries. The existing promenade and cycle routes will also be retained post-development.	N/A during construction + during operation	Local residents	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.
Does the proposal encourage recycling, including building materials?	Yes	The overall waste management strategy for construction and operational waste at the proposed development will follow the principles of circular economy, waste hierarchy and local and national waste policies. Waste reduction, reuse and recycling will be prioritised at each design stage and during construction and operation. A full grey water recycling system will be provided for Eden Project North. Water will be captured from hand wash basins and any internal systems of suitable quality. This will then be treated and reused for WC flushing and potentially irrigation. In addition, rainwater harvesting will also be used. This will be collected from the build area and the landscaping surrounding the proposed development. The system will utilise the stormwater attenuation tanks as storage, using future weather prediction to discharge some water ahead of a storm event to ensure there is sufficient capacity for the attenuation whilst also ensuring that rainwater storage is maximised.	N/A during construction + during operation	Local residents	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.
Does the proposal incorporate sustainable design and construction techniques?	Yes	Construction will be expected to follow at least best practice, with contractors being required to adhere to the Considerate Constructors Code or similar. At tender stage selected contractors will need to provide a preliminary Construction Environmental Management Plan (CEMP) and indicative programme. The preparation of a CEMP is an established method of managing environmental impacts resulting from demolition and construction works. The CEMP would be submitted to LCC (and other relevant bodies) prior to the commencement of the works. Compliance with the CEMP is anticipated to be secured by appropriate planning conditions or obligations, and the obligations contained within it passed onto the main contractors as 'Employer's Requirements' within the contract for the works.	N/A during construction + during operation	Local residents	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.

Table 16-19 – Health Determinant – Climate change

Assessment Criteria	Relevant to the proposed development?	Details and evidence	Potential Population and Health Impact	Population affected	Duration of change	Frequency or permanence	Further actions or mitigation?
Does the proposal incorporate renewable energy?	Yes	The proposed development will be an exemplar net zero or net positive development. The energy system design for Eden Project North has followed the Lean > Clean > Green approach. This process looks to maximise passive design opportunities with the heating and cooling provided in a clean and energy efficient way. Renewables are then used to offset the carbon produced in the provision of electrical power for the heat source. Further details of the renewable energy provision at the site are outlined in the Sustainability Statement, prepared by WSP Buro Happold which supports the planning application.	N/A during construction + during operation	Local residents	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.
Does the proposal ensure that buildings and public spaces are designed to respond to winter and summer temperatures, for example ventilation, shading and landscaping?	Yes	Natural Ventilation will be used in the summer to provide thermal comfort with low level intake openings and high level vents to expel the warm air. Experience from Eden Cornwall shows that even during winter, these systems are required as the biomes can become hot on clear sunny days. To avoid draughts and local discomfort, trench heaters are proposed to be used. The proposed biomes of Eden North are envisaged to be semi outdoors spaces with tempered internal conditions rather than fully conditioned spaces. Local micro climates will be created where there are visitors to ensure comfort.	N/A during construction + during operation	Visitors and staff at the site	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.
Does the proposal maintain or enhance biodiversity?	Yes	Significant biodiversity net gain – anticipated to be approximately 31% net gain.					
Does the proposal incorporate sustainable urban drainage techniques?	Yes	For the rainwater harvesting, it is envisaged that a blue roof system is utilised on the lower roofs, to store as much of the roofs rainwater runoff as possible. The remainder of the rainwater is proposed to be stored in an underground tank located below the arena. Rainwater will be harvested and reused as part of the site's irrigation demands. For the remaining surface water storage requirement, a number of SuDS systems are proposed in landscape/public areas. Rain gardens/swales are to be incorporated into the landscape with below ground storage in the form of gravel. Ponds and wetlands will be introduced in the southern areas to capture run off from the neighbouring walkways. Permeable paving is to be utilised in the north west corner of the site with granular storage below to attenuate additional surface water. As the storage available from these SuDS features is not sufficient to store all of the required volumes, it is envisaged that the remaining storage volume is proposed to be in the form of attenuation tanks.	N/A during construction + during operation	Local residents	N/A during construction Long term during operation	N/A during construction Permanent during operation	No further measures are considered necessary.

16.6. SUMMARY

16.6.1. This Population and Health assessment has been based on the details of the proposed development available at the time of writing, and on published data sources such as Census 2011 and NHS statistics. This assessment has followed the 'HUDU Rapid Health Impact Assessment Tool' matrix and has assessed the principal health benefits to the local community as:

- The creation of significant employment opportunities for local people through the construction and operation of the proposed development, in an area which suffers from high levels of unemployment. In addition, Eden is committed to training local people throughout both the construction and operation of the proposal.
- The proposed development seeks to improve education and skills among the local population, through collaborating with Lancaster University to devise and implement the innovative Morecambe Bay Curriculum for local primary schools. The curriculum seeks to achieve significant and lasting improvements to the lives of those living in the Morecambe Bay area and will ensure that the different stages of the education system provide the skills, knowledge and behaviours required for the future, helping to tackle the education inequality that exists in Lancaster district.
- The proposals will redevelop heavily underutilised and poor quality open space, leading to significant public realm improvements and the provision of two publicly permissible outdoor gardens.
- The provision of space in which temporary food, beverage and merchandise stalls can operate, helping to create opportunities for local businesses.
- The provision of a range of facilities to encourage the use of active travel for both staff and visitors, including secure cycle parking, showers and changing rooms, locker facilities and free e-bike battery charging while visiting Eden. In addition, active travel will be incentivised through benefits such as ticket discounts and Eden vouchers.
- An anticipated biodiversity net gain of approximately 31%.
- The creation of an exemplar net zero or net positive development.

16.6.2. The main potential negative health impacts are associated with construction phase air quality and noise. However, mitigation measures will be implemented to ensure any construction impacts are minimised. A Construction Traffic Management Plan (including shuttle transport for construction staff) and Construction Environmental Management Plan will be required by planning condition and will ensure the temporary impacts from construction are mitigated and managed as far as practicable.

16.6.3. It can therefore be concluded that the proposed development will overall have a positive impact on the health and wellbeing of the local population and future employees at the site.



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