eden project

# EDEN PROJECT NORTH
## DESIGN & ACCESS STATEMENT

AUGUST 2021

| Version | Date | Description | Content | Format | Prepared | Checked | Approved |
|---|---|---|---|---|---|---|---|
| 1 | 27.08.2021 | Submission for Planning | Design & Access Statement describing key principles of the project | A3 | OF | CR/AB | JB |

This Design & Access Statement Report, has been prepared by Grimshaw Architects with, and on behalf of, Eden Project International Ltd. with contributions from the additional following specialists:

- TEP: Landscape Design
- Buro Happold: Civils, Utilities, Engineering and MEP
- WSP: Transport, Planning and Environment
- Schlaich Bergermann Partner: Structural Engineering
- 3 Adapt: Sustainability Strategy
- Art of Fact: Experiential Design
- Charcoal Blue: Performance Engineering
- Trivandi: Project Management
- Rider Levett Bucknall: Cost Management

| Glossary of Terms | |
|---|---|
| Acronyms / Abbreviations | Description |
| AOD | Above Ordnance Datum |
| BoH | Back of House (venue ancillary & support spaces) |
| EPN | Eden Project North |
| HV | High Voltage Transformer Room |
| MEP | Mechanical, Electrical & Plumbing (Plant Rooms) |
| STR | Stairs |
| Key Experiential Spaces | Description |
| Above the Bay | Experiential zone integrating immersive large scale exhibits and live planting |
| Bay Glade | Horticultural exhibition space containing an indoor landscape in perpetual Spring |
| Below the Bay | Theatrical 'black box' experiential zone |
| Four Seasons Garden | External landscaped courtyard at the centre of the venue |
| Natural Observatory | Gallery space for engaging the public across various scientific research and educational programmes |
| Rhythm Garden | Flexible outdoor open space designed to host concerts and activities |
| Rhythm Machine | Enclosed experiential zone containing Above and Below the Bay |
| Seasonal Programming | An adaptable gallery space for changing & travelling exhibitions and events |
| Sensory Burrows | A series of immersive black box spaces set within the Below the Bay zone |
| The Bay Hall | Orientation and flexible exhibition space able to host large installations |
| Tide Garden | A sheltered, outdoor garden with a shallow pool; a place to relax, play and explore |

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SECTION 1

# Introduction

**Summary of the purpose and scope of the project and the structure of the Design and Access Statement.**



INTRODUCTION

# 1.1 DOCUMENT PURPOSE & STRUCTURE

1.0

### 1.1.1 Purpose of this Document

This Design & Access Statement (DAS) explains the design rationale for the Eden Project North in Morecambe, and to explain the proposals submitted for planning approval.

The DAS also describes how the design scheme has been informed by a rigorous process of assessment, collaboration, evaluation and consultation.

The planning application seeks 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 classes E, F1 and F2 and Sui generis), public realm, landscaping, car parking and associated engineering works**"




N7. "The Design and Access Statement" - LCC Planning Application Validation Guide

### 1.1.2 Document Structure

The structure of this document has been set up according to the latest Lancaster City Council guidance on DAS document structure including the 10 characteristics of well-designed places as set out in the National Design Guide. The report is organised into the following sections:

- **Context** assesses the physical context of the project's site as well as the planning policy and guidelines, in particular those associated with LCC. The relevant policies considered as part of the scheme are outlined below;
- Local Plan Part One: Strategic Policies and Land Allocations DPD adopted July 2020; and
- Local Plan Part Two: Development Management DPD adopted July 2020.

The proposals have also been assessed against the relevant national policy guidance including;

- National Planning Policy Framework(2019): and
- Planning Practice Guidance.
- **Building Design Concept** describes the proposed use, size, massing, layout, form, scale, aesthetics and materiality of the proposed scheme with a specific focus on the nature of the frontages as well as key features of the external envelope especially the shells in relation to the context and relevant parameters.
- **Landscape Design Concept** describes the public realm and landscaping proposals in detail. This is further described and illustrated in relation to the key contextual components of the Morecambe area.
- **Accessibility & inclusivity** considers the way people travel to, enter and exit the development, includes the servicing, parking, pedestrian and cyclist strategies.
- **Engineering & Sustainability** summaries the environmental, social and economic considerations that have influenced the design proposal inclusive of Engineering parameters to enable the delivery of the project. Description of the sustainability agenda and BREEAM targets are also described in detail.
- **Engagement** summarises the various methods and results of engagement with local authorities, stakeholders and the local community undertaken to date. It also touches on how comments received from the public have influenced the design process and early design iterations.

**Beauty Surrounds, Health Abounds, Nature Astounds**



# 1.2 EDEN PROJECT INTERNATIONAL



## The Client

Eden Project International Limited (EPIL) is a wholly-owned subsidiary of the Eden Trust, a UK-registered charity (number 1093070). It is an educational charity and social enterprise with a global mission to create and build relationships between people and the natural world to demonstrate the power of working together for the benefit of all living things. Eden Project's work is underpinned by the understanding that we need to live with the grain of nature and that everything is interconnected.

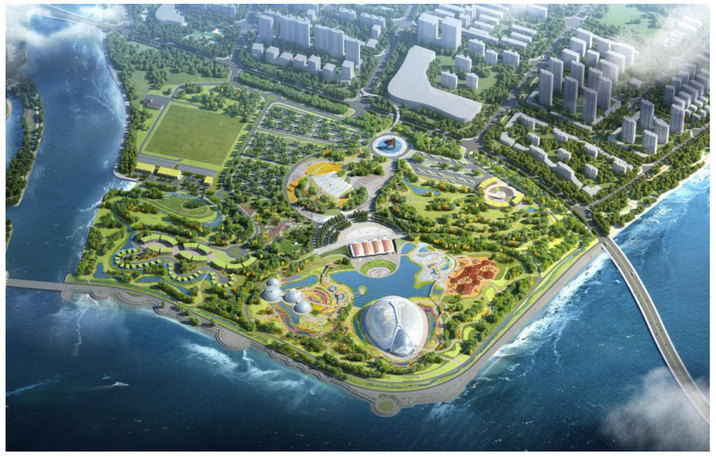
Eden Project was founded over twenty years ago, transforming a former china clay pit in Cornwall into an immersive experience of plants and people. The Eden Project Cornwall is a visitor destination but also a global garden to showcase dependence on plants and landscapes.

Regenerative sustainability is at the heart of the Eden Project vision and design ethos. Regenerative sustainability involves making things better, not just less bad; environmentally, socially and economically.

More recently the Eden Project is moving and developing locally, nationally and internationally in order to inspire citizenship over consumption and care for the planet across the world. EPIL was created to drive development activity and the establishment of Edens around the world.



Eden Project Cornwall. Clay pit site prior to Eden transformation in 1998



Eden Project Qingdao, China currently under construction



Eden Project Cornwall, UK



Proposed Eden Project Foyle, UK



# 1.3 EDEN PROJECT NORTH VISION



A visit to the seaside is a great British tradition. The original seaside resorts were centred on activities that drove health and wellbeing, wonder and entertainment. For many years Morecambe was one of Britain's most popular tourist destinations with visitors attracted by its stunning natural landscape.

Eden Project North is a unique and ambitious project that seeks to re-imagine the seaside resort for the 21st century. The project has far-reaching environmental, social and economic ambitions, but above all it will be a day out that inspires a sense of wonder and connection with the natural world.

Eden Project North shares much with the hugely successful Eden Project in Cornwall. It will be a ticketed visitor attraction that is sustainable and transformative. At its heart are large indoor environments, housed within iconic pavilions. It builds on Eden Project's particular mix of entertainment and education, leaving visitors with lasting memories as well as driving positive behavioural change.

As in Cornwall, Eden Project North combines exhibits, performance, learning, play, immersive experiences, world-class horticulture, art, food, beverage and retail spaces, all integrated as essential parts of the overall experience; building on nearly 20 years of operational expertise. Eden Project North will be a particular response to place and time as well as the global climate emergency.

Unique to Morecambe is Eden Project North's focus on natural rhythms – dictated by the Sun and Moon – and how they underpin the health and wellbeing of humankind and the natural environment on which we rely. These themes will be brought to life in a series of zones, each of which allows an intense and enjoyable experience.

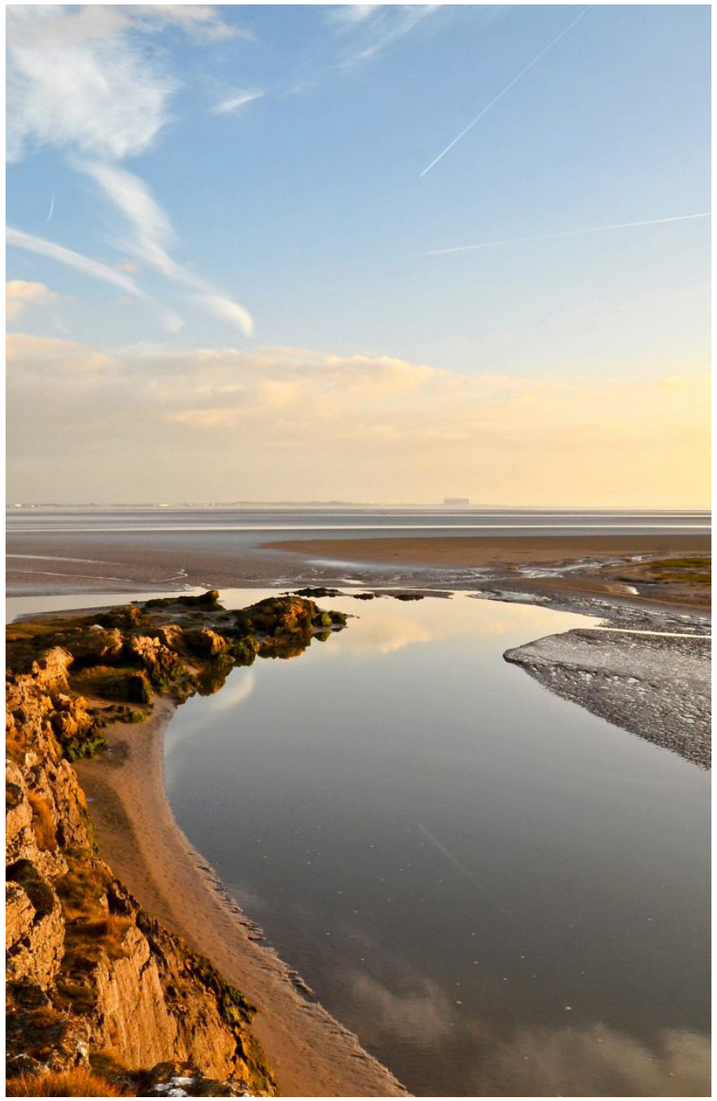
It will also be a place that is connected to the local community through its on-site and outreach activities – raising the level of aspirations and ambition to help support positive social and inclusive change. Eden Project North will also be a wet weather destination for tourists to the Lake District and Blackpool, complementing the existing tourism and also creating a destination for year-round breaks.

By encouraging visitors to be curious and creative, the expectation is to inspire new ways of engaging with the natural landscape; to see themselves as part of the natural world (the Bay), not apart from it, and to understand how they can individually and collectively impact on the health of the planet through their daily lives.

Content will include living plant exhibits, static and kinetic physical exhibits, experientially immersive environments using combinations of digital and physical media, and choices for visitors to experience tactile and sensory elements.

Eden Project North will create a new landmark for Morecambe enhancing the existing townscape and seascape of Morecambe Bay.

Eden Project Cornwall was developed and is operated as an educational charity by Eden Project Ltd under the Eden Trust. Eden Project North will be operated by Eden, in a similar way, with local staff.



Morecambe Bay

## 1.3 EDEN PROJECT NORTH VISION

# 1.0



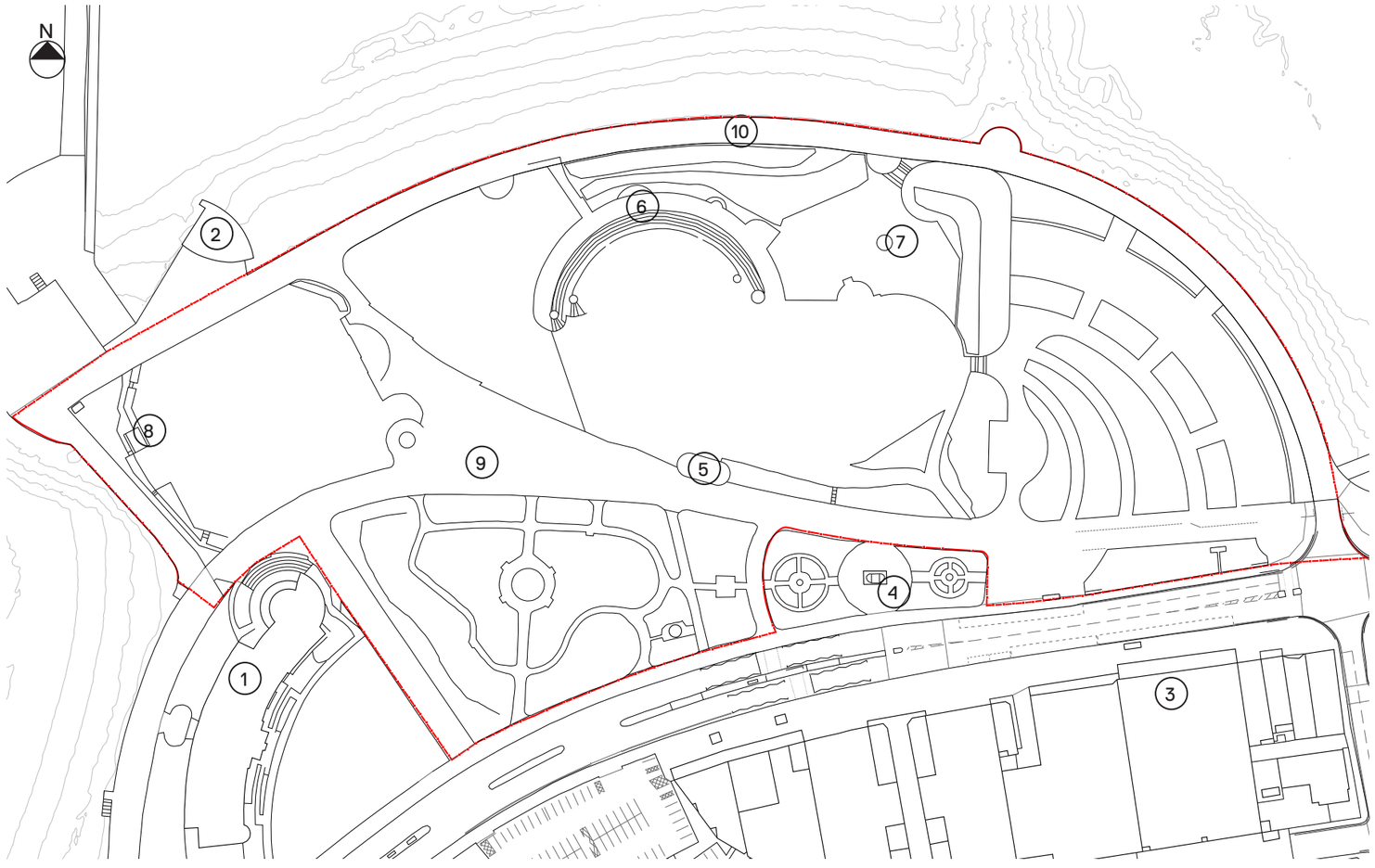
# 1.4 APPLICATION BOUNDARY



Eden Project North Planning Application Boundary

Key:

1 Midland Hotel
2 RNLI Building
3 The Winter Gardens
4 War Memorial
5 Public Convenience (Existing)
6 Amphitheatre (Existing)
7 Pump House (Existing)
8 Electrical Substation (Existing)
9 Promenade (Existing)
10 Sea Front Promenade (Existing)




0 25 50 100m

# 1.5 REFERENCES



### Application Documentation

This application seeks planning permission with details of appearance, landscaping, layout and scale as set out in the accompanying information. To fully appreciate the overall intent, this report should be read in conjunction with the following documentation,

- Planning Application Form
- Application Cover Letter

Planning Drawings **[Architecture]**

- Site Location Plan
- Existing Site Plan
- Proposed Demolition Layout
- Existing & Proposed Site Levels - Section
- Existing Site Topographical Survey
- Proposed Site Plan
- Proposed Site Layout
- Proposed Site Access Plan
- Proposed Lower Ground Floor Level [+3.5m & +4.5m]
- Proposed Ground Floor Level [+7.72m & +8.5m]
- Proposed First Floor Level [+11.72m & +12.72m]
- Proposed Roof Plan
- Proposed Elevations 01 [North & South]
- Proposed Elevations 02 [West & East]
- Proposed Elevations in Context

Planning Drawings **[Landscape]**:

- Landscape General Arrangement
- Tide garden & Western Space Layout
- Arena & Seasonal Support Space Layout
- Journey Space Layout [Frontage Area South of Prom]
- Northern Coastal Edge Layout
- Surfacing Proposal Plan
- Boundary Treatment Plan
- Section 01 - Through Rhythm Gardens (Arena)
- Section 02 - Through Northern Coastal Edge
- Section 03 - Through Tide Garden
- Section 04 - Through Journey Space

Other Supporting Documents **[Various]**:

- Environmental Statement
- Planning Statement
- Statement of Community Involvement [SCI]
- Lighting Strategy
- Drainage Strategy
- Utilities Statement
- Waste Management Strategy
- Energy and Sustainability Statement
- Transport Assessment

SECTION 2

# Context

**Assessment of the physical context of Morecombe Bay as well as the planning policy and guidelines. This section sets the scene in terms of the unique project location, accessibility and connection.**

# 2.1 NATIONAL, REGIONAL & LOCAL CONTEXT



Eden Project North will be situated in the historic Lancashire seaside town of Morecambe, which lies approximately 3 miles west of the City of Lancaster and just to the south of the Lake District National Park.

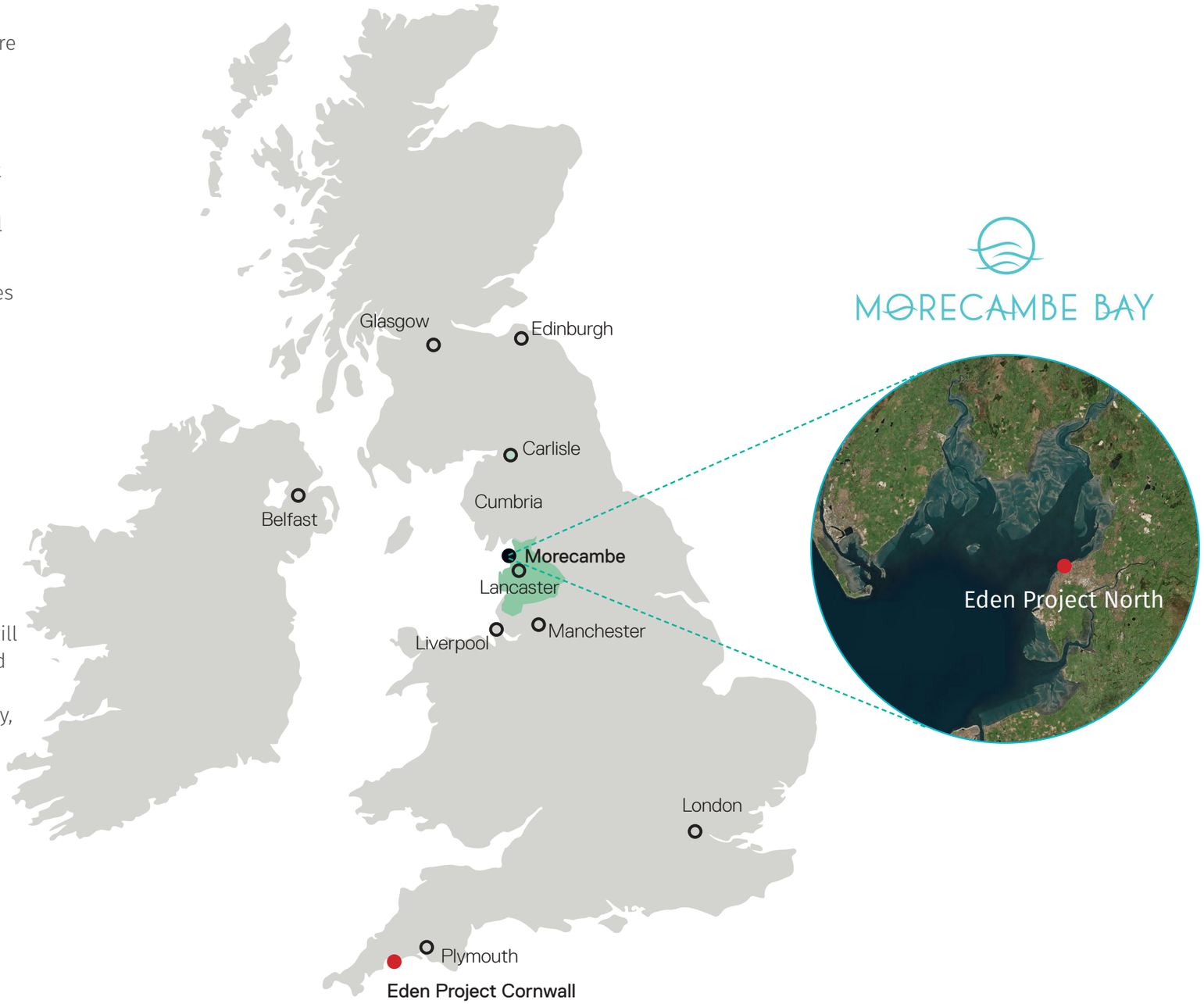
The main venue will be located on a prominent water front site of approximately 4 hectares that provides fantastic views of Morecambe Bay – a large tidal estuary and natural asset of international importance.

Around 320,000 people live along the coastline communities of Morecambe Bay and Morecambe itself has a population of approximately 35,000.

The site is easily accessible from several nearby major UK cities, including Liverpool and Manchester with over 10 million people living within a 2 hour catchment.

As well as providing a catalyst for the regeneration of Morecambe,  Eden Project North supports current UK Government economic, environmental and social policy objectives including Northern Powerhouse, 'levelling-up', Coastal Communities, and Climate Change.

Once operational, it is envisaged that Eden Project North will attract up to 1 million visitors per annum with an estimated average of 760,000 per annum.  Eden Project North has been designed to accommodate 3,750 visitors on a peak day, and a maximum of 750 visitors per hour accessing the site. Timed ticketing protocols will be implemented to control visitor flows.

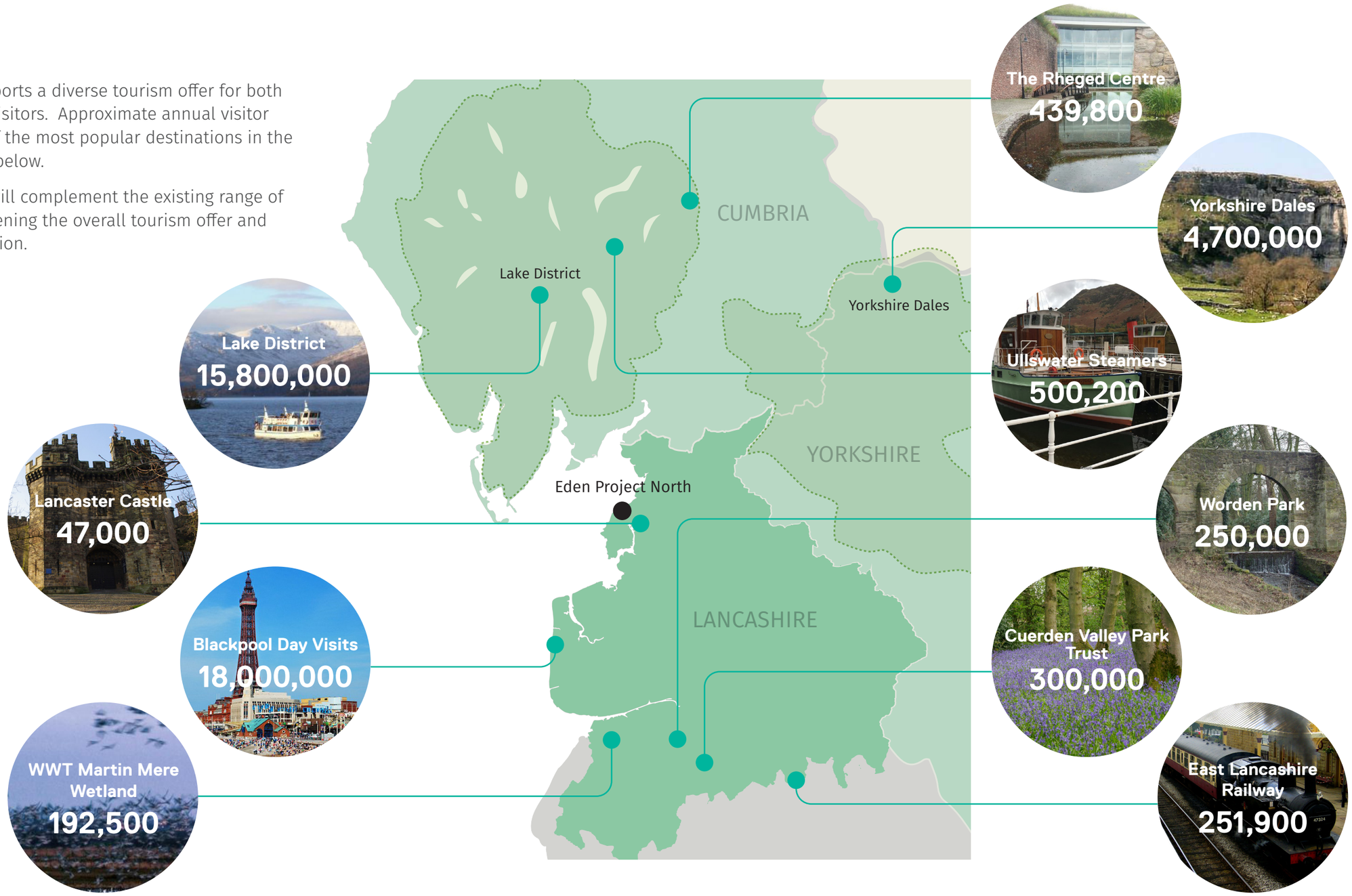


# 2.1 NATIONAL, REGIONAL & LOCAL CONTEXT



The North-West supports a diverse tourism offer for both over-night and day visitors. Approximate annual visitor numbers for some of the most popular destinations in the region are provided below.

Eden Project North will complement the existing range of attractions, strengthening the overall tourism offer and reputation of the region.



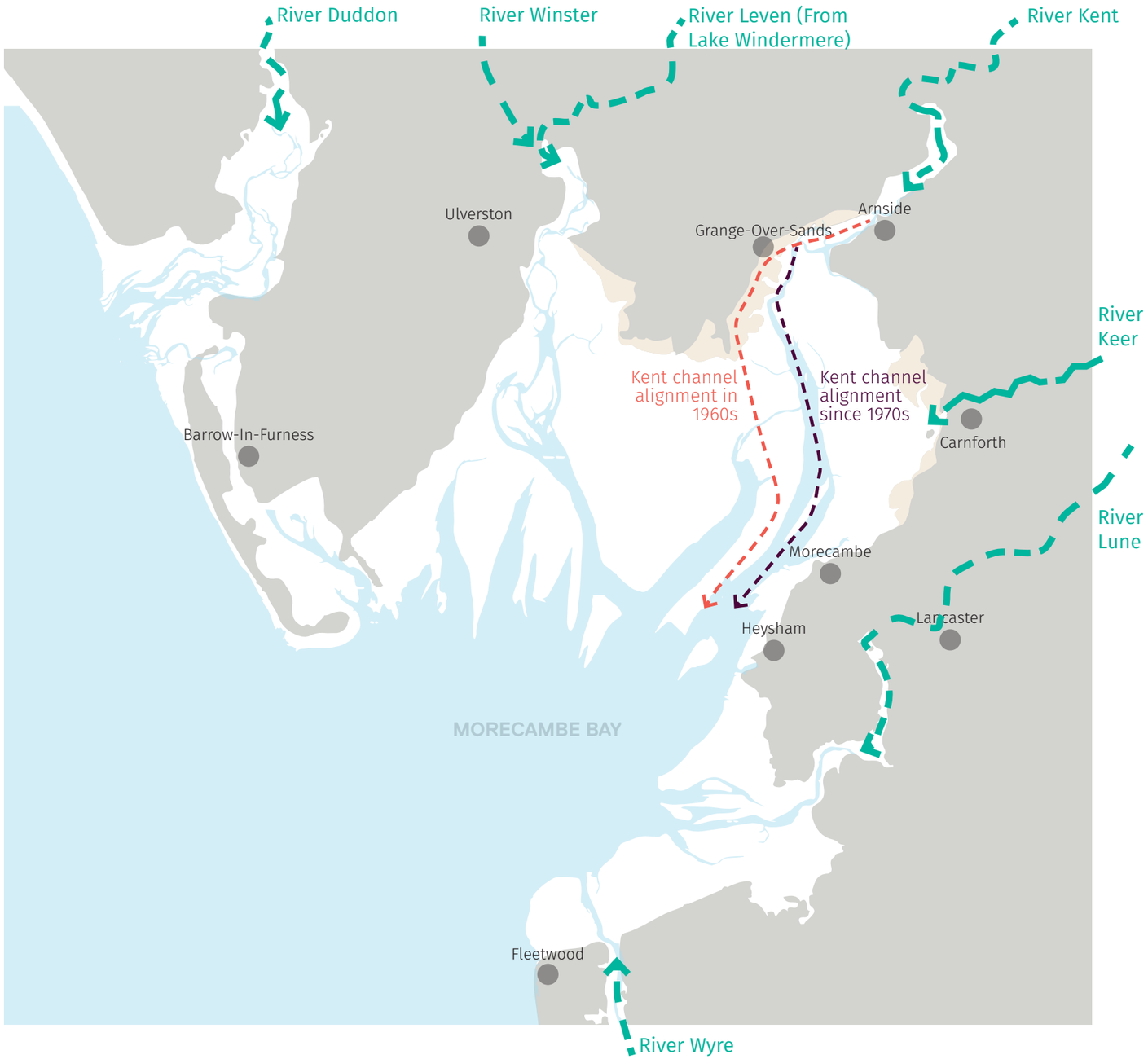
# 2.1 NATIONAL, REGIONAL & LOCAL CONTEXT

2.0

The bay is the largest inter-tidal area in the UK, and contains estuaries of the river Leven, Kent, Keer, Lune and Wyre.

Morecambe Bay is protected under a number of Environmental Designations:

- RAMSAR - An international treaty for the conservation and sustainable use of wetlands.
- SSSI - Sites of special scientific interest (SSSIs) are protected by law to conserve their wildlife or geology.
- SAC - Special Areas of Conservation (SACs) are strictly protected sites designated under the European Comission (EC) Habitats Directive.
- SPA - Special Protection Areas are strictly protected sites classified in accordance with Article 4 of the EC Birds Directive.
- SPA/SAC supporting habitats - Habitats shown to be important to a species or an assemblage of species in the designated SPA/SAC area.
- Priority habitats - Most threatened sites requiring conservation action under the UK Biodiversity Action Plan (UK BAP).



CONTEXT

# 2.1 NATIONAL, REGIONAL & LOCAL CONTEXT

2.0

The Eden Project North site is situated within the Morecambe Conservation Area, which was designated in June 2003.

According to the The Morecambe Conservation Area Appraisal (Adopted September 2008) the Conservation Area comprises four main character areas:

### Central Attraction Area

A focal point of the Conservation area predominantly leisure area with larger scale buildings and urban realm.

Eden Project North will be located within this character area on a vacant waterfront site adjacent to the Midland Hotel and War Memorial.

### Victoria Street/ Edward Street

Residential area characterised by terraced streets with small scale retail at street level, and at a larger scale the Church of St Laurence.

### Green Street to Euston Road

Busy retail/commercial area with active units facing the seafront along the promenade.

### Poulton

An historic village, primarily residential with a number of community functions such as schools, public houses and several churches.



# 2.1 NATIONAL, REGIONAL & LOCAL CONTEXT



The Central Attraction Area and immediate setting around the Eden Project North site contains several listed buildings and heritage assets, most notably the Midland Hotel and Winter Gardens Theatre (both Grade II* listed buildings).

The Grade II listed war memorial is also in close proximity to the site, but outside of the ownership boundary. The war memorial garden is not listed, but may be deemed to be historically significant.

Conservation Area Boundary

Listed Buildings:

1 Midland Hotel
2 Morecambe Promenade Railway Station
3 War Memorial
4 Station & Lighthouse
5 The Winter Gardens
6 217, 219, 221 Marine Road
7 Church of St Laurence
8 Barclays Bank
9 The Clock Tower
10 Queens Hotel, 274 Marine Road
11 1 Deansgate (Mona House)
12 Morecambe Central Methodist Church
13 333-343 Marine Road
14 The Morecambe Hotel
15 Morecambe Town Hall
16 Telephone Exchange (Recently listed)

(Refer to Morecambe Conservation Area Appraisal 2008 for full list)

Eden Project North Site






The Midland Hotel
(Grade II* Listed)



The Winter Gardens
(Grade II* Listed)



The War Memorial
(Grade II Listed)



The Littlewoods and Woolworth Buildings
(non-designated heritage assets)

# 2.2 SITE HISTORY & DEVELOPMENT

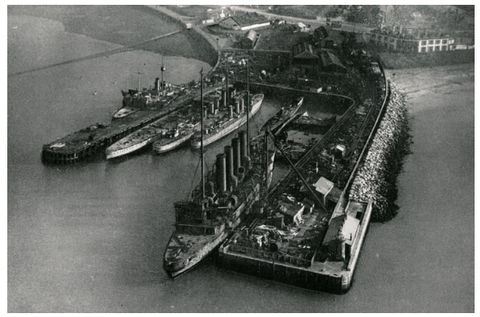


The project site is located on reclaimed land that has been gradually extended out and previously built upon. The diagram opposite illustrates the seafront profile over time:

- The natural coastline in 1844 before the construction of the railway and harbour.
- The railway and harbour stone jetty constructed in 1846 and operational until 1928.
- The site was significantly built out for the construction of Morecambe Lido in 1936, with a capacity for 1,200 bathers and 3,000 spectators. It was closed in 1975.
- A new outdoor pool site - 'Bubbles' - was opened on the site in 1979 (closed in 1999).
- Rock armour sea defence work and extension of the stone jetty was carried out in the mid 1990s.

Further details of the current ground conditions are provided later in this section.





Morecambe Harbour (1905-1933)


Morecambe Lido (Circa 1960)


'Bubbles' Swimming Pool (Circa 1979)

## 2.3 EXISTING SITE CONTEXT

# 2.0



## 2.3 EXISTING SITE CONTEXT



Due to its prominent central seafront location, the existing site is recognised in the Morecambe Area Action Plan as a development opportunity site with strategic importance. Further details on the relevant Planning Policies related to development of site are provided in section 2.4.

The site is currently vacant, and provides public outdoor amenity, with grassed areas and a large concrete amphitheatre at the lower level.  The site connects directly to key pedestrian and cycling routes along the promenade.

The site is easily accessible from Morecambe train station, primarily along the Flock of Words, or alternatively Northumberland Street.

Marine Rd Central runs along the southern edge of the site, with several prominent buildings facing the promenade.  The Midland Hotel is located to the west, at the junction point of the Stone Jetty.  The promenade runs along the northern edge of the site providing excellent views towards the south lakes.



Existing Pedestrian Route through the Site (Looking West)




Frontages Opposite the Site on Marine Rd Central



View from the Stone Jetty Looking towards the RNLI Building



Existing Promenade Looking West



Beach and Promenade (Looking East)

# 2.4 PLANNING CONTEXT



## Relevant Planning Policy & Standards

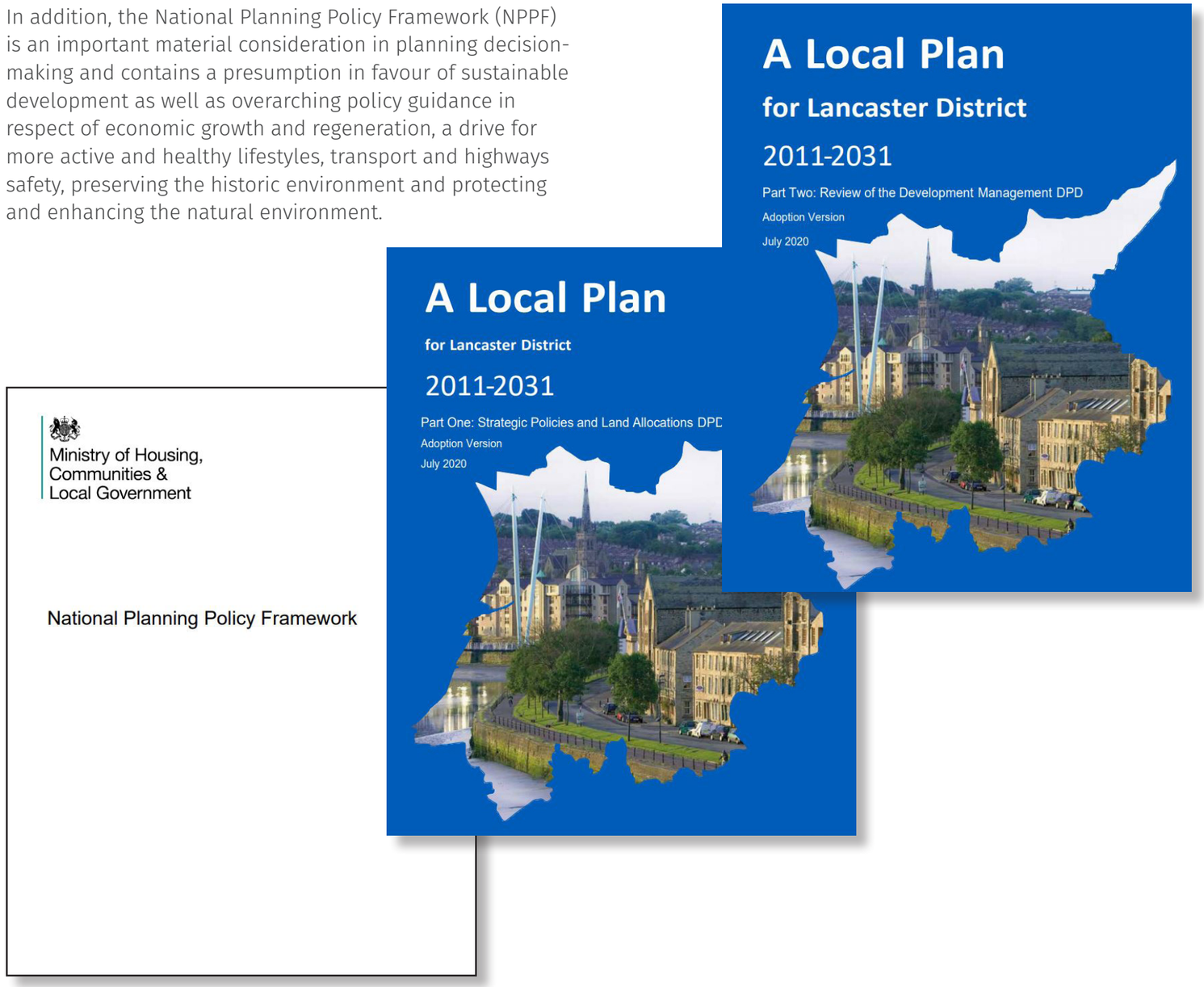
This chapter describes how our proposals for Eden Project North meet with National, Regional and Local Planning Policies.

Section 38(6) of the Planning and Compulsory Purchase Act 2004, states that planning decisions must be made in accordance with the Development Plan unless material considerations indicate otherwise.

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 of 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".

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.



# 2.4 PLANNING CONTEXT



Morecambe Area Action Plan (2014)

| Policy | Description |
|---|---|
| Policy DO2 (Strategic Leisure - Seafront Headland, Central Promenade) | Designates the site as a strategic opportunity for leisure investment. Leisure uses will be supported where they relate well to heritage assets and Main Seafront and Promenade, they contribute to improving the public realm and provide appropriate vehicle access, servicing and parking. |
| Spatial Policy SP1 (key pedestrian routes and spaces) | Confirms the key routes and spaces for pedestrians within central Morecambe, as set out in the Local Plan Proposals Map. It states that buildings which front onto these key routes should relate well to these networks and surrounding space. |
| Spatial Policy SP3 (Morecambe Main Seafront and Promenade) | Specifies that development must be of a high quality, enhance the open character and bring forward opportunities for informal recreation. The policy seeks to protect the Bay from adverse effects resulting from development. |

Lancaster Local Plan Part One – Strategic Policies & Land Allocations Development Plan Document (2020)

| Policy | Description |
|---|---|
| Policy SP4 (Priorities for Sustainable Economic Growth) | Sets out the economic priorities over the plan period. The policy states that the Council will seek to support development which improves the "retail, leisure and cultural heritage offers which enhance areas such as the Morecambe Seafront, for the benefit of residents and visitors." |
| Policy SP8 (Protecting the Natural Environment) | Recognises the importance of and seeks to protect biodiversity and geodiversity within the district. |
| SP10 (Improving Transport Connectivity) | States that development should be in "sustainable locations that ensure a range of transport options and seek to reduce the need to travel". |
| Policy EC5 (Regeneration Priority Areas) | Identifies Central Morecambe as a Priority Area of sub-regional importance. Tourism, housing development and heritage led regeneration will re-invent Morecambe as a visitor destination "that draws on its natural and built heritage and its coastal location". |
| Policy TC1 (The Retail Hierarchy for Lancaster District) | Identifies Morecambe as a key service centre, where regeneration will continue to enhance the town's retail role and attractiveness as a visitor destination. |
| Policy TC4 (Central Morecambe) | Introduces the Morecambe Area Action Plan DPD and sets out the document's key aims of conserving the Bay, integrating the seafront and town, create an improved town centre and increase the support of local people in custom of the town centre. The policy states development will be supported which will regenerate derelict and underused land within Central Morecambe. |
| Policy EN1: Conservation Areas | Development in the Morecambe Central conservation area will be considered against their impacts on the local character of the area and, in particular Policies DM38 and DM39 of the Development Management DPD. |
| Policy EN9: Environmentally Important Areas | Morecambe Bay and Duddon Estuary, and Morecambe Bay Pavements are designated as Special Protection Areas (SPA), Special Conservation Areas (SAC) and RAMSAR sites due to their environmental importance. |
| Policy SC4: Green Space Networks | Morecambe promenade & Heysham promenade and coastline are identified as a green space network which will be protected from development, which would cause inappropriate harm and damage to their value and integrity. |
| Policy SC5: Recreation Opportunity Areas | Through future development proposals the Council will investigate the potential to provide significant new or improved open space in Central Morecambe (via the Morecambe Area Action Plan DPD). |
| Policy T1: Lancaster Park and Ride | The policy will protect Land at M6 Junction 33 and 34 for the purposes of park and ride. |

Lancaster Local Plan Part Two – Development Management Policies DPD (2020)

| Policy | Description |
|---|---|
| Policy DM22 | Sets out proposals for major leisure facilitates will be permitted where<br>The site within an identified town centre boundary, in accordance with policy EC5 (Regeneration Priority Areas) of the Strategic Policies & Land Allocations DPD, which can provide a catalyst for regeneration within the locality; or<br>Supported by a specific site allocation in the Strategic Policies & Land Allocations DPD; or<br>Part of an identified direction of mixed-use growth set out elsewhere within the local development plan. |
| Policy DM26: Public Realm and Civic Space | Sets out that the Council expect development proposals to make a positive contribution to their surroundings. This should be achieved through the use of 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. |

## 2.4 PLANNING CONTEXT



| | |
|---|---|
| Policy 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 policy sets out a range of criteria which development will be expected to meet, including;<br><br>■ Contribute positively to the identity and character of the area through good design, having regard to local distinctiveness, appropriate siting, layout, palette of materials, separation distances, orientation and scale;<br><br>■ Ensure there is no significant detrimental impact to amenity in relation to overshadowing, visual amenity, privacy, overlooking, massing and pollution;<br><br>■ Ensure that safety and security are fully considered through the design process;<br><br>■ Promote diversity and choice through the delivery of a balanced mix of compatible buildings and uses;<br><br>■ Create buildings and spaces that are adaptable to changing social, environmental, technological and economic conditions;<br><br>■ Be accessible to all sectors of the community, including people with disabilities;<br><br>■ Promote and enhance access and permeability by creating places that connect with each other and existing services, and are easy to move through;<br><br>■ Maximise opportunities for cycling and walking linkages through and to/from a site to promote sustainable healthy travel;<br><br>■ Provide sufficient landscaping areas / buffer zones and appropriate levels of open space provision to mitigate development impacts on adjoining sensitive users; and<br><br>■ Minimise impacts on air quality (including odour), noise and light pollution. |
| Policy DM30: Sustainable Design | Confirms that the Council will encourage development to deliver high standards of sustainable design and construction through a range of measures. |
| Policy DM21: Air Quality Management and Pollution | Sets out that all developments must demonstrate that they have sought to minimise the levels of air polluting emissions generated and adequately protect their new users, and existing users, from the effects of poor air quality. |
| Policy DM32: Contaminated Land | Planning permission will only be granted whereby it has been demonstrated that the development site will be suitable for the proposed use without risk from contaminants to people, buildings, services or the environment. |

| | |
|---|---|
| Policy DM33: Development and Flood Risk | States that new development in areas at risk of flooding will be required to meet a range of criteria including producing a Flood Risk Assessment (FRA) and ensuring suitable mitigation measures are put in place. New developments must not increase the risk of flooding in the locality. |
| Policy DM34: Surface Water Run-Off and Sustainable Drainage | The Council will ensure that surface water is managed sustainably within new development. Proposals for all new development should implement sustainable drainage systems. |
| Policy DM35: Water Supply and Waste Water | Development proposals must take into account the demand for off-site water service infrastructure. In particular, developers will be required to demonstrate that there is adequate waste water capacity on and off the site to satisfactorily serve the development. |
| Policy DM36: Protecting Water Resources and Infrastructure | States that new development, amongst other criteria must not have a detrimental impact on surface water and groundwater quantity and quality caused by water run-off into nearby waterways and not have a detrimental impact on the quality and standard of bathing water in the locality. |
| Policy DM37: Development Affecting Listed Buildings | Sets out the Council's approach to development affecting heritage assets. In summary, 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.<br><br>Any harm (substantial or less than substantial) will only be permitted where this is clearly justified and outweighed by the public benefits of the proposal. |
| Policy 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. A series of criteria must be complied with. Substantial harm to the Conservation Area will not be permitted unless it can be demonstrated that the substantial loss or harm is necessary to achieve substantial public benefits that outweigh the harm or loss.<br><br>Where a development proposal will lead to less than substantial harm to the significance of the Conservation Areas, this harm should be weighed against the public benefits of the proposal. |
| Policy DM39: The Setting of Designated Heritage Assets | The Council will look for opportunities for new development within the setting of heritage assets to enhance or 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. |
| Policy DM42: Archaeology | Development proposals should conserve or enhance those elements which contribute towards the significance of a Scheduled Monument or an archaeological site of national importance. Harm to such elements will only be permitted where it is clearly justified and outweighed by the public benefits of the proposals. |

## 2.4 PLANNING CONTEXT



| | |
|---|---|
| Policy DM43: Green Infrastructure | The thrust of the policy is 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.<br><br>Development proposals should incorporate new and/or enhanced amenity green spaces of an appropriate type, standard, size and reflects the needs / deficiencies for the area. |
| Policy DM44: The Protection and Enhancement of Biodiversity | Confirms that the Council will support proposals where the primary objective is to conserve or enhance biodiversity and/or geodiversity or where development proposals provide better opportunities to secure management for the long-term biodiversity and geodiversity enhancement.<br><br>Development proposals should protect and enhance biodiversity and/or geodiversity, to minimise both direct and indirect impacts. |
| Policy 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.<br><br>New development should positively incorporate existing trees and hedgerows. |
| Policy DM46: Development and Landscape Impact | States that the Council will attach great weight to the protection of nationally important designated landscapes. 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. |
| Policy DM53: Renewable and Low Carbon Energy | Confirms that the Council will seek to maximise the renewable and low carbon energy generated in the District where this energy generation is compatible with other sustainability objectives. The Council will support proposals for renewable and low carbon energy schemes. |
| Policy DM57: Health and Well-being | Recognises the importance of health and wellbeing. The Council will expect development in the district to promote health and well-being and contribute to addressing health inequalities. To do this, development should seek to deliver health benefits to all sections of society but must focus proportionately more to benefiting those lower down the social gradient.<br><br>The Council will require the submission of Health Impact Assessments for major schemes of more than 100 housing units or 10,000sqm for commercial uses where they are considered to have potential impacts on health and well-being. |
| Policy DM58: Infrastructure Delivery and Funding | Sets out that development proposals and infrastructure provision will be co-ordinated to ensure that growth within the district is supported, where necessary, by the provision of infrastructure, services and facilities that are required to maintain and enhance the quality of life and responds to the needs of local people, the local environment and the local economy. |
| Policy DM60: Enhancing Accessibility and Transport Linkages | The Council will seek to ensure that development proposals, particularly those that will generate significant footfall and motorised vehicle journeys, are located where sustainable travel patterns can be achieved. This will seek to ensure that higher density mixed-use developments are located in accessible centres or in close proximity to main public transport routes.<br><br>Proposals should minimise the need to travel, particularly by private car, and maximise the opportunities for the use of walking, cycling and public transport. A number of criteria must be met. |
| Policy DM61: Walking and Cycling | The policy encourages development proposals to maintain and improve pedestrian infrastructure and the Public Rights of Way (PROW) and green infrastructure network and ensure that no adverse impacts are created for the pedestrian environment.<br><br>Development that will generate a significant level of footfall should be located within central or highly accessible locations, which provide good access for pedestrians.<br><br>For cycling, development proposals should also encourage greater opportunities for cycle users through good design, and deliver appropriate cycle access. Proposals should also include appropriate linkages to the existing cycle network and secure and covered cycle parking and storage facilities. |
| Policy DM62: Vehicle Parking Provision | Sets out that proposals must incorporate car and cycle parking that meets the Council's set standards. |
| Policy DM63: Transport Efficiency and Travel Plans | Sets out that the Council will support proposals that maximise opportunities for the use of sustainable modes of travel.<br><br>Development proposals will be supported where a Travel Plan can demonstrate that appropriate mitigation measures can be achieved, and a clear approach is identified to deliver such measures. |
| Policy DM64: Lancaster District Highways and Transport Masterplan | Confirms that proposals by their scale, location and nature must not compromise the delivery of strategic highway and transport improvements in the district. |

# 2.4 PLANNING CONTEXT



### NPPF

The following paragraphs and sections of the NPPF are considered relevant to the proposal.

### Achieving Sustainable Development

Sustainable development means meeting the needs of the present without compromising the ability of future generations to meet their own needs (paragraph 8). The planning system has three overarching objectives in achieving sustainable development: economic, social and environmental.

Planning should play an active role in guiding development towards sustainable solutions, but in doing so should take local circumstances into account, to reflect the character, needs and opportunities of each area (paragraph 9).

At the heart of the NPPF is the 'presumption in favour of sustainable development' ("the presumption") set out at paragraph 11, which establishes the planning principles in pursuing sustainable development in a positive way. Where the development plan is absent, silent or relevant policies are out-of-date, permission should be granted unless 'any adverse impacts of doing so would significantly and demonstrably outweigh the benefits'.

### Building a Strong, Competitive Economy

Paragraph 81 encourages a strong, competitive economy where: "Planning policies and decisions should help create the conditions in which businesses can invest, expand and adapt. Significant weight should be placed on the need to support economic growth and productivity, taking into account both local business needs and wider opportunities for development. The approach taken should allow each area to build on its strengths, counter any weaknesses and address the challenges of the future. This is particularly important where Britain can be a global leader in driving innovation, and in areas with high levels of productivity, which should be able to capitalise on their performance and potential."

### Vitality of Centres

Paragraph 86 sets out that planning policies and decisions should support the role that town centres play at the heart of local communities, by taking a positive approach to their growth, management and adaptation. Planning policies should define a network and hierarchy of town centres and promote their long-term vitality and viability – by allowing them to grow and diversify in a way that can respond to rapid changes in the retail and leisure industries, allows a suitable mix of uses and reflects their distinctive characters.

### Promoting Sustainable Transport

Paragraph 104 requires transport issues to be considered from the earliest stages of development proposals, so that the potential impacts on transport networks can be addressed; opportunities from existing or proposed transport infrastructure, technology and usage are realised; opportunities to promote walking, cycling and public transport use are identified and pursued; the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account; and patterns of movement, streets, parking and other transport considerations are integral to the design of schemes and contribute to making high quality places.

Paragraph 111 makes clear development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe.

### Making Effective Use of Land

Paragraph 120 states development decisions should give substantial weight to the value of using suitable brownfield land for identified needs, and support appropriate opportunities to remediate despoiled, degraded, derelict, contaminated or unstable land.

### Achieving Well Designed Places

Paragraph 126 states that the creation of high quality, beautiful and sustainable buildings and places is fundamental to what the planning and development process should achieve. Good design is a key aspect of sustainable development, creates better places in which to live and work and helps make development acceptable to communities. Effective engagement between applicants, communities, local planning authorities and other interests is essential.

Paragraph 130 ensures that developments will function well and add to the quality of the area; are visually attractive as a result of good architecture, layout and appropriate and effective landscaping; are sympathetic to local character and history, including the surrounding built environment and landscape setting; establish or maintain a strong sense of place; accommodate and sustain an appropriate amount and mix of development including green space and support local facilities and transport networks; and create places that are safe, inclusive and accessible and which promote health and wellbeing.

## 2.4 PLANNING CONTEXT



Paragraph 132 states that applicants should work closely with those affected by their proposals to evolve designs that take account of the views of the community. Applications that can demonstrate early, proactive and effective engagement with the community should be looked on more favourably than those that cannot.

Paragraph 134 sets out that significant weight should be given to:

a) development which reflects local design policies and government guidance on design, taking into account any local design guidance and supplementary planning documents such as design guides and codes; and/or

b) outstanding or innovative designs which promote high levels of sustainability, or help raise the standard of design more generally in an area, so long as they fit in with the overall form and layout of their surroundings.



# 2.5 SOCIAL & ECONOMIC CONTEXT OVERVIEW



Eden Project North is fully aligned with current government national social and economic policies:

### Contributing to "Levelling up"

The Morecambe Bay area contains areas that currently experience high levels of deprivation; some areas of Morecambe are within the top 10% most deprived in England, and half are within the 20% most deprived in terms of employment deprivation.

The development of Eden Project North in Morecambe will provide a catalyst for investment in the town and wider region across multiple sectors, contributing to the Government's commitment to levelling up economic performance and opportunities across all nations and regions of the UK.

### Regeneration Through Quality of Place

A key ambition of the Northern Powerhouse is to capitalise on the North of England's offer of an outstanding quality of life, which attracts tourists, businesses and investors from around the world. This mirrors Eden Project North's own vision to create activities and facilities that change perceptions, enlighten and connect people to the unique environment of Morecambe Bay.

Eden Project North will provide transformational improvement to the existing site with a high quality design that will complement and rejuvenate the townscape and heritage of Morecambe.

### Covid Recovery

Eden Project North can positively contribute to the recovery from the COVID related economic crisis. In the near term, as a large high-profile capital investment, its construction 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.

### Creating Successful Sea Side Towns.

The 2019 Parliamentary Select Committee report on regenerating seaside towns examined the challenges facing seaside resorts: a decline in their core industries; their location on the outer boundary of the country which places them on the periphery of the economy; and the consequential social problems and outcomes.

Eden Project North is referenced in the report and presents a strong response to achieving future success, with relevance to five of the seven solutions outlined:

- The employment and retention of young people within the local economy;
- Investment from central government must be focused on supporting sustainable, long-term regeneration, not piecemeal, short term initiatives;
- Local Enterprise Partnerships support in seaside regeneration where it is most needed;
- Support and celebration of the natural environment; and
- Review and develop a mixed economy.

Through these channels, Eden Project North aims to help Morecambe reclaim its position as a resort for the 21st Century.

A detailed Socio-Economic Assessment and Population & Human Health Assessment is contained within the Environmental Statement.

# 2.6 EXISTING ECOLOGY AND BIODIVERSITY



The site is adjacent to Morecambe Bay and Duddon Estuary Special Protection Area, which supports the third largest number of wintering wildfowl in Britain. The Bay is part of a series of west coast estuaries of outstanding importance for numerous species of passage, breeding and wintering water birds.

Morecambe Bay is also designated as a Special Area of Conservation, a Ramsar site and a Site of Special Scientific Interest (SSSI), on account of its coastal habitats and bird assemblages.

The new buildings and landscape will occupy land which is currently hardstanding, amenity grass, ornamental shrubs and some trees, comprising largely non-native species. There are no “habitats of principal importance” for biodiversity on the site.

The site is generally publicly accessible and does not support any protected species. It is rarely used by any wader or wildfowl species associated with the protected habitats of Morecambe Bay. There are two structures on the site which could support bat roosts, but no actual roosting occurs.

Thus the development site itself is of very little ecological interest, whilst it adjoins an inter-tidal and marine area of international importance, and there is a real opportunity through the development of Eden Project North to improve the current biodivesity value of the site.

Ecological surveys have been carried out from 2019 to the present day, and a detailed review of literature and ornithological data from Morecambe Bay has been carried out. Consultations with Natural England and local wildlife and ornithology specialists have occurred.

The ecological assessment has established which areas of inter-tidal habitat near the site are regularly used by flocks of important bird species and where high-tide roosting occurs.

Moderate numbers of wader species occasionally roost on the flood defence structure directly adjacent to the north east of the site at high tide, such as turnstone, oystercatcher and redshank.

Only low numbers of waders and wildfowl were regularly recorded to feed or “loaf” on inter-tidal habitat within 250m of the site. In the wider area, large groups of feeding and roosting knot and oystercatcher were recorded. Large numbers of roosting waders were consistently recorded at the Regent Road Groyne and the Battery Groyne between 700m and 1.2km south west of the site.



Oystercatcher



Knot



Knots



Waders

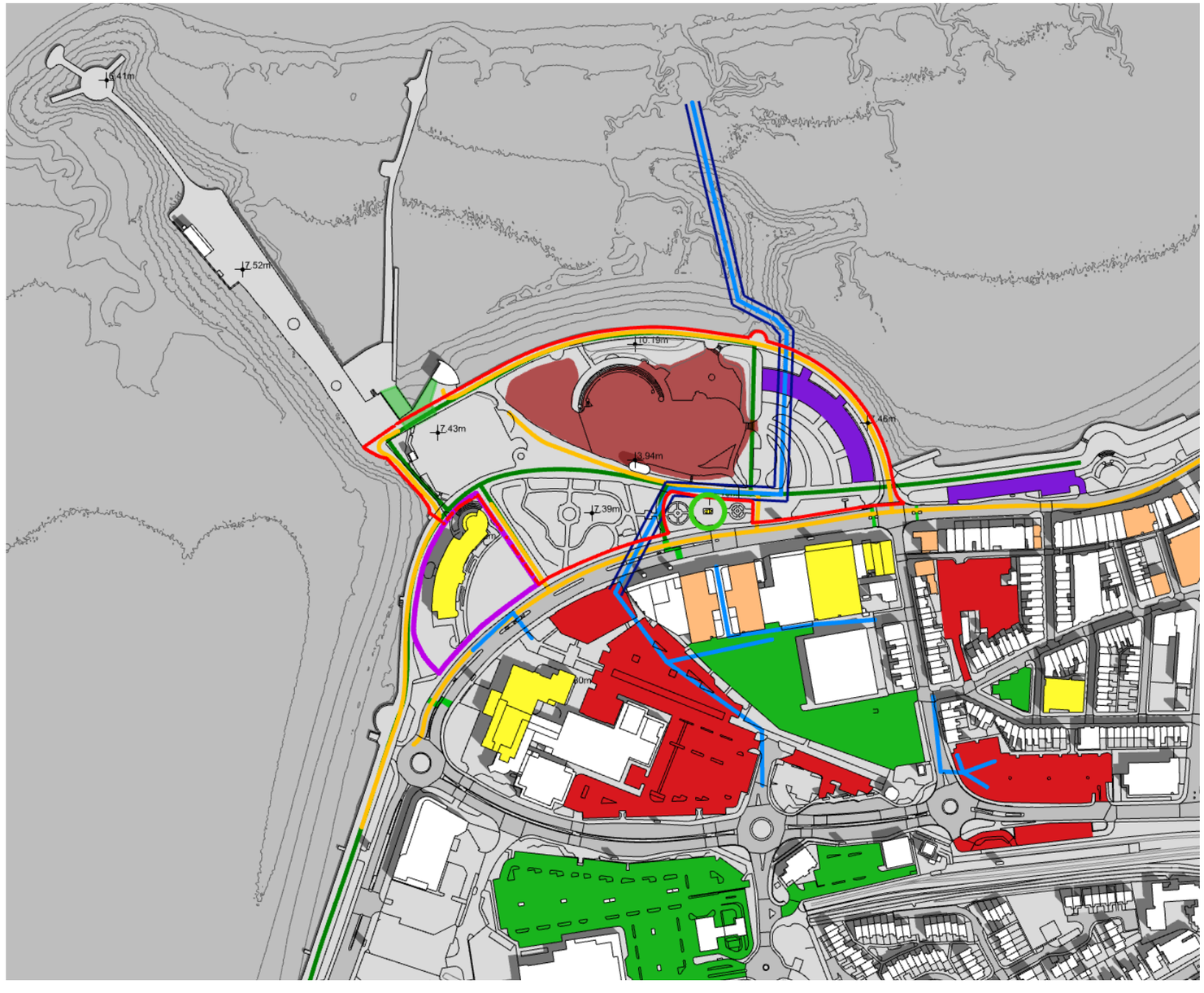
# 2.7 EXISTING SITE CONDITION



The design of Eden Project North has been heavily influenced by the existing site context and constraints. The building has been carefully shaped in response to its surroundings and to enhance the waterfront, taking into account existing site conditions.

This section outlines the key physical site constraints that have informed the proposals for the venue and surrounding public realm.

The plan shown right provides an overview of the key existing site features and constraints. The subsequent pages of this section look at some of these in more detail, with an explanation of their relevance to the design of the project.




## Key

### Existing Drainage Infrastructure

- Existing Culvert
- Recommended Standoff Zone

### Existing pedestrian routes and crossings

- Pedestrian Route
- Pedestrian Crossings

### RNLI Vehicle Movements

- Current Access Route
- Turning Zone for Primary Launch Site

### Car Parks

- Long Stay
- Short Stay
- Private/Customer

### Listed and unlisted buildings of note

- Listed
- Unlisted
- War Memorial (Grade II)
- Midland Hotel, Wall & Piers (Grade II)

# 2.7 EXISTING SITE CONDITION



### Topography & Site Contours

The Site is relatively flat with levels between +7m and +8m Above Ordnance Datum (AOD). There is a lower area at the centre of the site (approx. +4m AOD) and a raised area to the north (approx. +10m AOD).

In order to minimise earthworks the design strategically makes good use of the existing topography to reduce cut & fill as much as possible; helping to reduce waste produced during construction and also the embodied carbon of the building.  The proposed layout and floor levels of the venue have been developed to maximize ease of access, create dramatic internal spaces, and to provide visual connections to outside where required.

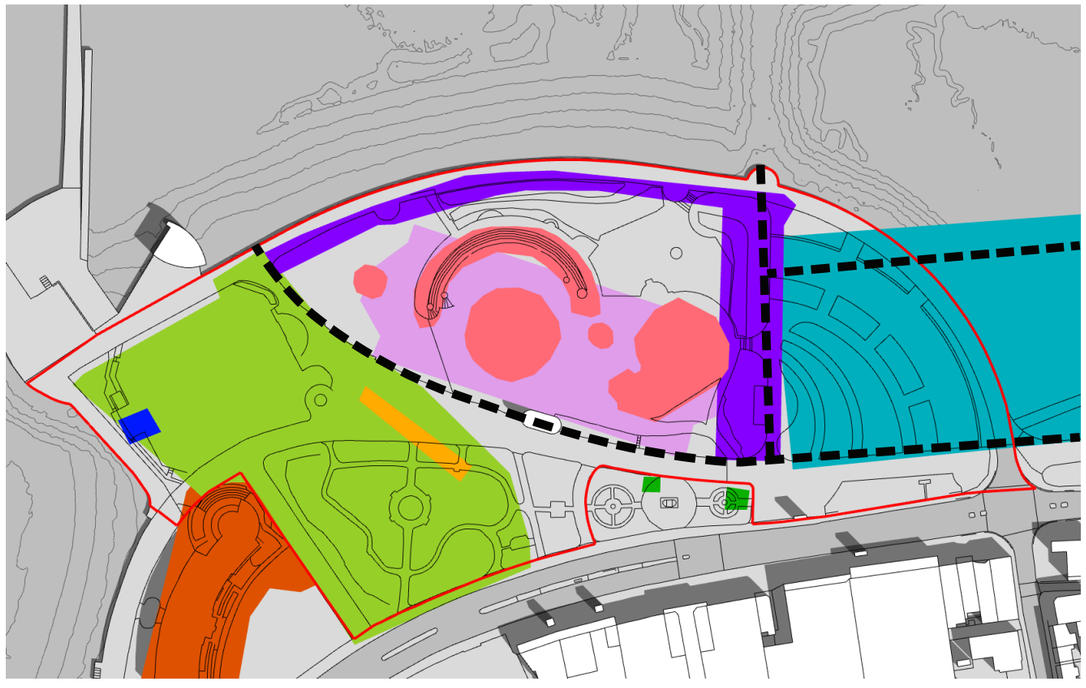



+10m AOD approx.
+4m AOD approx.

### Ground Conditions & Exiting Structures

The Site is underlain by a bedrock of Millstone Grit Group – Mudstone, Siltstone and Sandstone.  There are small Bank Deposits – Sediment, Shells to the north and Storm Beach Deposits – Gravel can be found along the south-east of the Site.

Identifying the location and composition of historical structures has been a key consideration for the design layout with the goal of minimising embodied carbon of the building. As an example of this, the existing stepped amphitheatre has been considered as a constraint to keep this feature as part of the internal layout of the building.



1884 - North Western Hotel
1889 - Railway Building
1889 - Railway Sidings
1913-1933 - Rain Gauge
1931 - Paddling Pool
1937 - Band Stand
1937 - Embankment/Promenade
1937 - Swimming Baths
1961 - Bubbles Leisure Park
Various phases of historic coastline/seawall. Unclear if removed or in-situ. Large obstruction risk.

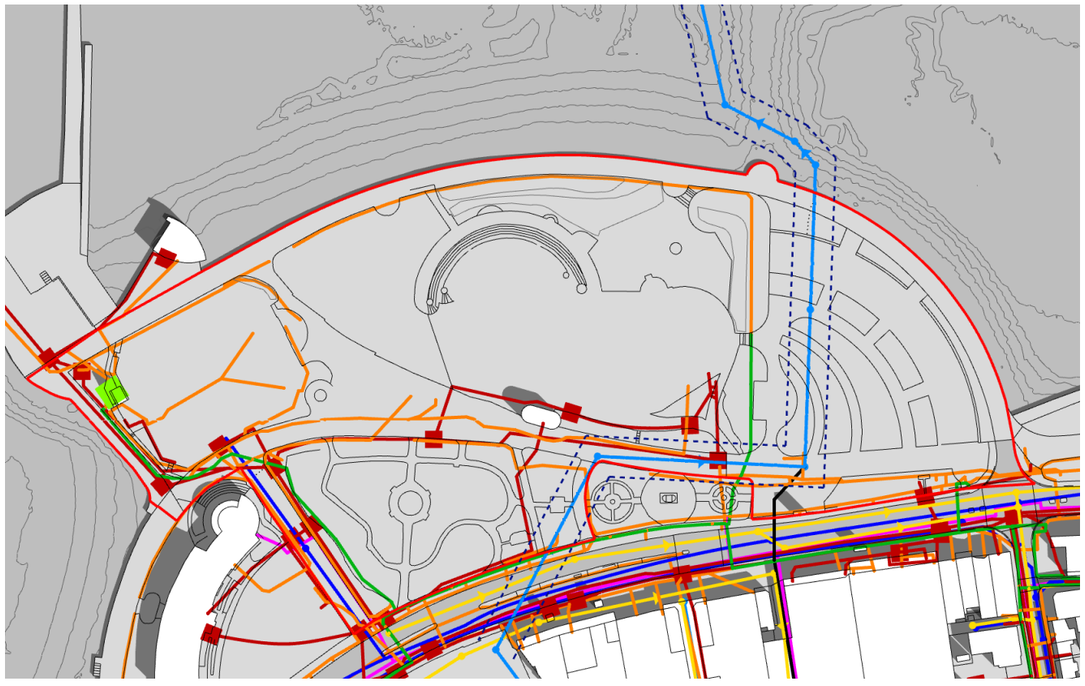
# 2.7 EXISTING SITE CONDITION

2.0

### Existing Utilities

There is an existing below ground water course that crosses the east end of site, with a recommended stand-off zone of 8m. The main building has been located to avoid this culvert.

There is an existing sub-station building at the west end of the site.  This is proposed to be re-located within the main building as part of the enhancements to the urban realm and landscape.

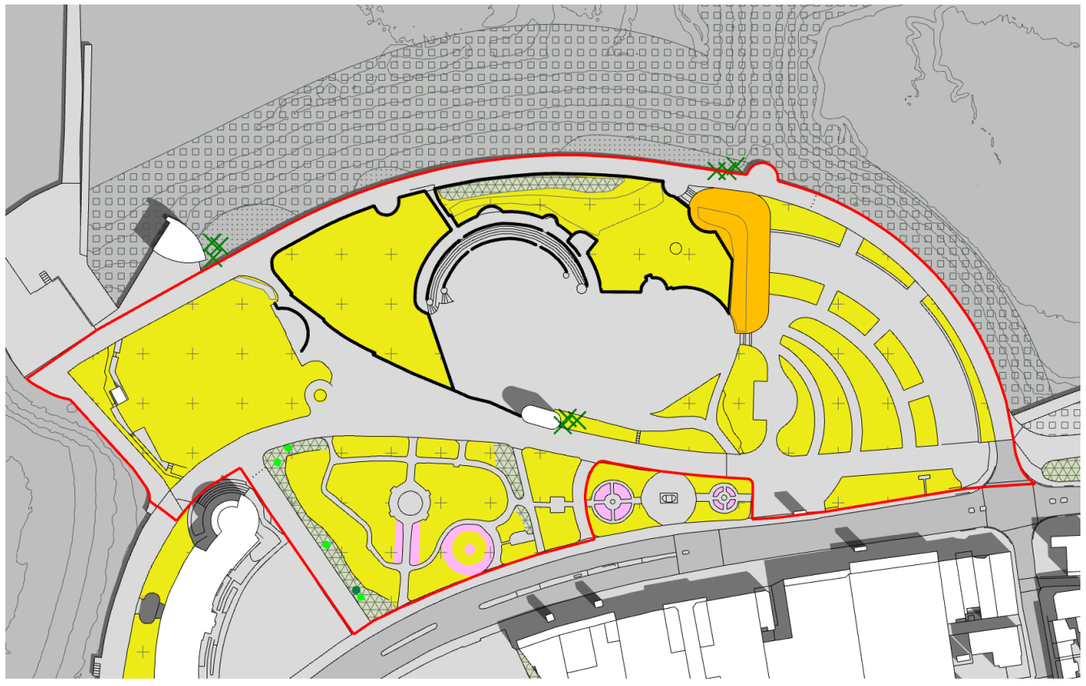


Recommended Standoff Zone
Surface Water Drainage
Combined Foul & Surface
Abandoned Pipe
6kV-6.6kV
LV
Substation
Gas
Potable Water
Telecoms

### Plants & Ground Surface Materials

The plan below shows the existing plants and ground surface material.

Consideration to ecological value of this habitat has been carried out, and in accordance with Eden Project North's regenerative sustainability strategy, to inform proposals that will improve  the existing biodiversity of the area.



Hardstanding with ephemeral short perennials
Boulders
Scattered Shrubs
Scattered Coniferous Tree
Scattered Broad Leaved Tree
Modified neutral grassland
Wall
Hard Standing
Building
Flower Bed
Introduced Scrub
Amenity grassland

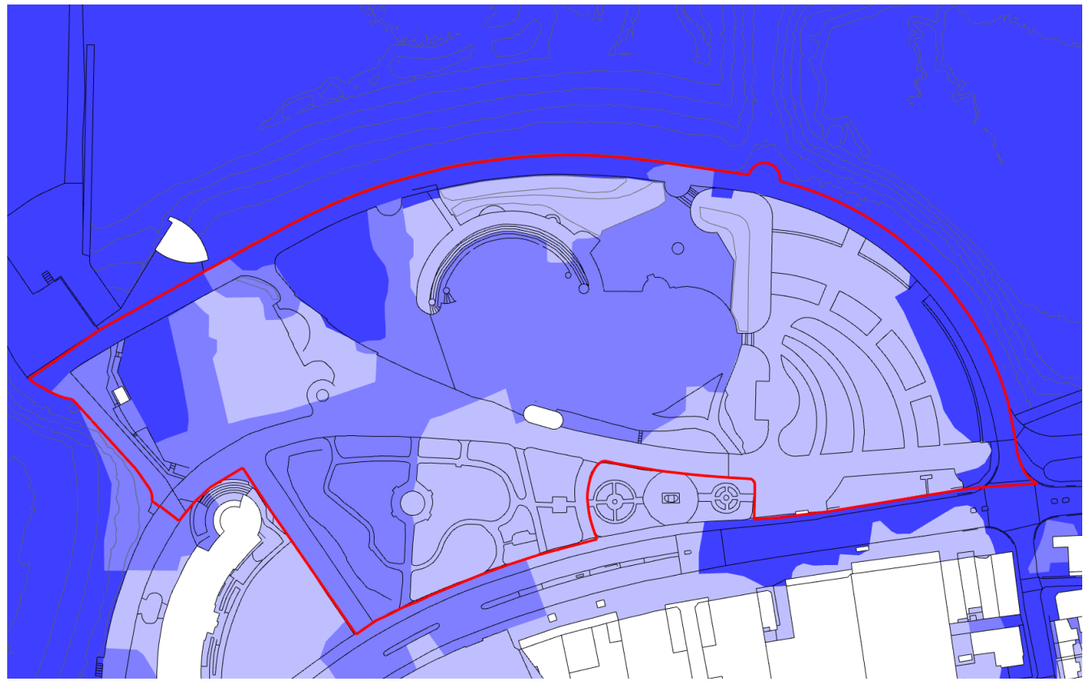
# 2.7 EXISTING SITE CONDITION



### Flood Risk

The Environment Agency's Flood Map for Planning shows the Site lies in Flood Zone 1, 2 and 3. Subsequently, the current risk of fluvial/tidal flooding to the Site is considered to be 'high'. Sea level rise as a result of future climate change may also increase the risk of flooding to the site in future.

Further detail on Flood Risk can be found in the Environmental Statement. Consideration of future flood scenarios has informed the setting of primary levels in the building and other design features to minimise the risk of operational disruption in a flood event.



Zone 1

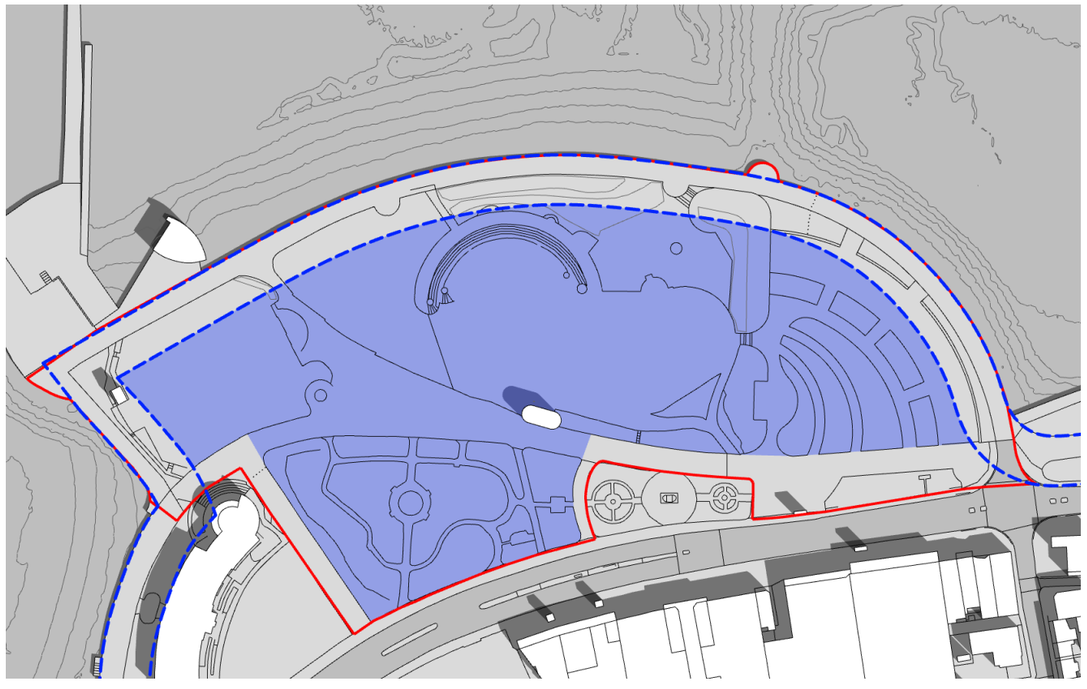
Zone 2

Zone 3

### Existing Flood Defences

To enable access and maintenance to the flood defence infrastructure, the Environment Agency (EA) requires permanent non-moveable elements to be at least 16m away from the landward toe of the flood defence to allow for any future construction/raising works in line with increased flood risk from climate change. In addition, the EA has recently spent £11M upgrading seawall and flood defences in Morecambe.

This requirement has informed the siting and layout of the building, allowing public access along the promenade to be maintained and creation of an enhanced landscape along the northern edge of the building.



16m offset from primary flood defence

Area of site suitable for built structures

SECTION 3

# Building Design Concept

**Descriptions of the proposed use, layout and scale of the development in relation to the context and parameters. The public realm and landscaping proposals are explained in relation with the local planning policies.**

# 3.1 OVERVIEW

3.0

### 3.1.1 Building in Context

This chapter describes how the design of Eden Project North has been inspired by, and developed in response to, the unique setting of the site to create an exemplary piece of architecture that is highly appropriate for its prominent location on the Morecambe seafront.

The architectural, functional and environmental concepts for the building are all highly contextual and the proposed design has been created through careful consideration of not only how it relates to, but can positively enhance the existing townscape and seascape character.

The following pages illustrate and explain how the design of Eden Project North will create a new landmark for Morecambe that activates the surrounding public realm and external landscape on all sides whilst ensuring that the existing nearby heritage buildings, primarily the Midland and Winter Gardens, maintain their significance within the Central Attraction Area.




**Proposed Development:**
**1. Eden Project North Planning Application Boundary**
**2. Eden Project North Main Building**
**3. Tide Garden**
**4. Rhythm Gardens**
**5. Energy Field**

**Existing Buildings / Features:**
**6. Morecambe Train Station**
**7. The Flock of Words (Main Approach Route to Eden Project North)**
**8. The Midland Hotel**
**9. The Winter Gardens**
**10. The War Memorial**
**11. The RNLI Building**
**12. Festival Market**
**13. Morecambe Clock Tower**
**14. The Arndale Shopping Centre**

# 3.1 OVERVIEW



### 3.1.2 Design Synopsis

The design of the building has responded to a number of influences, including:

- A regenerative design approach, where techniques are pursued that reduce embodied and operational carbon, minimise energy demand and, where possible, contribute positively to the environment;
- A concept of biophilia, where the building is inspired by nature, adopting forms in order to improve the efficiency of its structure and use of materials;
- A design for the visitor experience that establishes specific requirements for the building and landscapes, and;
- The surrounding context of built form and natural landscape, and the specific constraints and opportunities of the site.

The following pages explain how these considerations have influenced the proposed design, which is then described in more detail in later sections.




## Key Aspirations



**A Unique, Landmark, Attractor**

- Inspired by nature
- There is a story behind the building that reflects Eden “ethos”
- Beautiful world-class architecture



**A design that is relevant to its context**

- Belongs to Morecambe and its sea side context
- Interface between Town and Sea
- Follows curved line of Promenade and Midland Hotel



**A design that responds to natural rhythms of the site**

- Cultural rhythm, Daily rhythm, Tidal rhythm, Lunar rhythm, Seasonal rhythm



**Functional Design**

- Form responds to its function
- Durable and hard wearing
- Relatively low maintenance



**A design that is Efficient and Regenerative**

- Structural Efficiency (Lightweight long span structure)
- Resource Efficiency and Efficient Use of Materials
- Biophilia embedded in building design
- Low operational cost
- Carbon Neutral and Biodiversity Net Positive



**A Design that is Affordable and Flexible**

- Cost Effective
- A Flexible design that responds to changing programmes and safeguards for future expansion / change

# 3.2 KEY DESIGN DRIVERS



### 3.2.1 Regenerative Design Principles Overview

To support this approach a regenerative sustainability framework has been developed for the project.

This 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.

The framework vision and objectives are presented in the image opposite.



# 3.2 KEY DESIGN DRIVERS



### 3.2.2 Architecture in Harmony with the Nature of the Bay

Inspired by the unique coastal setting of the Bay, the architecture of Eden Project North is informed by both the beauty and efficiency of nature.

The design concept reflects how 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.

In this way, a beautifully engineered colony of lightweight shell structures will create spaces for unique visitor experiences, as well as making Eden Project North an exemplar of sustainability through efficiency of structure and minimisation of material.

The proposed design can be divided into two core types of space, that function differently from both a structural and programmatic context.

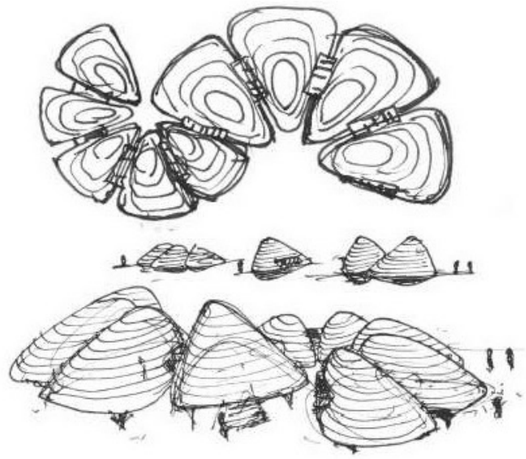
- **Shells** - the colony of gridshell structures containing the principal visitor experience areas.
- **Dunescape** – the lower part of the building that connects the shells to the ground and contains visitor circulation and ancillary spaces, and that links the building to its surrounding context.

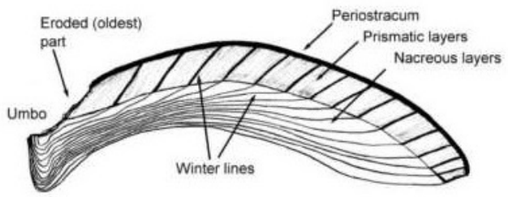


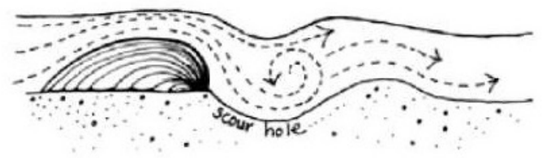
A Colony of Shells nestling on a 'Dunescape'

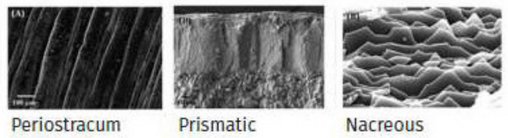


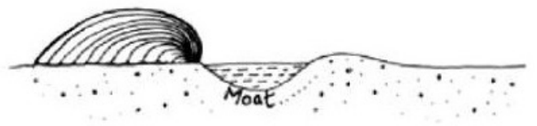


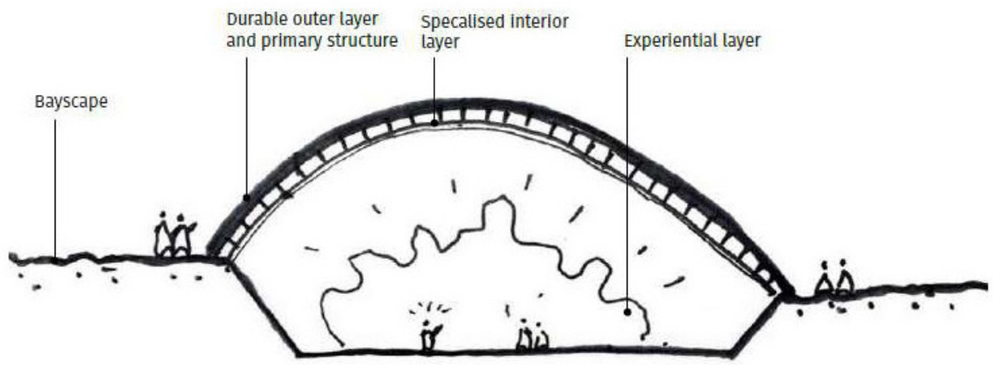




# 3.2 KEY DESIGN DRIVERS



### 3.2.3 Regenerative Sustainability

Sustainability and Regenerative Design have been at the forefront of the design agenda of Eden Project North, and as such, expressing and showcasing this approach in the building and landscape for visitors to learn has been a priority.

The following list summarises the key goals of our regenerative design approach, with examples of how the design responds to these goals:

**1. Minimise Embodied Carbon**

Choice of low carbon materials across the scheme has been key for the design of the building. In this way, the Shells and Dunescape parts of the building are designed to use timber as the primary structural material, having calculated that this has a significantly lower carbon 'cost' when compared to steel and concrete alternatives. Other key features aiming to reduce the embodied carbon of the building include:

- Maximise use of existing structures and topography
- Shells designed with an efficient long span lightweight structure
- Use of innovative lightweight envelope
- Reduction of glazing facades
- Responsible material sourcing (Living economy sourcing)

**2. Minimise Operational Energy**

The design establishes large daylit internal spaces for the gathering of large numbers of visitors; these spaces optimise solar heat gains and maximise the potential for natural ventilation in order to reduce the energy required to operate the building.

**3. Minimise Carbon in Energy Supply & Value Chain**

The remaining energy requirement for the operation of the building uses a combination of integrated photovoltaic panels, heat pump technologies and green tariff supplies to ensure that operational carbon is minimised.

**4. Resilient & Adaptable to Future Change**

The principal floor levels and external landscape have taken into account predicted flood events, and environmental modelling for internal spaces will reflect predicted rises in annual temperatures.

**5. Minimise Waste & Maximise use of Recycled Components**

The design of the shells optimises the form such that the amount of timber required for structure is minimised.
All parts of the building are designed to enable off-site fabrication of components to help manage supply and waste streams.

**6. Improve On-Site Water Management**

The Dunescape is designed to help manage the surface water run-off from the Shell roofs and, together with the adjacent landscaped spaces, will help to attenuate surface water flows.

**7. Enhance Ecology & Biodiversity & Improve Health & Well-Being**

The proposals will significantly enhance the site through new gardens within the building, planting incorporated on the Dunescape roof, and a number of gardens around the building.

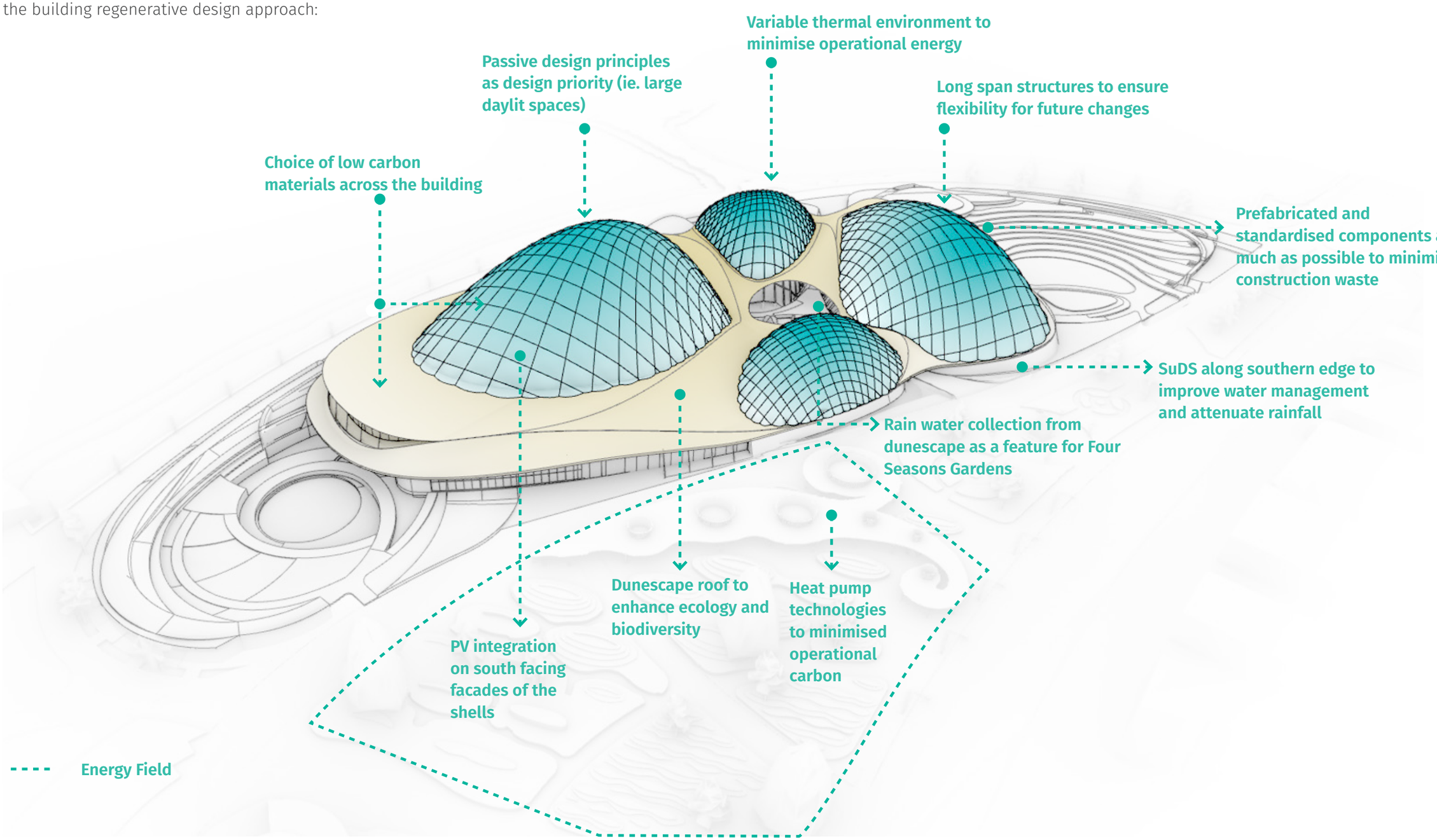
**8. Express Approach to Regenerative Design**

Photovoltaic panels integrated into the south facing parts of the Shell roofs, and heat pumps showcased in an 'Energy Field' adjacent to the main visitor entrance routes, will enable the regenerative design story of Eden Project North to be effectively presented to visitors and passers-by.

## 3.2 KEY DESIGN DRIVERS



The following diagram illustrates some of the key features of the building regenerative design approach:



## 3.3 EXPERIENTIAL DESIGN APPROACH



Eden Project North will connect visitors to the world around them, and to see it through the lens of ‘rhythms’. These themes will be brought to life in a series of zones, each of which allows an intense and enjoyable visitor experience, and together offer choice to visitors. It brings together:

**Rhythm Machine:**

› **Above the Bay**

A spectacular hyper-real forest, fusing live plants with large-scale structures, installations, kinetic sculptures, immersive experiences and special effects to create a changing and evolving indoor landscape with a year-round comfortable and sheltered climate. These elements will be choreographed to bring to life solar cycles, such as seasonality and circadian rhythms.

› **Below the Bay**

An immersive theatre set that regularly changes from light to dark as a full moon rises on a sped-up cycle, throughout the day. Within this world are embedded installations, play and black box experiences that bring to life lunar rhythms and tides, and the creatures that live below Morecambe Bay.

**The Bay Hall**

The orientation space in the visitor journey is a great hall, offering flexible space for exhibitions and large installations, as well as being the base for a range of guided activities, trails and programmes.

**Food Experiences**

A range of venues for visitors to come together around food that is inspired by the produce and heritage of Morecambe Bay and the region. Cafés and food outlets are embedded within the project zones, and to take advantage of the extraordinary views across the Bay.

**Bay Glade**

An indoor landscape of perpetual spring with a focus on wellbeing for people and planet.

**The Natural Observatory**

Facilities dispersed across the project zones to showcase cutting-edge scientific research and Eden Project educational programming, along with a series of collaborations between art and science that engage the public in an innovative way.

**Seasonal Programming Space**

An indoor flexible space that hosts Eden’s seasonal programme, performance, traveling exhibitions, and events.

**The 4 Seasons Garden**

An outdoor, flexible open space that connects the 4 main shells

**The Rhythm Garden**

An outdoor, flexible open space to host concerts and activities.

**Tide Garden**

A sheltered, outdoor garden with a shallow pool; a place to relax, play and explore

These zones have been formed into an arrangement of 4 Shells: Rhythm Machine (containing ‘Above the Bay’ and ‘Below the Bay’), Natural Observatory (containing that component above a Seasonal Programming space) with large panoramic window, Bay Glade and Bay Hall. These Shells are connected by the Dunescape element, enclosing the other key facilities required to deliver Eden Project North’s experience and programme.

## 3.3 EXPERIENTIAL DESIGN APPROACH

# 3.0

Rhythm Machine

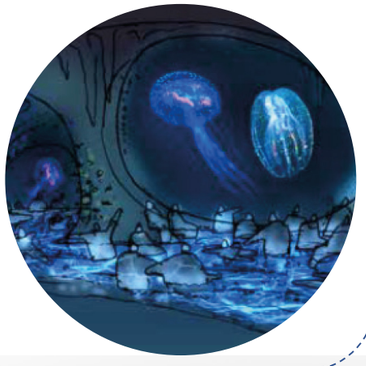
Visitor Centre



Above the Bay



Below the Bay



Natural Observatory



Seasonal Programming

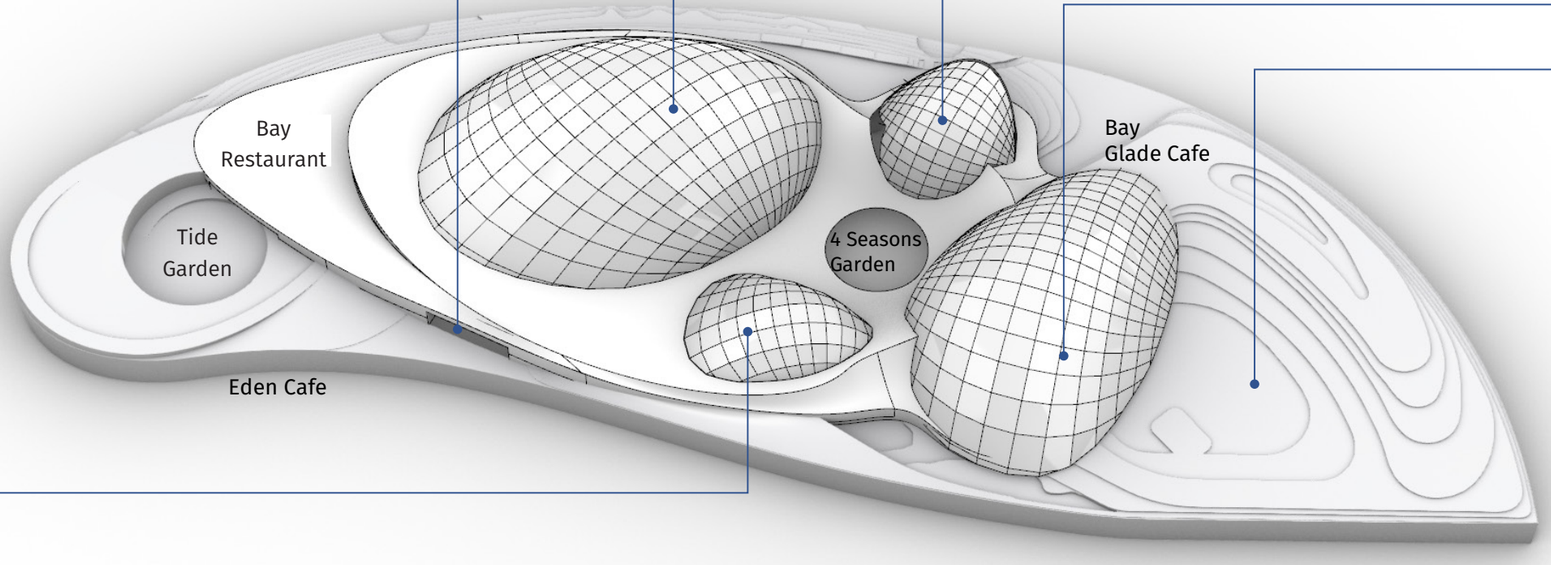


Bay Glade



Bay Hall






Rhythm Gardens



## 3.4 SITE ARRANGEMENT



The proposals have been developed to respond to the scale and location of surrounding buildings and features, whilst recognising that Eden Project North is a unique building type and is intended to be a landmark in the region. The division of the project brief into a number of discrete shells helps to reduce the overall massing of the building, creating an interesting skyline and allowing views between shells. The form and location of the shells has been influenced by the proximity of the Listed structures, including The Midland Hotel, Winter Gardens and the War Memorial. As the cladding of the shells is predominantly translucent, overshadowing effects are significantly reduced.

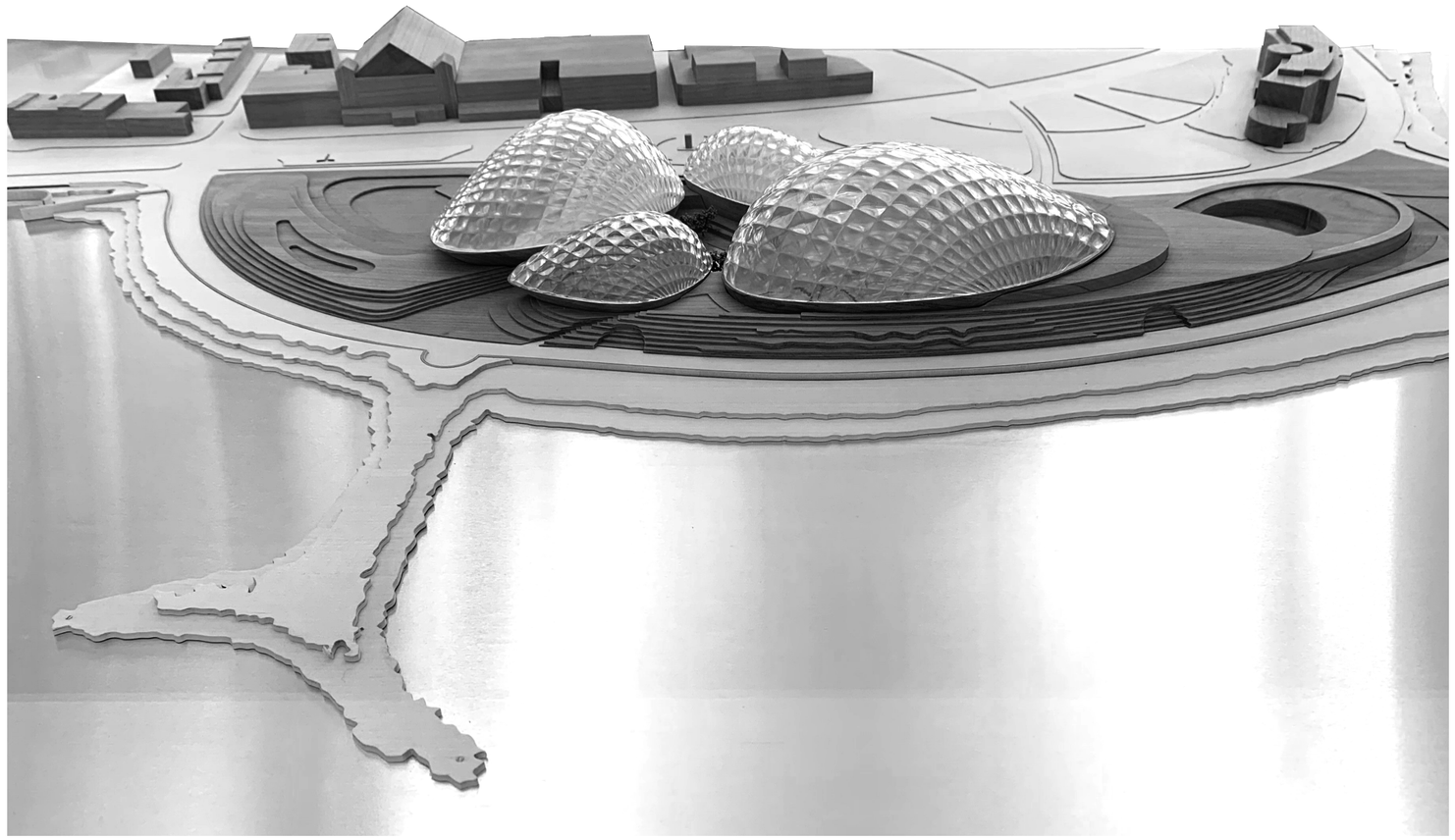
The positioning of gardens surrounding the building helps to create appropriate space between Eden Project North and its neighbours, including the space around the War Memorial, and the overall composition maintains longer range views to the Midland Hotel and Winter Gardens from the promenade.

A number of site constraints have influenced the detailed location of the building and landscape, including:

- A 16m clear zone from the sea wall
- Retaining public access to the northern and southern promenades
- Providing appropriate vehicular access and turning circle to the RNLI building
- The location of an underground culverted watercourse

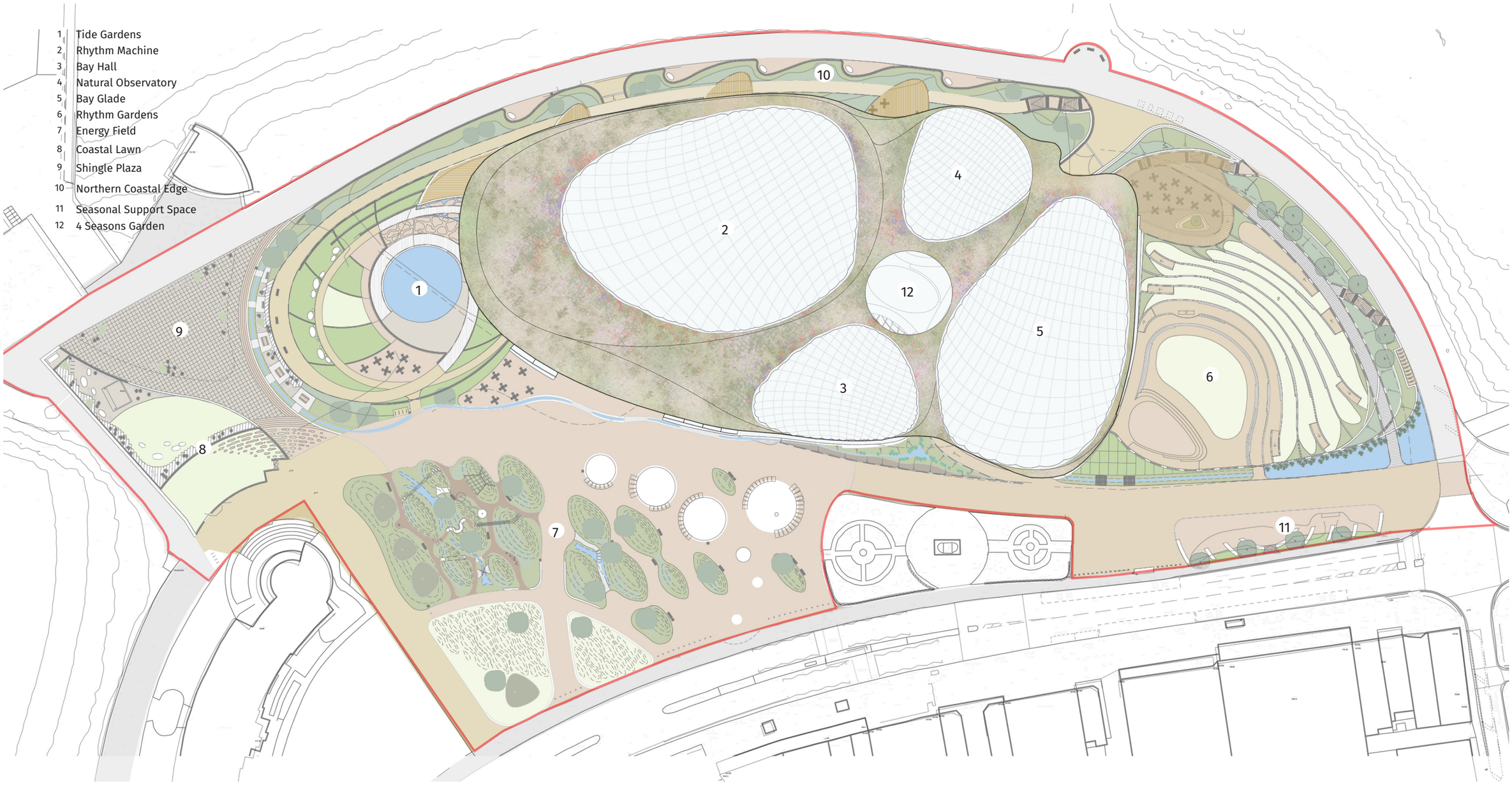
The design team have sought to exploit opportunities presented by the site and its features. For example, the levels of the site have been incorporated into the building in order to minimise the cut and fill requirement.

The location of the Rhythm Machine shell has been manipulated to accommodate the existing amphitheatre structure to allow for its reuse within Eden Project North.



## 3.4 SITE ARRANGEMENT

# 3.0



# 3.5 BUILDING MASSING



The proposed building has been carefully positioned to work well with its townscape, seascape and context, acknowledging the important historic landmarks around it.

### Building Height Levels

Maximum height limits have been set according to both experiential and contextual requirements mentioned previously.

The highest shell is the Rhythm Machine located at the north-west edge of the site so it does not interfere views of listed buildings around it. Its maximum height is around +36.9m AOD (Site ground level is at around +8m AOD).

The Bay Glade located at the east of the venue adjacent to the Rhythm Garden is the second highest shell with a maximum height of around +31.3 m AOD.

The Bay Hall maximum height is around +23.7m AOD which secures views through the main axis of the site and makes sure that the overall form and massing of the building fits well from its direct neighbours (Winter Gardens +27.5m AOD and Midland Hotel +22.8m AOD)

The Natural Observatory is the shell that seeks to draw out the best views of the Bay. It sits on top of the northern embankment and its maximum height is around +25.9m AOD making sure best views out to the Bay and South Lakes are provided.

Indicative sections of building levels can be seen overleaf

### Material Selection and Translucency

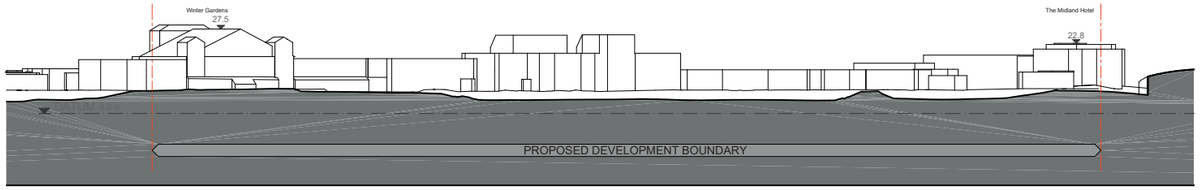
The choice of materials for external cladding has also been key when it comes to the scale and appearance of the building. A lightweight membrane material for the shells' envelope with various degrees of opacity ranging from transparent to opaque will reveal different layers of the shell edges at different times of the day ensuring a dynamic building silhouette which adapts to its context and rhythms of the bay in both day and night times.

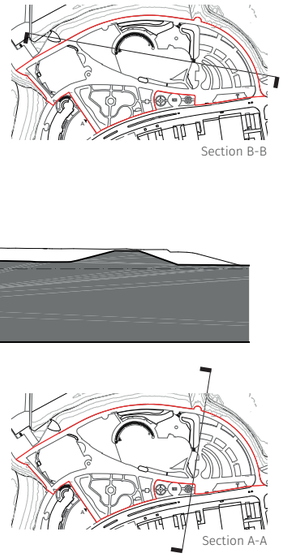
The cladding strategy of the building will be explained in more detail in the next section of this document.

# 3.5 BUILDING MASSING

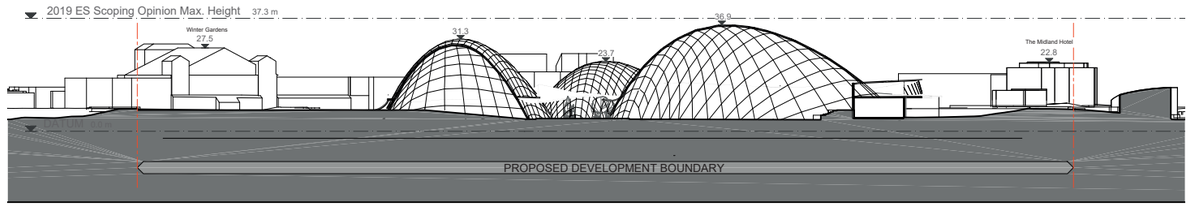


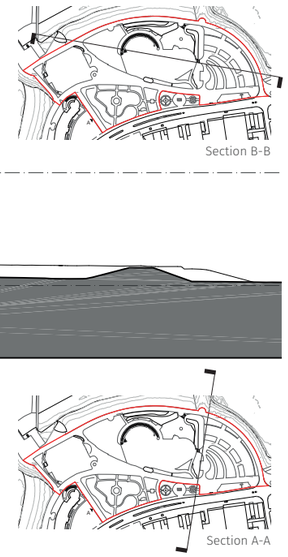
## Existing Site Sections




## Proposed Building Massing Sections:




NOTE: Proposed building heights are indicative and subject to slightly change with process of natural optimisation

## 3.5 BUILDING MASSING



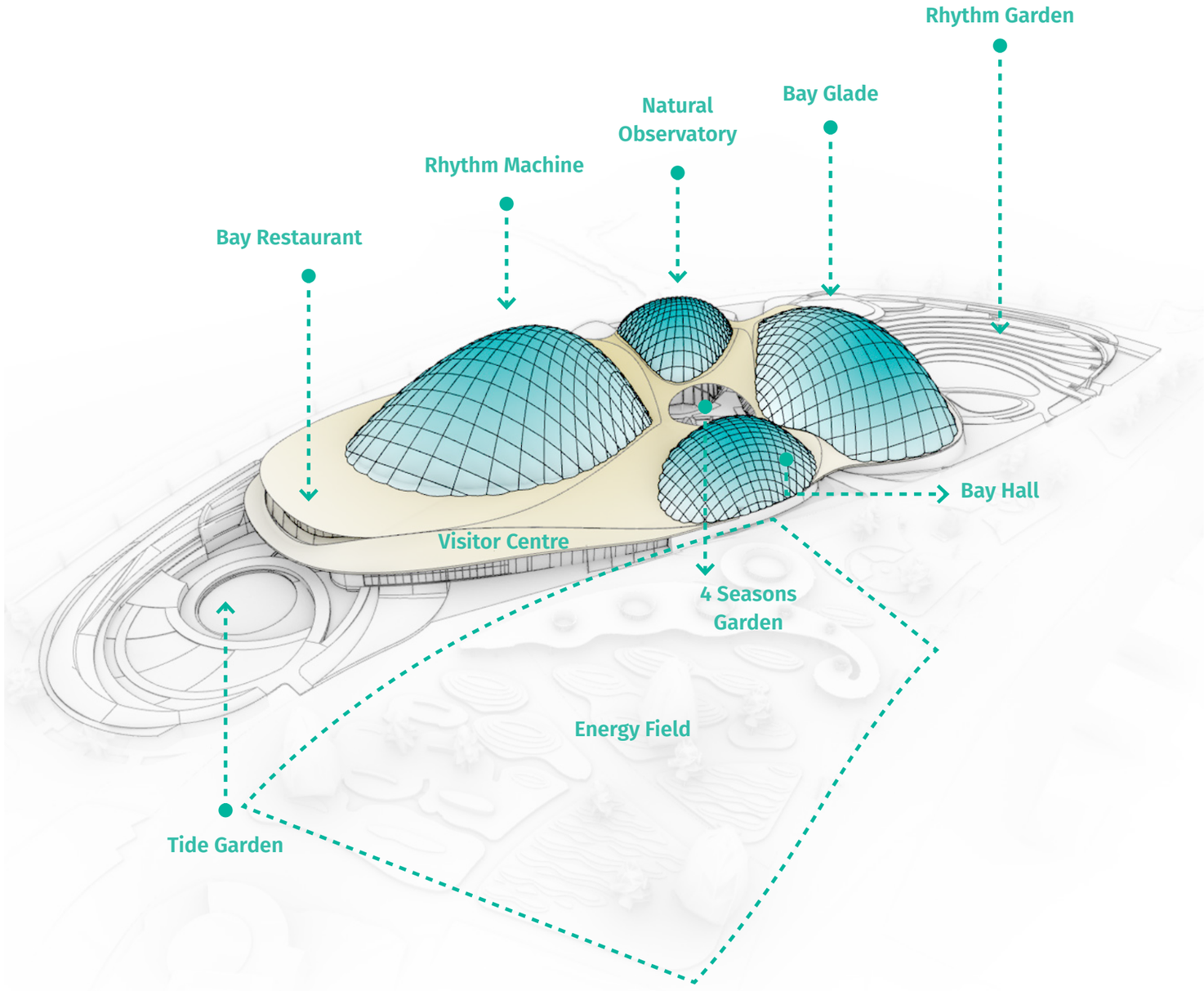
In terms of the general arrangement of the building, there is a colony of 4 shells located around a central courtyard which host the main exhibition spaces allowing multiple ways for visitors to explore the venue. A ‘cloister’ around the central courtyard will provide shelter for visitors circulating externally around the different shells. In addition, this outdoor spaces will work as a ‘rain collector’ for improving on-site water management.

The shells are connected to the ground by a lower structure that wraps around the building called ‘the dunescape’. which is where all ancillary spaces are accommodated. The form of this dunescape undulates responding to the different programmatic requirements and to aid the shaping of amazing spaces for visitors to enjoy.

The main entrance to the venue is through the visitor centre, at the south, next to the main Eden retail area creating an active frontage towards the town alongside Eden cafe and areas with permissive access at the south of the venue.

The Energy Field at the south end of the site is a landscaped space outside the paid boundary where visitors will learn about the energy story of how the building works, showcasing strategies which have been used to minimise the carbon associated with the building energy requirements.

The landscape surrounding Eden Project North has been designed to create a ‘bayscape’ that showcases the varied, distinctive and beautiful landscapes found around Morecambe Bay.



## 3.5 BUILDING MASSING



Photomontage 01 **[VP 1]**

The following views have been produced to support the visual impact assessment. For the full set of photomontages and viewing instructions refer to Environmental Statement Figures 6.12.1 to 6.12.7. Materials are indicative and opacity levels of the shells' external cladding will vary according cladding strategy to be developed in later stages of design..





# 3.5 BUILDING MASSING



Photomontage 03 **[VP 3]**

The following views have been produced to support the visual impact assessment. For the full set of photomontages and viewing instructions refer to Environmental Statement Figures 6.12.1 to 6.12.7. Materials are indicative and opacity levels of the shells' external cladding will vary according cladding strategy to be developed in later stages of design..






## 3.6 AMOUNT & USE



The proposed development involves the construction of a major **mixed leisure development** in association with Eden Project International Limited (including classes E, F1 and F2 and Sui generis), public realm, landscaping, car parking and associated engineering works.

The amount of the proposed development measured as Gross Internal Area (GIA) is 17,186sqm. This is broken down in the table opposite.

The building is predominantly designed across three (3) levels split across Front of House & Back of House areas. Several experiential components make up the front of house areas and these are described in detail in later sections.

| | | |
|---|---|---|
| **1.0** | **Visitor Centre** including Eden Cafe & Eden Retail | **1,015sqm** |
| **2.0** | **Bay Hall** [Exhibition] | **800sqm** |
| **3.0** | **Rhythm Machine** | **5,135sqm** |
| **4.0** | **Bay Glade** | **2,150sqm** |
| **5.0** | **Natural Observatory** [Seasonal Programming & Science Engagement Space] | **1,187sqm** |
| **6.0** | **Other Front Of House** [General] *inclusive of circulation | **3,968sqm** |
| **7.0** | **Other Back Of House** [General] | **2,931sqm** |
| | **Total Building GIA** | **17,186sqm** |

# 3.7 BUILDING LAYOUT



### 3.7.1 Overview

There are 3 primary levels in the building which have been set to deliberately make good use of the existing levels on the proposed site:

#### Lower Ground Floor Level (+3.5m/+4.5m)

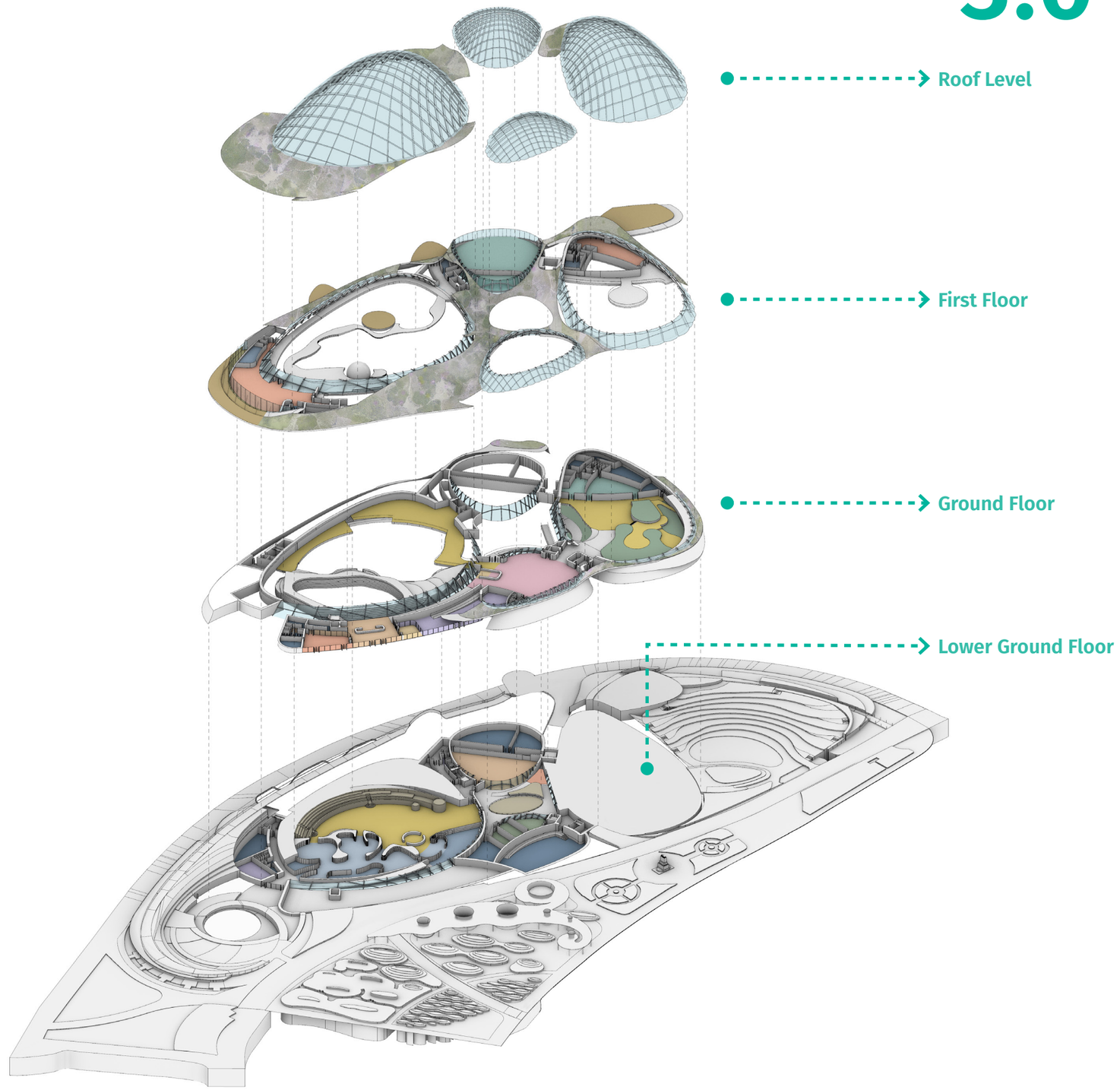
The Lower ground level of the building makes use of the existing lower level of the site at around +4.5m. This is where spaces which don't require natural light have been allocated.

#### Ground Floor Level (+7.72m/+8.5m)

Most of the facilities are located at the Ground floor at around +7.72 m & +8.5m, which is the same level of the promenade. In this way, provision of easy access into the building and allowance for connections between indoor and outdoor spaces is secured.

#### First Floor Level (+11.72m/+12.72m)

The spaces that require good views towards the bay are all located on this upper level between +11.72m and +12.72m. Specifically, Bay Restaurant, Natural Observatory Science Engagement Space, Glade cafe and its outdoor terrace.



# 3.7 BUILDING LAYOUT



### 3.7.2 Core Arrangement

Cores have been planned and laid out to meet the minimum recommendations set out within the Fire Safety Standards. (Refer to section 5 of this document for fire engineering overview & principles).

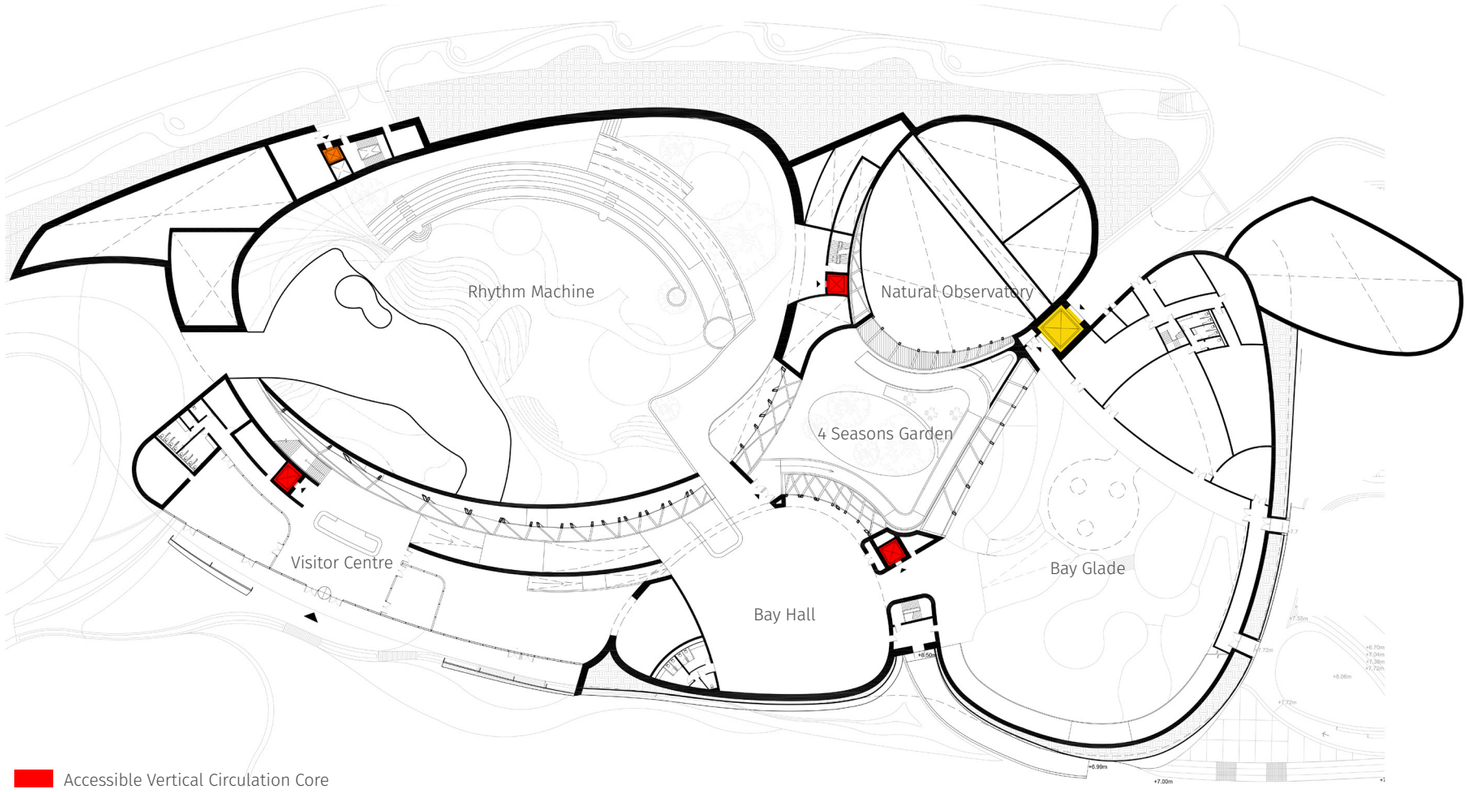
### 3.7.3 Vertical Circulation

The intermediate zones between the shells have been utilised for vertical circulation points within the building. These points provide levelled access across the three primary levels within the building. The vertical circulation points have been designed to ensure that every part of the building is truly inclusive.

The illustration beside shows the five different locations of the inclusive vertical circulation points provided within the building. Each zone comprises a lift. The main service lift is located in the northern part of the building and this serves as the main service point for accessing the lower & upper levels back of house spaces.

A set of existing concrete amphitheatre steps is retained & integrated within the Rhythm Machine Shell. This provides vertical connection within the bay forest. The stair points generally provide protected egress routes & means of fire escape from the building.

Several internal ramps have been integrated to provide accessible vertical circulation within the individual shells. These sometimes are experiential and therefore form part of the end user experience. The ramp within the Bay glade provides access to a cafe space located at the first floor of the Bay Glade shell.




**Ground Floor Layout** highlighting all accessible vertical circulation elements within building

0 20 40 80m

# 3.7 BUILDING LAYOUT



The Four seasons gardens is accessed via a ramp from the Bay Hall, with an intermediate tea deck area whilst in transit. A lift located between the Bay Hall & Bay Glade provides an alternative means of accessing the gardens at the lower ground floor level.

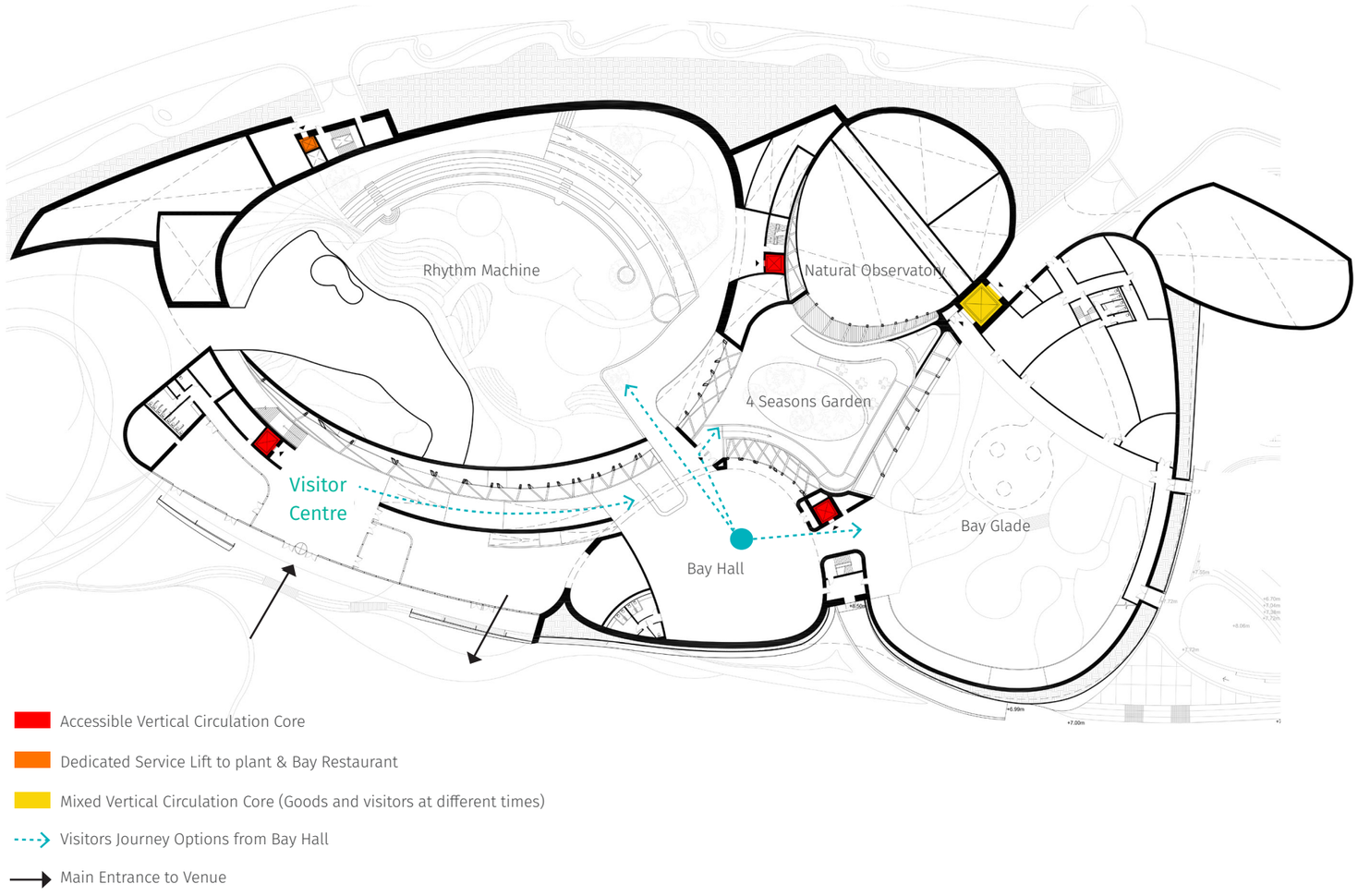
A dedicated vertical circulation point is provided from the visitor centre to allow for direct access to the Bay Restaurant.

### 3.7.4 Horizontal Circulation

At the ground level (+7.72m), the horizontal circulation is controlled by a ticket line integrated within the Visitor Centre and is supported by an Information Centre. Once crossed, the rest of the building is open and unrestricted for visitors experience, which includes the four shells & Four seasons gardens as well as access to Rhythm and Tide Gardens.

The Glade cafe located on the first floor on the northern end of the building provides an alternative route to access the building, but internal control measures will ensure access is not compromised.

The Visitor Centre acts as the main distribution point for the building. A retail area is directly adjacent to the main visitor lobby and provides a route for accessing the first exhibition space - The Bay hall. The Bay Hall is accessed via a 1:21 ramp at a slightly higher level at +8.5m. The Bay Hall provides three journey options: - Access to the Rhythm Machine located North of the cluster, Four seasons gardens located in the middle of the clustering and Bay Glade located East of the cluster.



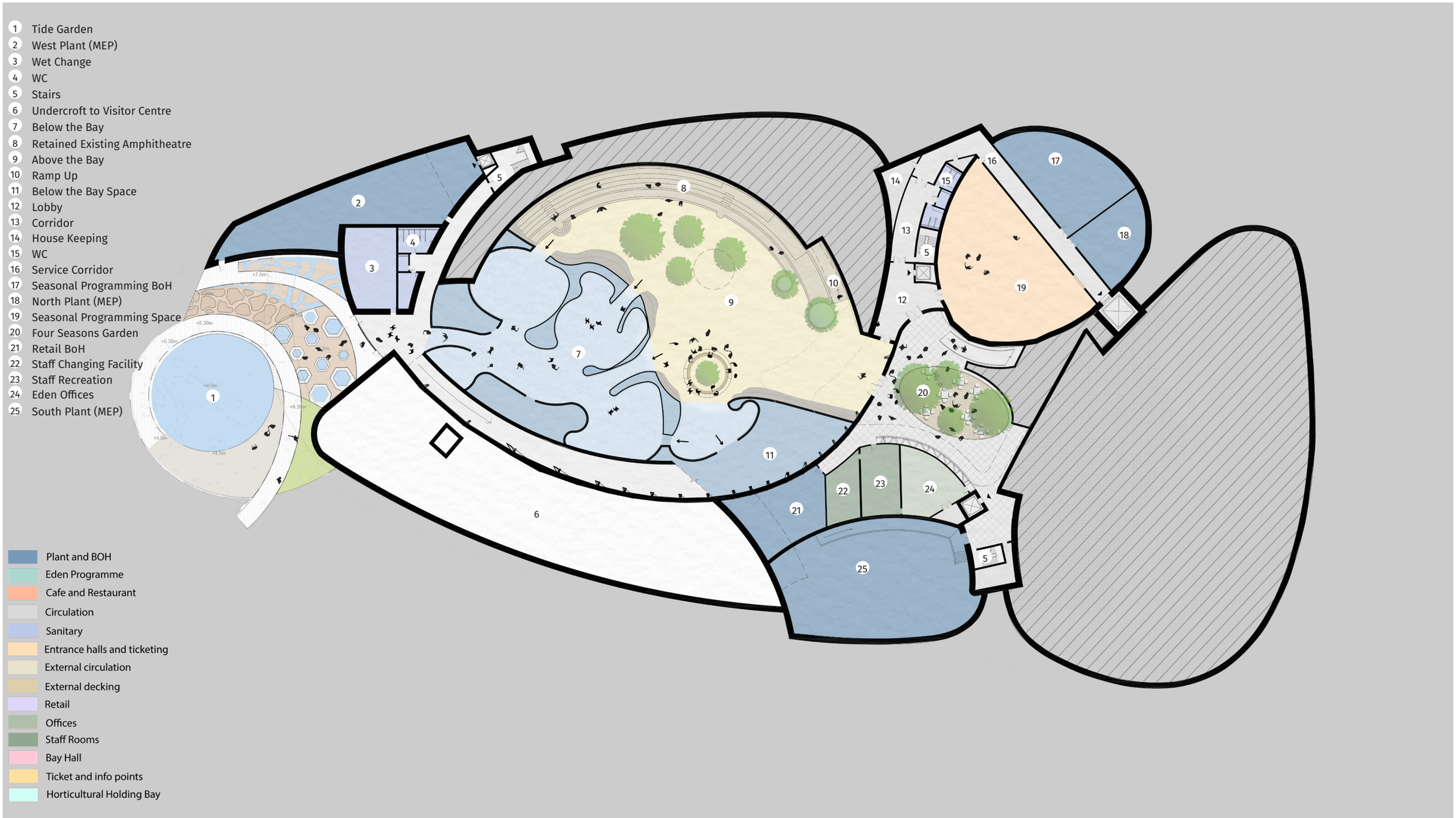

**Ground Floor Layout** highlighting all accessible vertical circulation elements within building

0 20 40 80m

# 3.7 BUILDING LAYOUT



## 3.7.5 Lower Ground Floor Plan (+3.5m/+4.5m)

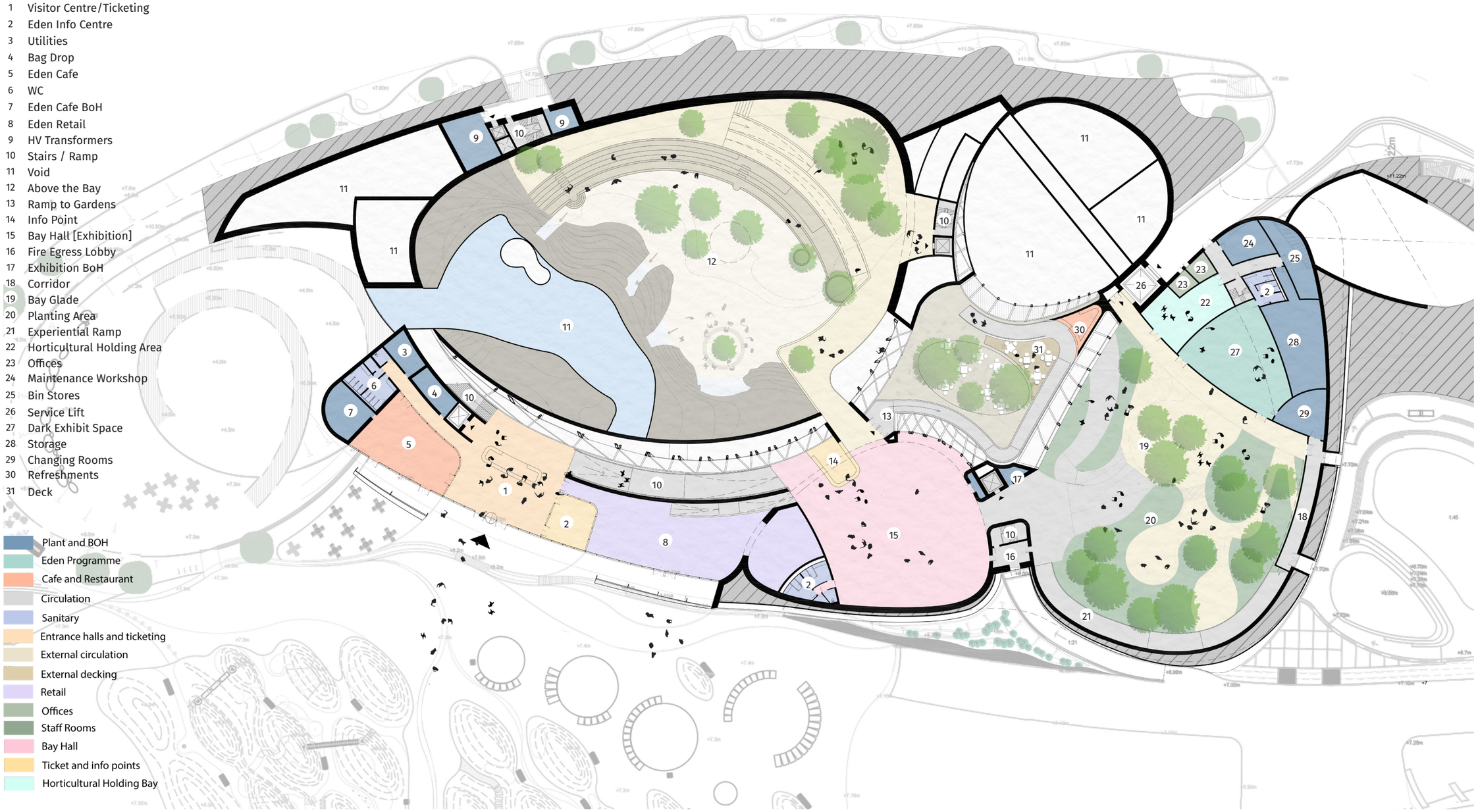


# 3.7 BUILDING LAYOUT



## 3.7.6 Ground Floor Plan (+7.72m/+8.5m)

1 Visitor Centre/Ticketing
2 Eden Info Centre
3 Utilities
4 Bag Drop
5 Eden Cafe
6 WC
7 Eden Cafe BoH
8 Eden Retail
9 HV Transformers
10 Stairs / Ramp
11 Void
12 Above the Bay
13 Ramp to Gardens
14 Info Point
15 Bay Hall [Exhibition]
16 Fire Egress Lobby
17 Exhibition BoH
18 Corridor
19 Bay Glade
20 Planting Area
21 Experiential Ramp
22 Horticultural Holding Area
23 Offices
24 Maintenance Workshop
25 Bin Stores
26 Service Lift
27 Dark Exhibit Space
28 Storage
29 Changing Rooms
30 Refreshments
31 Deck



Plant and BOH
Eden Programme
Cafe and Restaurant
Circulation
Sanitary
Entrance halls and ticketing
External circulation
External decking
Retail
Offices
Staff Rooms
Bay Hall
Ticket and info points
Horticultural Holding Bay

0 20 40 80m

# 3.7 BUILDING LAYOUT

3.0

## 3.7.7 First Floor Plan (+11.72m/+12.72m)

1 Outdoor Restaurant Terrace
2 Bay Restaurant
3 Kitchen/BoH
4 BoH
5 Stairs
6 WC
7 Above the Bay
8 Tree House
9 Bridged Link
10 Void
11 Natural Observatory Deck
12 Storage
13 IT
14 Service/Passenger Lift
15 Natural Observatory Engagement Space
16 Science Space
17 Glade Cafe BoH
18 Sanitary Block
19 Raised Boardwalk
20 Glade Cafe
21 Glade Cafe Deck
22 Deck
23 Dunescape Roofplane



# 3.8 EXTERNAL APPEARANCE

3.0

### 3.8.1 Overview

As described in earlier sections, the shape of the proposed development has been inspired by nature, its context and biophillic principles. Passive design principles such as form factor, maximising daylight minimising solar gain and designing for natural ventilation have all contributed to the composition of the buildings form.

The shells have been conceived and designed to be long-span lightweight structures by utilising an engineered timber solution. In a bid to achieve a sustainable system with low embodied carbon, the use of timber elements is maximized. The utilisation of a gridshell structure will ensure the following;

- Efficient and light-weight structure
- Safeguard for future spatial flexibility
- Use of low-carbon materials
- Lightweight and flexible cladding
- Cladding allows for different opacity levels




Aerial view of proposed development within the Morecambe context

# 3.8 EXTERNAL APPEARANCE



### 3.8.1 Overview

The outer skin of the proposed development is characterised by a series of air-inflated Ethylene tetrafluoroethylene (ETFE) cushions. ETFE is a fluorine-based film with high corrosion resistance and strength over a wide temperature range. ETFE has a relatively high melting temperature, excellent chemical, electrical and high-energy radiation resistance properties. The lightweight cladding system has been selected in a bid to reduce the dead load on the primary structure. The utilisation of the flexible membrane cushions also allows for optimised shell geometry as well as non-planar panels at no additional cost compared to a glass cladding.

Varied opacity levels can be achieved with the ETFE cushion, in response to the surroundings and experiential needs inside the building. It is also proposed to incorporate integrated Organic Photovoltaic (OPV) film cells, into the ETFE membrane that have a southern aspect, to harness solar power and contributing to the renewable energy strategy.

The connecting dunescape piece, which connects the four shells has been designed as a landscaped plane for coastal vegetation and green roofing.



View looking south from the across the bay

# 3.8 EXTERNAL APPEARANCE

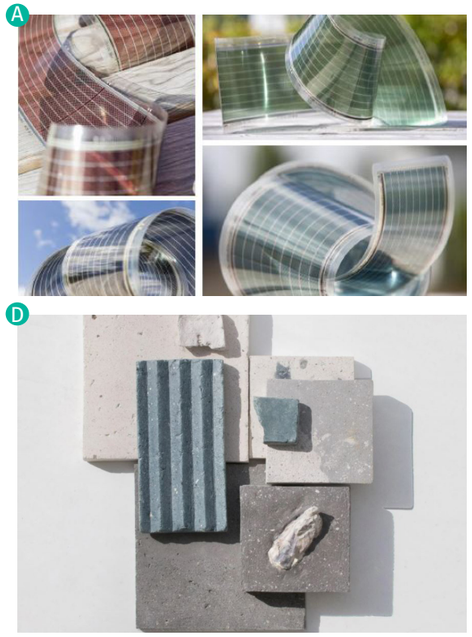


### 3.8.2 South Facade

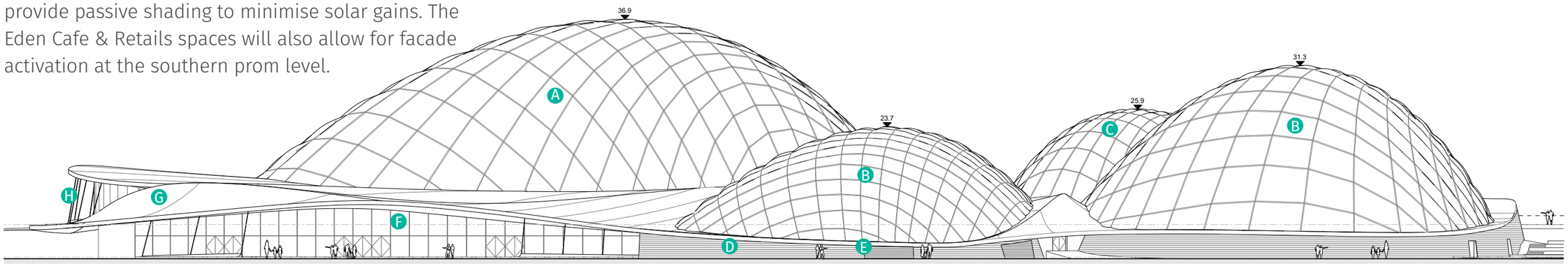
Whilst the four principal elevations have been conceived and designed to hold equal weight, the south facade serves as the key facade for the proposed development. Visitors and end-users will appreciate the full composition of the proposed building from the park & ride drop off area as well as the energy field upon arrival.

The four shells and their varied surface treatments and interesting juxtaposition of materials will be clearly visible from this viewpoint.  The integrated organic photo-voltaic [OPV] film cells within the Rhythm Machine & Bay Hall shells will create visual interest and these varied surface treatment will be perceived against the fully transparent Bay Glade shell [**B**].

The visitor centre, which sits beneath the dunescape roof on the southern end will be characterised by a fully glazed facade. The overhanging dunescape roof will provide passive shading to minimise solar gains. The Eden Cafe & Retails spaces will also allow for facade activation at the southern prom level.




**A** Ethylene tetrafluoroethylene (ETFE) with PV film integration
**B** Clear Ethylene tetrafluoroethylene (ETFE)
**C** Opaque Ethylene tetrafluoroethylene (ETFE)
**D** Recycled Sea Shell Natural Stone Facade
**E** Glazed Curtainwall Facade
**F** Green roof with coastal vegetation



# 3.8 EXTERNAL APPEARANCE



### 3.8.3 West Facade

The west facade is characterised by the Rhythm Machine shell sitting above the Bay restaurant. The Bay restaurant has been positioned to have a prime western aspect. The elevated restaurant placed at +11.72, 4m from the primary ground level has been designed to create a physical and visual relationship with the Tide Garden.

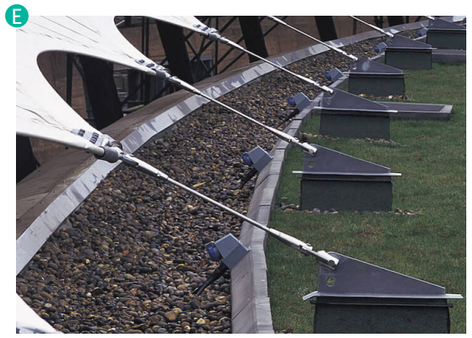
The fully glazed facade to the elevated Bay Restaurant will ensure that visitors and end-users have panoramic views of the sunset. The overhanging dunescape roof anchored via a series of tensioned cables/rods to the ground plane of the restaurant will provide shading to the glazed facade whilst also providing sheltered external space for the outdoor restaurant terrace. There is also an opportunity to integrate windbreaker systems set within or integrated between the tension cables/rods. The winding accessible ramp laced around the Tide Garden provides access to the external area of the restaurant from the site level.





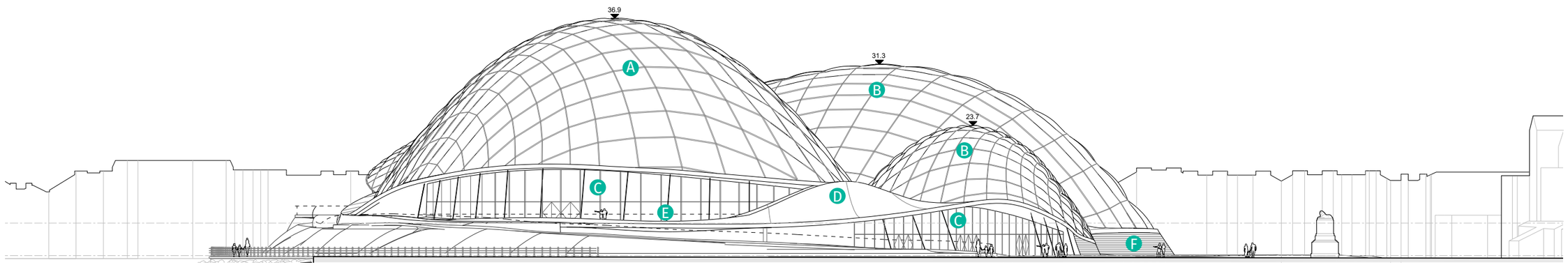








**A** Ethylene tetrafluoroethylene (ETFE) with PV film integration
**B** Clear Ethylene tetrafluoroethylene (ETFE)
**C** Glazed Curtainwall Facade
**D** Green roof with coastal vegetation
**E** Stainless Steel Tension Bars & Tie Rods
**F** Recycled Sea Shell Natural Stone Facade



# 3.8 EXTERNAL APPEARANCE



### 3.8.4 View of the West Elevation from the Midland Hotel



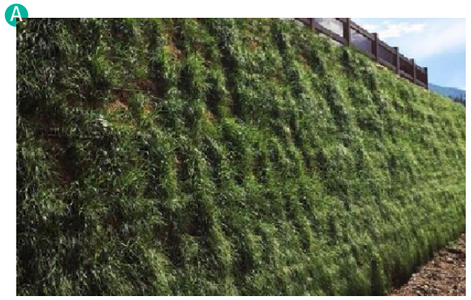
# 3.8 EXTERNAL APPEARANCE



### 3.8.5 North Facade

The north elevation is characterised by a visual interplay between the shells, dunescape plane and vegetated plinth. The vegetated retaining wall runs along the entire length of the northern facade with a great variety of coastal landscape and penetration cut-outs for service access allowed for at various points. The notion that the shells sit on a plinth on the north allows for a level of robustness for the building. Some of this robustness is utilised as part of the passive security by design measures adopted for the building. Sections of the existing secondary defence wall are retained at grade level with new sections added to accommodate scalloped seating pockets to protect visitors from prevailing winds while enhancing and activating the public realm along the promenade.

The Natural Observatory shell has been conceived and designed to have a fully glazed facade thereby allowing for uninterrupted views of the bay from the internal space.



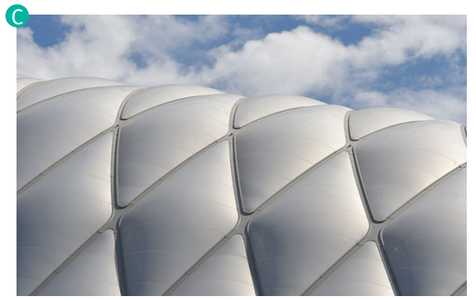








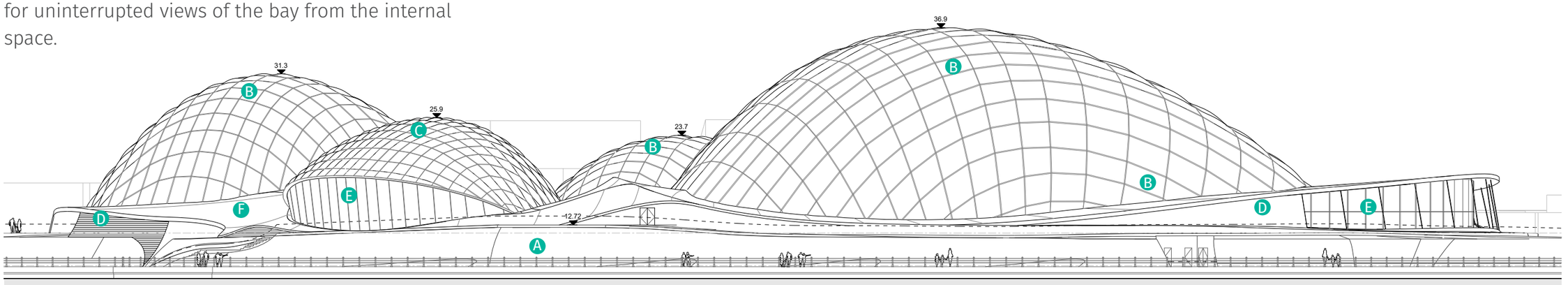








**A** Vegetated Retaining Wall System
**B** Clear Ethylene tetrafluoroethylene (ETFE)
**C** Opaque Ethylene tetrafluoroethylene (ETFE)
**D** Recycled Sea Shell Natural Stone Facade
**E** Glazed Curtainwall Facade
**F** Green roof with coastal vegetation



# 3.8 EXTERNAL APPEARANCE



### 3.8.6 East Facade

The East Facade is characterised by the Rhythm Garden at grade level. A plinth plane, which integrates with the dunescape plane provides a base for the Bay Glade shell on this elevation. The plinth plane is clad in recycled sea shell natural stone tiles, the nature of the material allows for robustness at the ground plane. Two direct access points provide direct access to the Rhythm Gardens support space integrated within the Bay Glade volume.

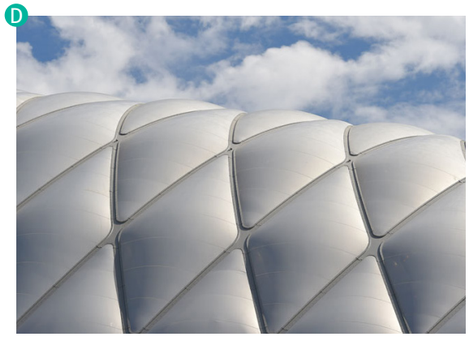
The Rhythm Machine shell forms a backdrop to the Bay Glade & Natural Observatory shells. The varied surface treatment of the external cladding of the shells with various opacities ranging from opaque to transparent creates an interesting layering of material finishes.

The Bay Glade shell has been designed to be mostly transparent to allow a variety of plants to grow inside.





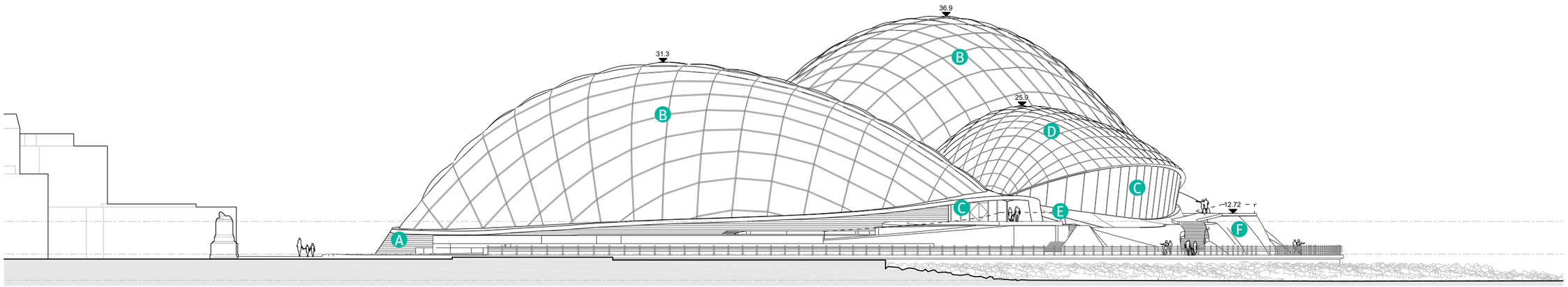








**A** Recycled Sea Shell Natural Stone Facade
**B** Clear Ethylene tetrafluoroethylene (ETFE)
**C** Glazed Curtainwall Facade
**D** Opaque Ethylene tetrafluoroethylene (ETFE)
**E** Green roof with coastal vegetation
**F** Vegetated Retaining Wall System



# 3.8 EXTERNAL APPEARANCE



### 3.8.7 Orientation & Arrival [South End Visualisation]

The southern zone of the proposed building acts as the key entrance axis to the development. The main entrance route directly links to the southern promenade. The entry to the building leads to the visitor centre and is directly located off the southern promenade. The route to the front door is surrounded by the Energy Field which tells visitors the story about regenerative design and sustainability. The landscape elements are an interplay of integrated play elements to the left hand side and a series of energy pods with a unifying sheltered canopy that characterises the right hand side. The nature of the energy pods and sheltering canopy are further described later in this section. The overarching landscape principles are also described in section 4.0 of this document.




**A** Rhythm Machine Shell
**B** Bay Hall Shell
**C** Bay Glade Shell
**D** Energy Pods

# 3.8 EXTERNAL APPEARANCE



### 3.8.8 South-East Visualisation

The Eastern end of the site is characterised by the Bay Glade and the Rhythm Garden. The Bay Glade – an indoor landscape of perpetual spring – will be the most transparent shell of the cluster to allow for natural daylight for plants to grow inside. The Rhythm Garden will be an outdoor space designed for various scheduled events and outdoor concerts. The Rhythm Garden has a direct relationship with the Bay Glade shell, these connections will allow for direct access to the support spaces provided internally within the Bay Glade floor plate.

The viewpoint below captures the junction between the South and North Promenades. The North Promenade will provide service access to the Northern part of the building where the primary service points have been clustered.




**A** Bay Glade Shell
**B** Natural Observatory & Science Engagement Shell

## 3.8 EXTERNAL APPEARANCE

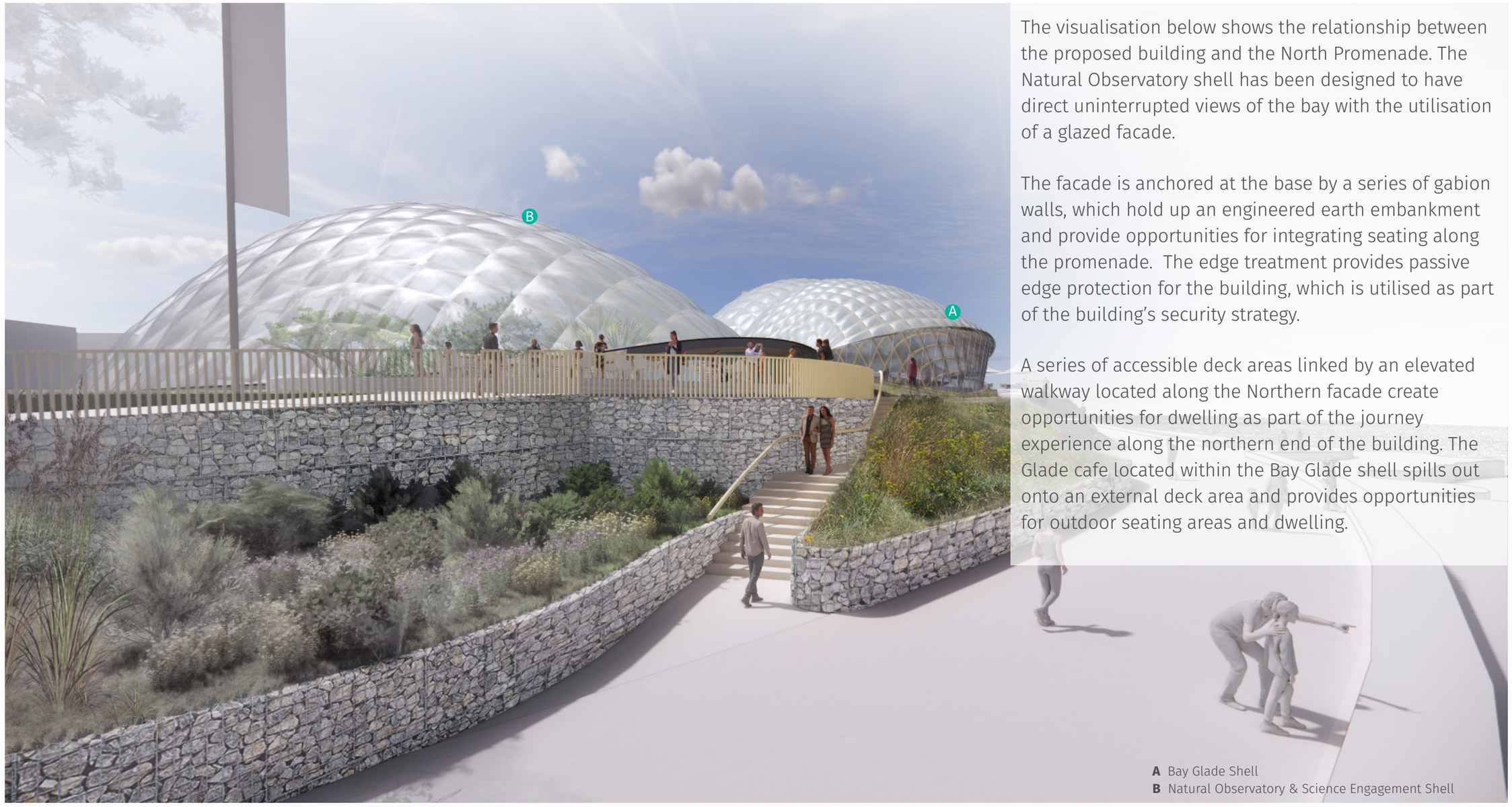


### 3.8.9 North-East Visualisation

The visualisation below shows the relationship between the proposed building and the North Promenade. The Natural Observatory shell has been designed to have direct uninterrupted views of the bay with the utilisation of a glazed facade.

The facade is anchored at the base by a series of gabion walls, which hold up an engineered earth embankment and provide opportunities for integrating seating along the promenade.  The edge treatment provides passive edge protection for the building, which is utilised as part of the building's security strategy.

A series of accessible deck areas linked by an elevated walkway located along the Northern facade create opportunities for dwelling as part of the journey experience along the northern end of the building. The Glade cafe located within the Bay Glade shell spills out onto an external deck area and provides opportunities for outdoor seating areas and dwelling.




**A** Bay Glade Shell
**B** Natural Observatory & Science Engagement Shell

# 3.8 EXTERNAL APPEARANCE



### 3.8.10 North-West Visualisation

The viewpoint below captures the relationship between the north promenade and the proposed building. The distinctive element of the building's external form from this viewpoint is the elevated Bay restaurant and its physical relationship with the Tide Garden. An integrated outdoor terrace provided along the Bay restaurant facade provides an opportunity for outdoor seating. A series of tensioned cable elements allow for the integration of wind breaker elements to ensure that the outdoor terrace is comfortable for use.

The Bay restaurant has been carefully designed, orientated and positioned in such a way that it maximises the views out towards the Bay thereby creating a unique visual relationship with the distant views beyond. The Rhythm Machine shell  provides a backdrop to the Bay restaurant from this viewpoint.




**A** Bay Restaurant
**B** Rhythm Machine Shell

# 3.9 ENERGY FIELD COMPOSITION



The Energy Field is adjacent to the main visitor entrance routes and is the area where the regenerative design story of Eden Project North will be presented to visitors and passers-by in a creative and playful way including Energy Art installations among others..

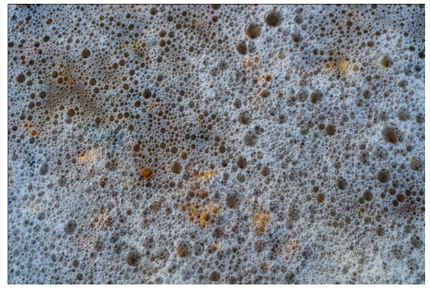
## 3.9.1 Seafoam Sheltered Canopy

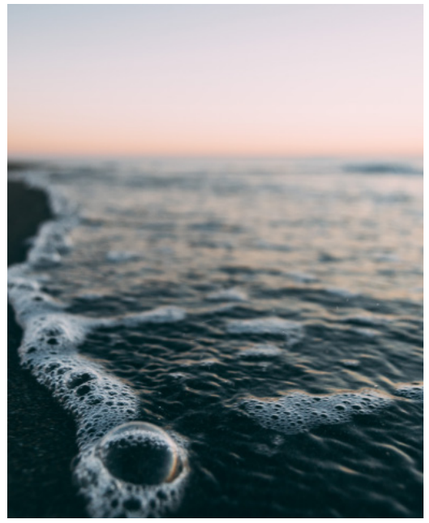
The ‘seafoam canopy’ as it is conceived and described will provide visitors sheltered connection from the park and ride area through the energy field to the southern promenade and venue main entrance.

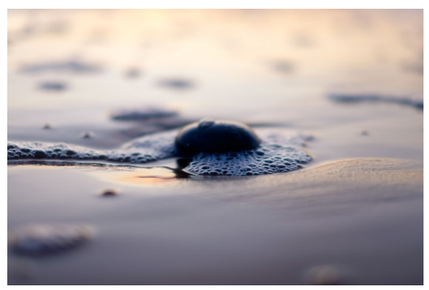
The design of the canopy seeks to integrate a series of energy pods, which are described in the next section. These pods will not only enclose a number external Air Source Heat Pump external units, it will also provide structural support for the canopy structure itself. The canopy has been conceived to ensure minimal impact from a heritage point of view and this has been validated through a series of consultation process undertaken during the course of the design process.

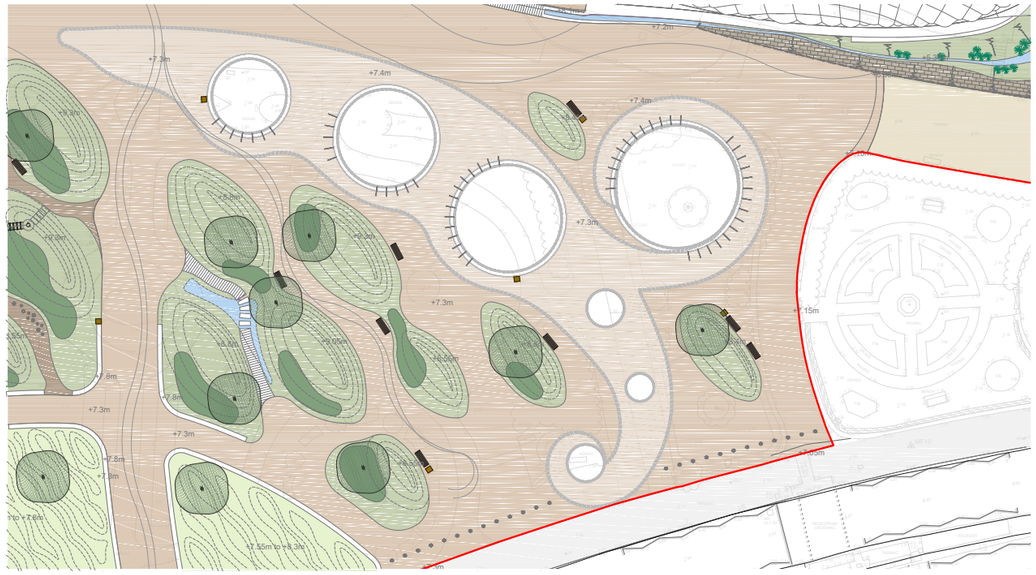
The design of the canopy structure itself is subject to further design development with an aspiration to collaborate with Lancaster University and other suitable local bodies in a bid to explore innovative materials, fabrication techniques, modularisation, modern methods of construction and most importantly foster collaboration towards an integrated and regenerative design approach.

The initial design concept is centered around the unique morphology of the “seafoam”, which is particular to the project context. Relevant precedents are illustrated opposite to give an idea of some possibilities. Refer to Section 4.0 for further description of the landscape components within the energy field.



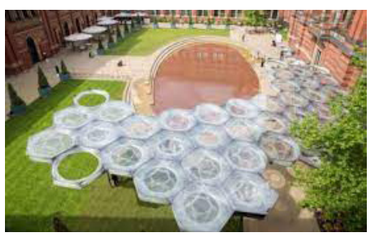






Sheltered canopy scope within proposed development







Precedent: Canopy Fabrication, Elytra FIlament Pavilion, Victoria & Albert Museum

# 3.9 ENERGY FIELD COMPOSITION

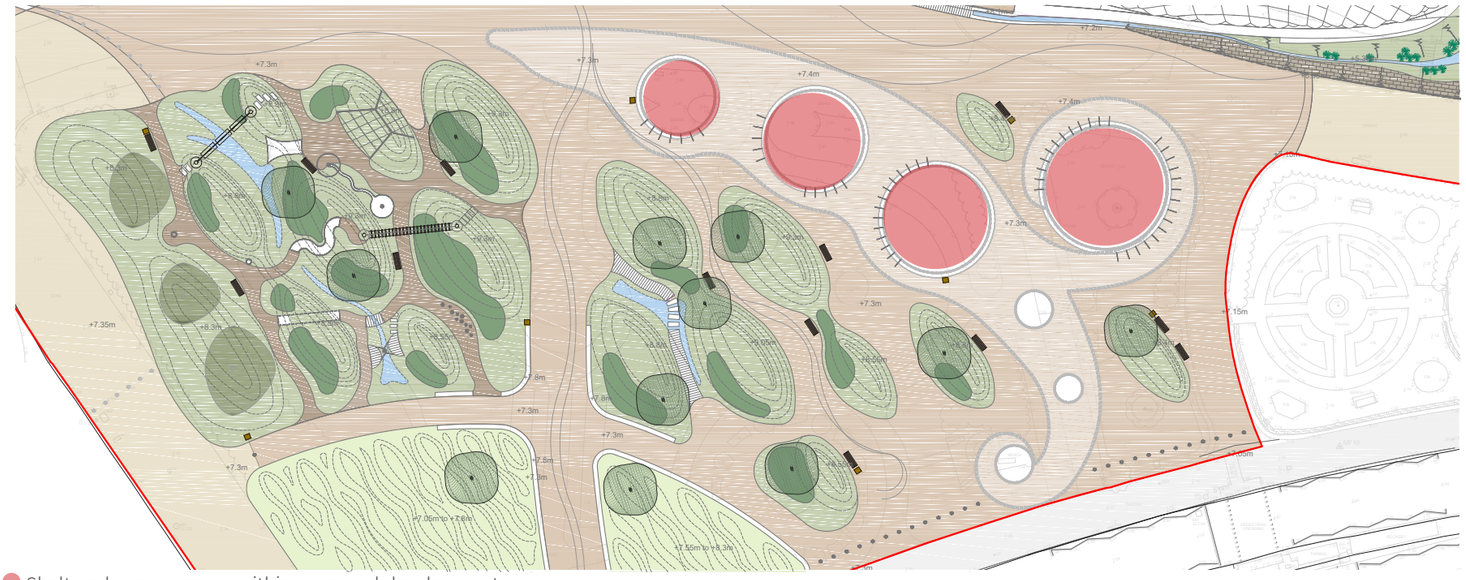


### 3.9.2 Energy Pods

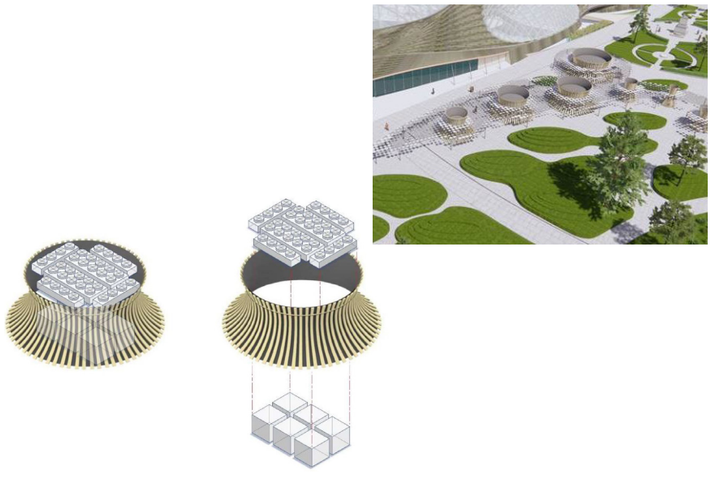
With an aspiration to showcase the ‘energy story’ of the development, the southern landscape is characterised by a series of cylindrical energy pods, which provide enclosures to a number of Air Source Heat Pump outdoor condenser units. Conceived and designed to be of varied sizes to provide visual interest, the timber clad enclosures have distinctive cylindrical forms, which provide integrated cycle parking for 116 cycles spaces. The vertical timber slats cladding to the enclosures provide opportunity for air intake and exhaust into/from the enclosures across the external surface. The integration of an attenuation layer will ensure issues relating with noise and acoustics are dealt with thereby mitigating the risk of noise spillage from the pods within the southern landscaped area.

Other opportunities to showcase the energy story of the development include an aspiration to showcase element of the Ground Source Heat Pump interface with the ground plane. This might potentially manifest through exposed manifold connections at the paving surface level. These exposed areas will be glazed with appropriate anti-slip glass suitable for external use. This aspiration is to be developed at a later phase but ultimately, end-users and visitors will be able to get a visual sense of certain regenerative design elements utilised in the building right from when they arrive.

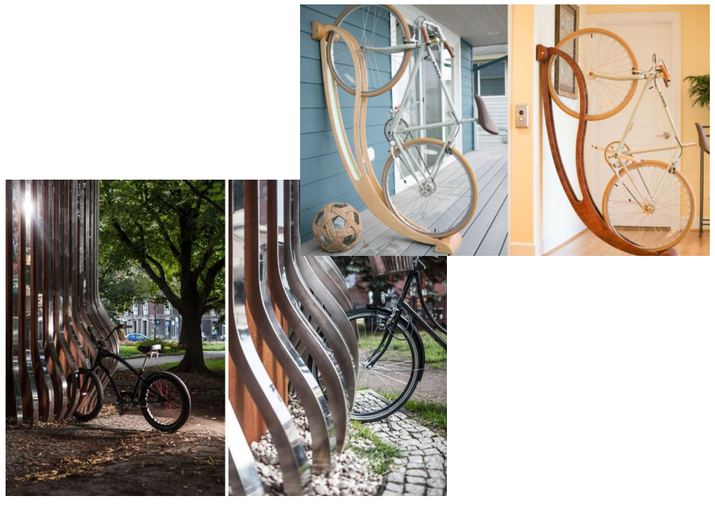
The pods alongside the sheltered canopy have potential to demonstrate both solar and wind harvesting. This shall developed at a later phase. The integrated cycle parking solution is further described in the landscape section.



Sheltered canopy scope within proposed development



Energy Pod Enclosure // Energy Pods in context



Integrated Cycle Parking Precedents

# 3.10 MATERIALS SELECTION



Materials selection and specification for Eden Project North have been driven by the following requirements:

### Natural Environment

- Coastal location and the harsh marine environment, understanding, in particular the effects of salt, wind and rain penetration have been important considerations when choosing the right materials. This includes durability, maintenance and replacement of materials.
- The external envelope will also have to be breathable to respond to wind conditions
- Naturally daylit spaces with solar control will also be a main requirement of the design and materials selection

### Structural Requirements

- A lightweight cladding system is chosen to reduce the dead load on the primary structure. Flexible membrane cushions allow for optimised shell geometry.

### Experiential Requirements

- Lighting control is an important part of the experience at Eden Project North, therefore, the cladding solutions will also address this. Variable opacity levels can be achieved with lightweight cladding systems like ETFE.

### Sustainability & Regenerative Design

- The Sustainability Framework for Eden Project North sets out the following considerations and targets under the theme of materials:

### Responsible Materials

- 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 (i.e. FSC for timber, Green Guide, BREEAM Location and Use Category)
- Building embodied carbon footprint
- Construction waste diverted from landfill (onsite)
- Proportion of project construction waste recycled
- Operational waste diverted from landfill
- Total annual carbon dioxide emissions sequestered on-site (naturally or artificially)

### Next Generation Materials & Technologies

In addition to the above, Eden Project North aims to use next generation materials, technologies and construction processes towards a smart and sustainable design.

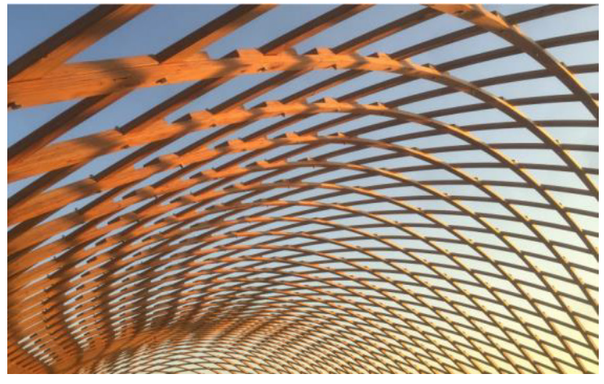
As an example, materials with Low environmental impact such as Graphene, Concrete, Biomaterials and Silicon Solar Cells among others are part of the current research. Specifically, potential collaborations with Material Institute have started to take place aiming for knowledge transfer between the academia and the construction industry.



Natural Environment at Morecambe Bay



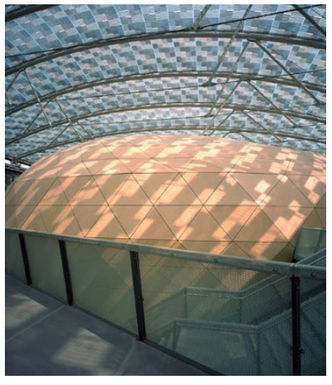
Recycled sea shells cladding



Precedent of Timber superstructure



Eden Project Cornwall - ETFE Cladding



Kingsdale School Sports Hall - ETFE Cladding

# 3.10 MATERIALS SELECTION



The following materials reflect the current structural and external cladding strategy for the main building elements:

**Superstructure:**

The use of natural materials like timber for the building superstructure has been prioritised due to its low embodied carbon. As per the external cladding of the shells, ETFE cushions with integrated photovoltaic panels will respond to the different requirements previously mentioned.

**Dunescape Roof:**

As the other main structural elements of the building the dunescape structure will also be timber, but, this time clad with a landscape roof with the aim of encouraging a level of biodiversity.

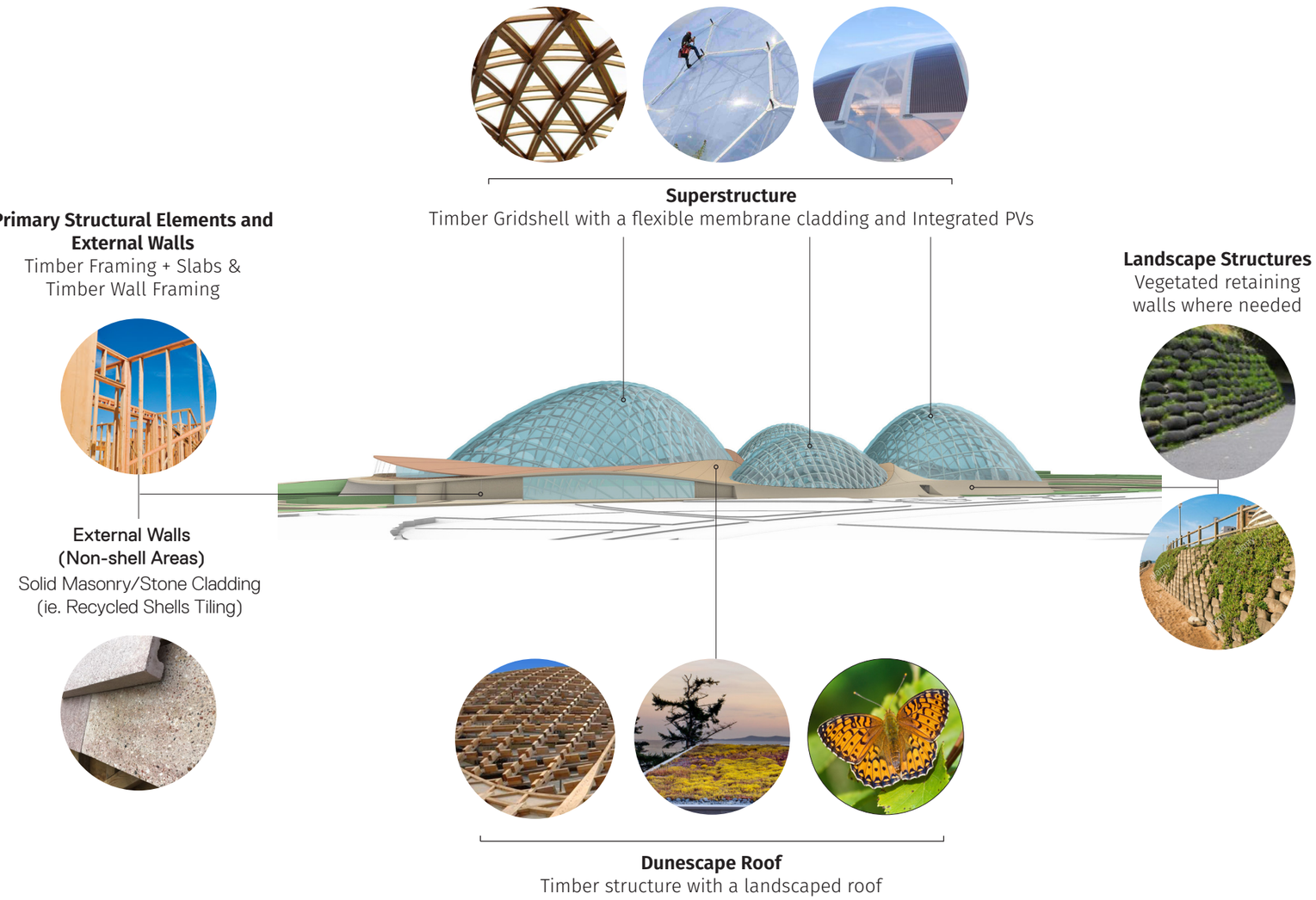
**Primary Structural Elements & External Walls:**

Primary structural elements and external walls will also be timber. The structure will be clad mostly with solid masonry using innovative materials such as recycled shells tiling.

Glazed areas will be reduced only to where building function /programme requires them. This is the case of the Bay Restaurant and Natural Observatory, for instance, which aim to capture the best views of the bay. Equally, the retail frontage towards Marine Road will benefit from some glazed facades to activate that area towards the town.

**Landscape Structures:**

Vegetated retaining walls will also contribute to the regenerative design approach and will improve biodiversity around the venue.



SECTION 4

# Landscape Design Concept

**Description of the proposed landscape spaces and hard and soft landscape strategy.**

BUILDING DESIGN CONCEPT

# 4.1 OVERVIEW & KEY DRIVERS

4.0

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 outdoor spaces, contributing to the overall narrative and experience of the visitor attraction.

- Provide an 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. Encourage movement between the two and pedestrian flow to the stone jetty.
- Respect the special character and access needs of our neighbours.
- Develop a regenerative landscape that enhances biodiversity and supports the sustainability of Eden Project North.

## Landscape Design Concept:

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 visitor attraction and wider landscaped space, which take reference from the distinctive, varied and beautiful 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.

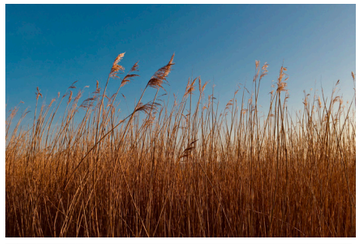
The bayscape concept will result in a new and contemporary landscape, but one which references natural coastal forms created through the processes of erosion and deposition, and plant communities found in the natural environment, in a way which is sympathetic to its location and complementary to the existing buildings and uses around it.

The plan on this page highlights the locations that have provided the inspiration for the bayscape design, and the images show some of these habitats.



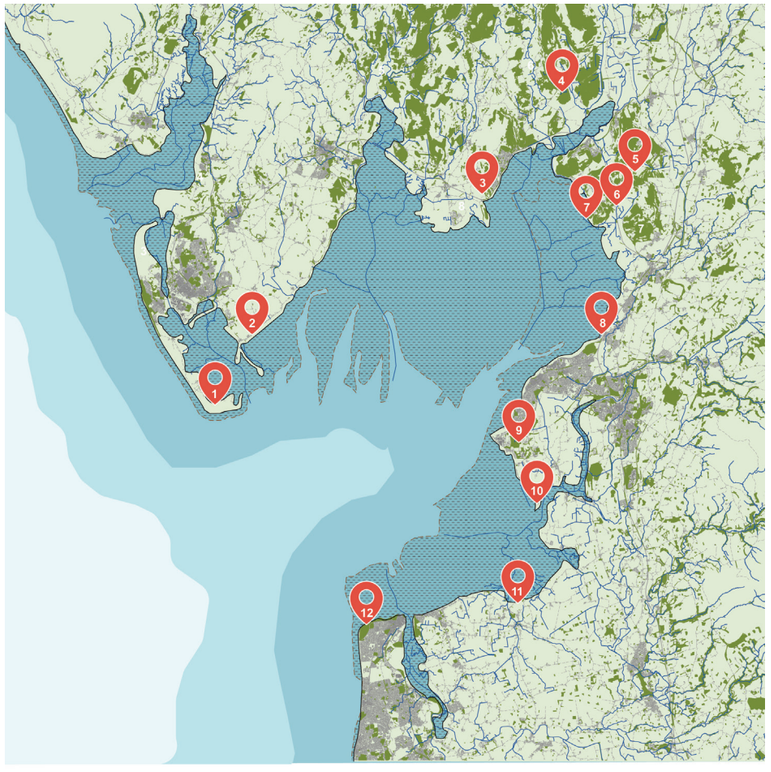













1. South Walney Nature Reserve: Shingle Bank
2. Foulney Island Nature Reserve: Shingle Bank & Salt Marsh
3. Grange-over-Sands: Salt Marsh
4. Whitbarrow National Nature Reserve: Limestone Pavement
5. Gait Barrows National Nature Reserve: Limestone Pavement
6. Hesketh Bank RSPB Reserve - Reed Beds
7. Arnside & Silverdale - Limestone Cliffs, Headlands & Coves
8. Hest Bank - Salt Marsh & Mud Flats
9. Heysham Nature Reserve - Reed Bed & Wetlands
10. Sunderland Point - Lune Estuary & Salt Marsh
11. Pilling Sands - Salt Marsh
12. Rossall Point - Sand Dunes

# 4.2 THE RHYTHM GARDEN

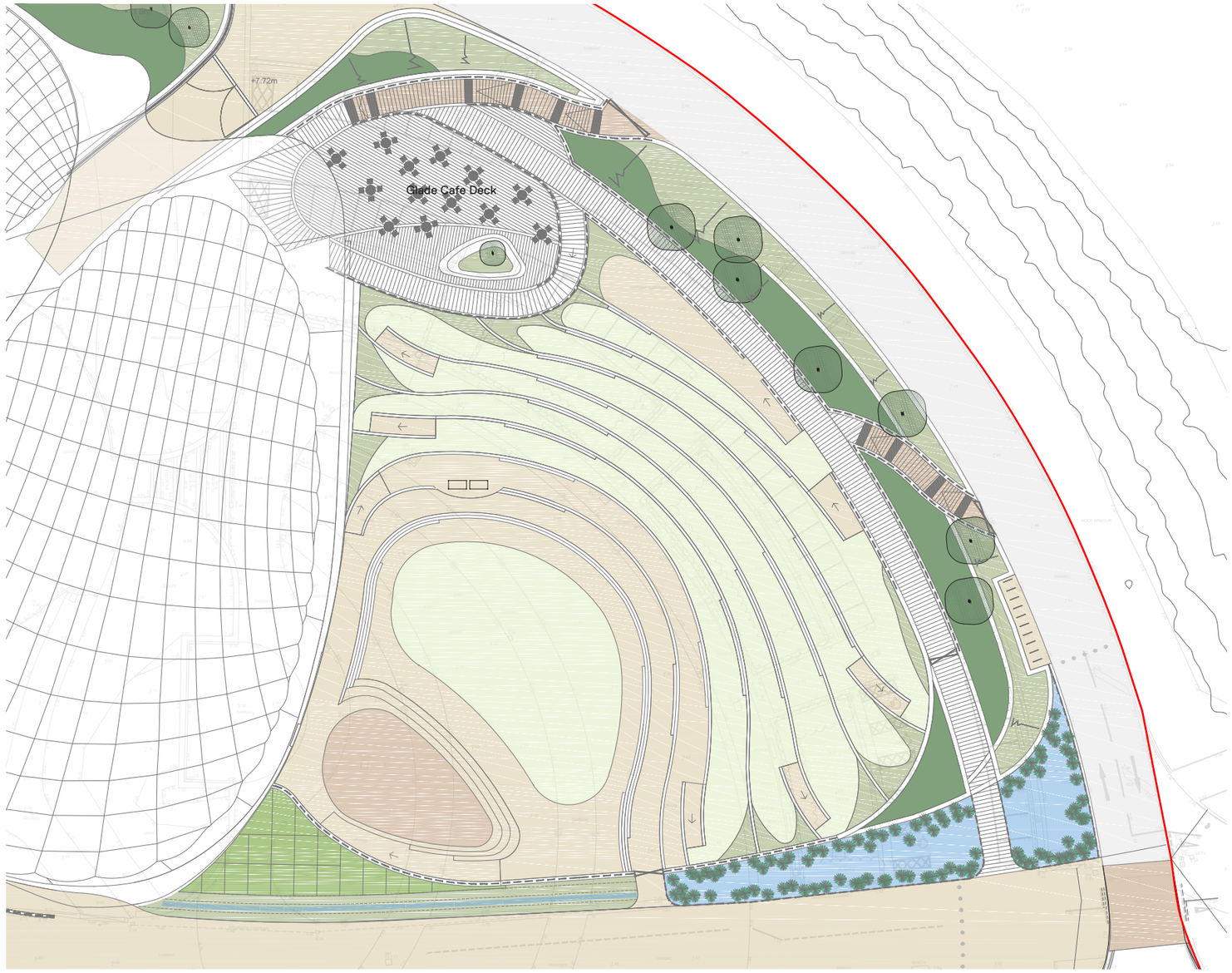


### 4.2.1 Description

The Rhythm Garden is a re-imagining of the existing Bay Arena located to the east of the site and has been designed as a flexible and organic space within the pay boundary that will serve as an arena to support outdoor concerts and events, but at other times will facilitate smaller scale activities and events.  In connection with the focus on health and well-being that will form part of the adjacent Bay Glade experience, this outdoor space will also provide an opportunity to explore these themes through physical activity and opportunities to practice mindfulness.

The Rhythm Garden will be enclosed on its northern and northeastern sides by a raised landform edge that will form a continuation of the 'Northern Coastal Edge' and will wrap around the space to form a sheltered cove.

A slightly raised natural stone permanent stage is proposed at the southwest corner of the garden (at +8.06m), which will be used for smaller events.  When a larger event is being hosted, a temporary stage would be built over this. Adjacent to the stage is a generous lower grass lawn area (ranging from +6.75m to +7.21m) to accommodate a standing audience, but also for use for picnicking and for children to run around on.  Both of these areas will be accessible via entrances off the eastern edge of the Bay Glade building (at +7.5m), with the access to the stage specifically designed for use during events.  The lower grass bowl area is surrounded by terraced steps, creating an opportunity for seating 'in the round' for smaller events and activities.  From this lowest point in the garden a series of terraces extend northeast at 0.34m intervals, providing viewing areas and means of access, via a series of steps or accessible ramps to the elevated Glade Café Deck (at +11.72m) in the northern corner of the Rhythm Garden.




Proposed Layout of Rhythm Garden

# 4.2 THE RHYTHM GARDEN



### 4.2.1 Description (continued)

The upper terraces are connected to the Glade Café Deck via a 3.0m wide accessible boardwalk route (1:21 gradient) that follows the raised landform edge to the north and northeast. This route extends down to the southern promenade at the southeast corner of the Rhythm Garden, although access will be controlled at this point. The Glade Café Deck at the highest point in the Rhythm Garden will benefit from views out across the bay and will provide a higher level connection into the Bay Glade building. It will also act as a VIP area during events. To maximise flexible access there are two sets of steps that connect directly to the café deck and the accessible 1:21 boardwalk route from the northern promenade.

The Rhythm Garden will be separated from the southern promenade by a drainage swale and reed bed waterbody, which will form part of the Sustainable Drainage System (SuDS) and will soften the appearance of this edge. To the rear of the permanent stage, coastal planting in movable containers and at varying heights will be installed so that the area can be cleared to create a backstage space for larger events. In addition to the accessible 1:21 boardwalk route connecting to the southern promenade at this point, a further pedestrian access connection closer to the stage will also be controlled via gates.

The organic form to the layout of the terraces and the flowing access arrangement, together with the integration of pockets of coastal dune grassland planting will create an interesting and attractive space for visitors to explore.

The Rhythm Garden and Seasonal Support Space drawing (TEP reference EDNN-TEP-ZZ-Z2-DR-LA-005) provides further information on the features and design of this space.





Bottière Chêneale, copyright Bruel-Delmar - image from Landzine



Hastings Pier by drmm architects - image from ArchDaily



Curved stone steps - image from John Gale Landscapes



North Cornwall Coastal Garden - image from Wheelbarrow





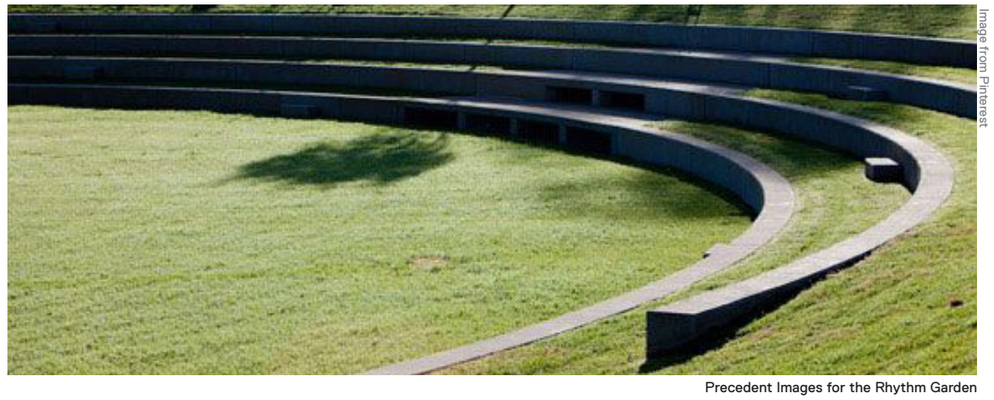



Image from Pinterest

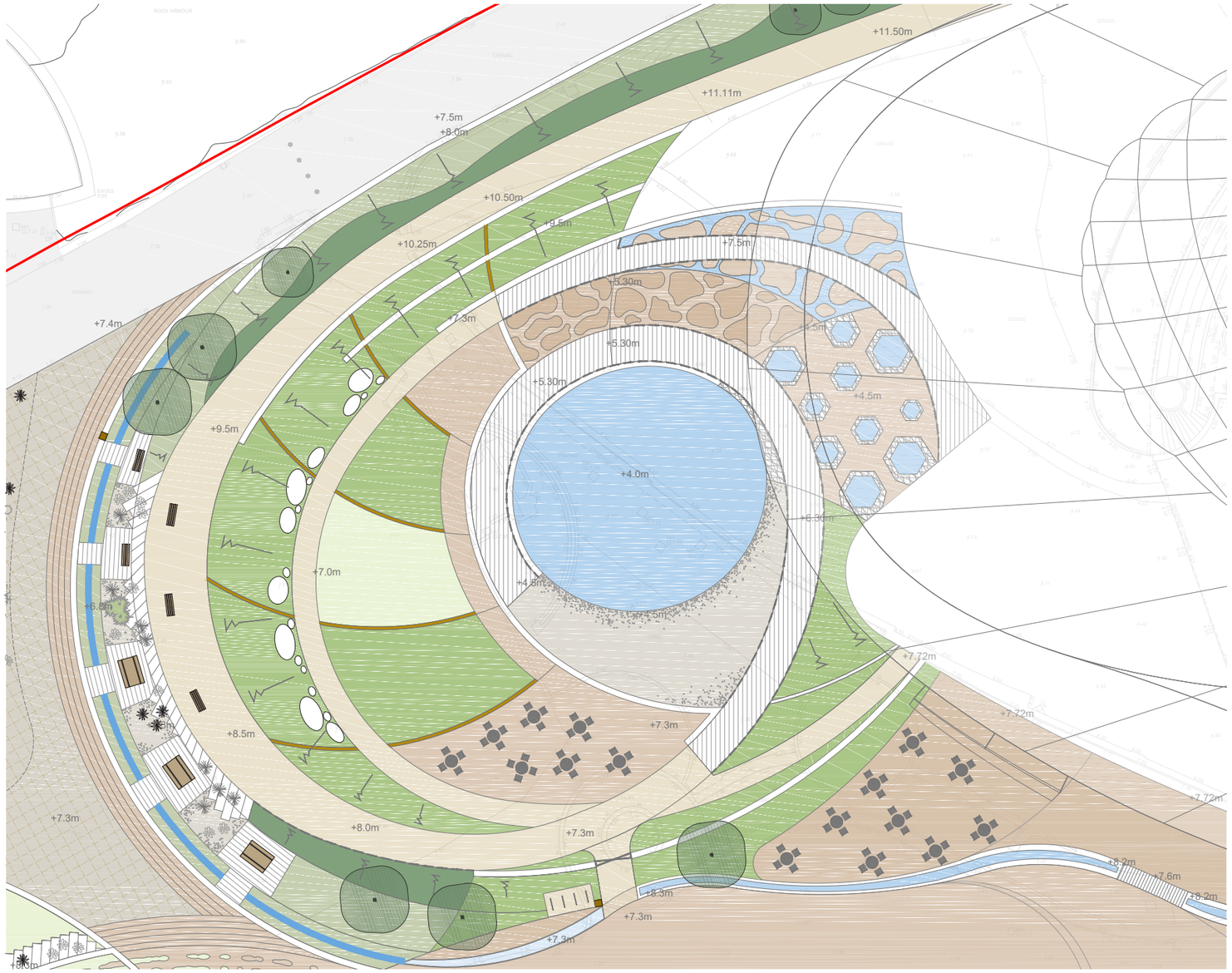
Precedent Images for the Rhythm Garden

# 4.3 THE TIDE GARDEN



## 4.3.1 Description

The Tide Garden lies at the western end of the visitor attraction and will ordinarily be within the pay boundary. The garden is enclosed by a raised landform edge, which forms a continuation of the 'Northern Coastal Edge' (see Section 4.5), curving around to the west in an anti-clockwise direction and creating a cove form that will offer shelter within the space from the prevailing westerly winds and help to define the pay boundary. The 3.0m wide elevated pathway that runs along the Northern Coastal Edge extends along this landform belvedere edge, forming a causeway route that offers views out to the sea and across the Shingle Plaza (refer to Section 4.6). The curved pathway route descends to meet the southern promenade level at around +7.3m at the garden's southern edge. At this point there is a means of access into the garden from the promenade, which can be used for special events and open days, as well as providing a maintenance access. From this +7.3m level the pathway continues on its spiral route, descending into the centre of the space, where it provides access to a tidal pool, which forms the focal point to the garden at its lowest level (+4.5m). From this lower level there is also a means of connection with the 'Below the Bay' experience in the lower level of the Rhythm Machine building, via a route which contains salt marsh and rock pool water features, as abstract representations of coastal habitats found around the Bay.




Proposed Layout of Tide Garden

# 4.3 THE TIDE GARDEN



### 4.3.1 Description (continued)

Between the elevated western edge and tidal pool at the lowest level, there is a garden space to explore at the +7.0 to +7.5m level. This space provides opportunity for a café terrace within the pay boundary (served by the Eden Café in the Visitor Centre) and basking opportunities surrounded by coastal garden planting that showcases a mixture of native and ornamental species. The garden space will also contain interactive elements and incidental play features connected to the theme of tides and currents. From this level, garden visitors can overlook the tidal pool below and can also connect back into the ground floor of the Rhythm Machine building (+7.72m) via an elevated walkway, which spans the salt marsh and rockpool water features below.

The Tide Garden and Western Space drawing (TEP reference EDNN-TEP-ZZ-Z4-DR-LA-007) provides further detail on the features and design of this space. The changing levels through the space are explained on the section shown on TEP drawing EDNN-TEP-ZZ-ZZ-DR-LA-012.

The precedent images on this page illustrate some of the design elements and the intended feel of the space.


Image by Dan Senior on Unsplash


Image from Glaucus


Image by Nick Page on Unsplash


Image from RHS


Image from Kate Joyce on Unsplash

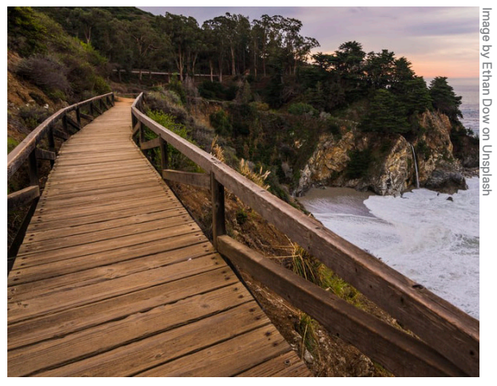

Image by Ethan Dow on Unsplash


Image from NatureScot


Image from Ben Barrell Sculpture

Precedent Images for the Tide Garden

# 4.4 THE ENERGY FIELD

4.0

## 4.4.1 Description

The Energy Field is to the south of the site and represents a generous landscaped area outside the pay boundary. This space has the potential to form part of a wider landscape design that incorporates the frontage to the Midland Hotel, and so the overall geometry and layout of the space has been developed with this in mind. The existing 'dead-end' vehicle access route, which extends north along the eastern edge of the hotel grounds will be retained and re-surfaced, with new automated retractable bollards added in order to provide a more direct and convenient access/egress for the RNLI when responding to emergency call-outs. The layout of the Energy Field space also responds to the east-west southern promenade crossing at its northern extent, the pedestrian movement route northward from the station and car parking areas, and the arrival of visitors from the bus and coach drop-off along Marine Road.

The Energy Field explores the power of water, wind and sun through its form and the elements contained within it. The space includes an actual and imaginary flow of water west to east, responding to the direction of the prevailing weather. The actual flow of water is in the form of a water feature channel, which continues from the narrow drainage swale around the edge of the Tide Garden. At its western extent this initially flows in the ground below floor glass, but further east it continues in a raised stone channel, providing a buffer to the edge of the Eden Café terrace and reception space outside the Visitor Centre, as well as informal seating opportunities along it. The linear water feature is interrupted by sections of hardwood timber decking that provide access across it. At its eastern extent the water drops down across a section of old sea wall into a sunken rain garden to the immediate south of the Bay Hall.



Proposed Layout of the Energy Field

# 4.4 THE ENERGY FIELD



### 4.4.1 Description (continued)

To the south of the east-west promenade route and opposite the main entrance is a sea foam shelter, supported by lattice timber 'energy pods', which extends in a southeast direction to meet Marine Road Central, offering a sheltered route for visitors arriving from the park and ride and coach drop-off. The energy pods will contain air source heat pump technology and also have potential to demonstrate both solar and wind harvesting, as well as integrating covered cycle parking (116 spaces) and seating for visitors.

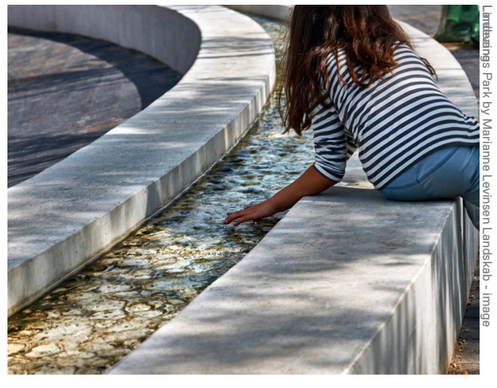
The flowing sea foam shelter interrupts or erodes its way through a pattern of repeated landform mounds (up to 2.0m high) that form the soft landscape element in the main part of the Energy Field and represent a dunescape. The orientation of the mounds, the retention of the existing pine trees, and the addition of further pine tree and other dune planting would be used to add to the shelter. The repeated dune forms will create an exciting space for visitors to explore, with the rhythm of the mounds controlling and revealing views of Eden North on the approaches, and also tying in with the concept for the dunescape roof that connects the shell-like buildings. The main soft landscape areas incorporate a children's play space, comprising bespoke play pieces constructed from natural materials, and linked to themes around energy and weather.

In the southwest part of the Energy Field are two islands of soft landscape that border Marine Road Central and provide a calm contrast to the dynamic and busy dunescape further north. The islands comprise gently rippling coastal lawns, with timber sleeper raised edges (0.5m high) used to create informal seating edges.

The Energy Field drawing (TEP reference EDNN-TEP-ZZ-Z3-DR-LA-006) provides further detail on this space.


Tumbling Playground, London by LUC - image from Landezine


Toronto desde la CN tower - Image by jrgcastro


Landscaping Park by Marianne Levinsen Landskab - image

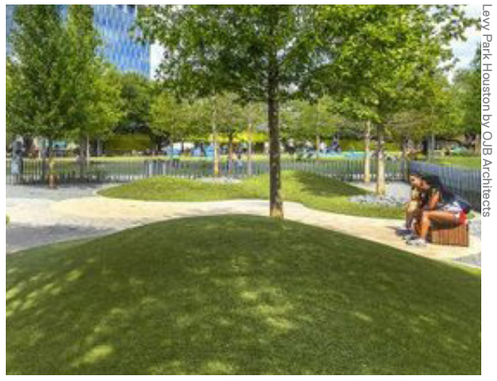

Marshalls Scoutmoor sandstone


Dune playground courtesy of Bureau Druzhba - Image Archdaily


Energy living garden by MAD architect - copyright Fangfang


Ripple Bits Wave Field, University of Michigan - image from


M Pavilion by AL_A - image from Dezeen, Photo by John Gollings


Levy Park Houston by OJB Architects

Precedent Images for the Energy Field

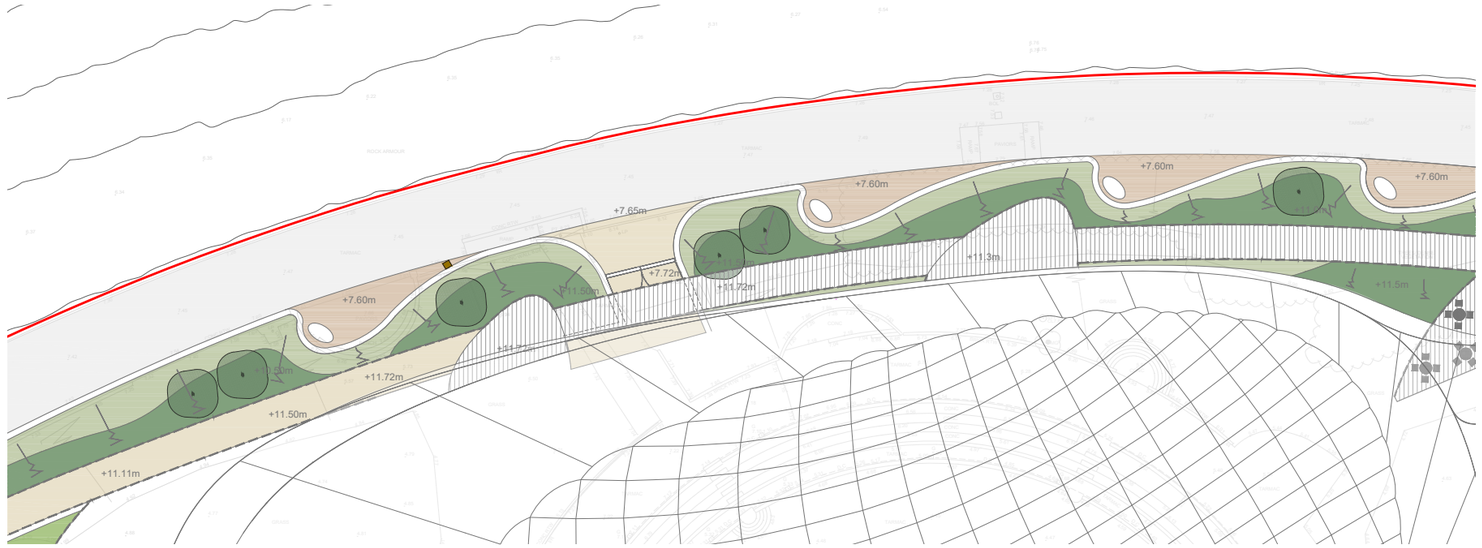
# 4.5 NORTHERN COASTAL EDGE



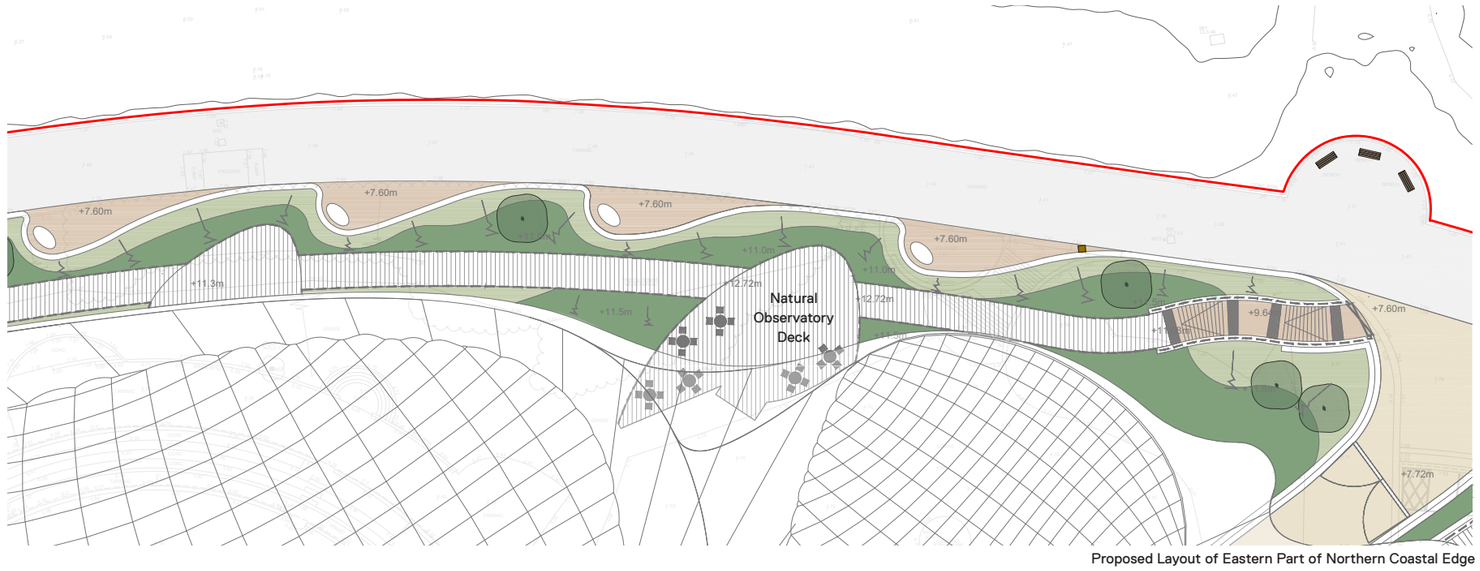
## 4.5.1 Description

At the northern extent of the visitor attraction, the existing precedent of a raised landform edge will be continued, in order to define the pay boundary on this side of the development. This edge takes reference from coastal morphology and the natural patterns of cliffs, headlands and bays and will be up to approximately +11.5m, some 4.0m above the existing promenade level (at approximately +7.5m). Within the pay boundary, a 3.0m wide elevated raised timber boardwalk route extends across the landform edge providing exhilarating views out across the Bay, as well as connecting different parts of the visitor attraction and helping with circulation.

At its western end the route continues and spirals down into the Tide Garden (refer to Section 4.3). At its eastern end the route has a controlled access connection with the northern promenade, via a set of natural stone steps with a 2.0m high decorative metal gate at the base. The steps up from the promenade provide a direct means of access to the Natural Observatory and exhibitions held in this space, as and when needed. In between, the raised boardwalk route undulates slightly across the landform edge (with boardwalk levels ranging between +11.73m and +12.72m) and at one point crosses the northwestern service access on a bridge crossing. The route also incorporates timber deck viewing points along it. These include the Natural Observatory Deck at the +12.72m level, which connects directly into Natural Observatory and could be used as an outdoor seating terrace. The edges to this deck will be formed by a 2.0m high glass balustrade to provide shelter for seating in this space. Elsewhere, the combination of the level change across the edge and a 1.0m high balustrade edge will form the pay boundary.




Proposed Layout of Western Part of Northern Coastal Edge




Proposed Layout of Eastern Part of Northern Coastal Edge

# 4.5 NORTHERN COASTAL EDGE



### 4.5.1 Description (continued)

At promenade level a series of scalloped seating bays are proposed, angled to help provide shelter from the prevailing wind, whilst offering views out. These will have a similar function to the existing pair of semi-circular seating pockets, but will be at more frequent intervals.

Level changes across the northern edge will be accommodated partly using stone clad retaining walls at promenade level (which will also function as secondary flood defence and will incorporate the retention of sections of the existing wall where this aligns with the new design) and above this vegetated retaining wall systems will be used to sculpt a flowing landform that will blend and transition into the building's dunescape roof. The planting used along the northern edge will be akin to exposed clifftop and headland plant communities, with some shrubbier and thorny species used to provide cover for birds and as a deterrent to climbing. Again, the native planting used will be designed to blend seamlessly with the planting used on the dunescape roof.

The Northern Coastal Edge drawing (TEP reference EDNN-TEP-ZZ-Z1-DR-LA-004) provides further detail on the features and design of this space. The changing levels through the space are explained on the section shown on TEP drawing EDNN-TEP-ZZ-ZZ-DR-LA-013.

The precedent images on this page illustrate the intention behind some of the design elements and the character of this landscape edge.


Image by Sarah Berriman on Unsplash


Image - Britt Willoughby Dyer for Gardenista




The Undercliff Gardens, Dover by Tonkin Liu - image World Landscape


Littlehampton by LDA Design - image World Landscape Architect

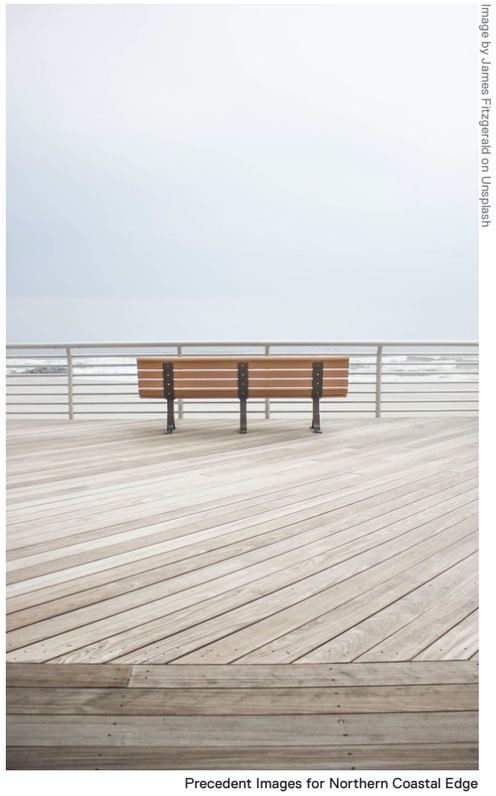
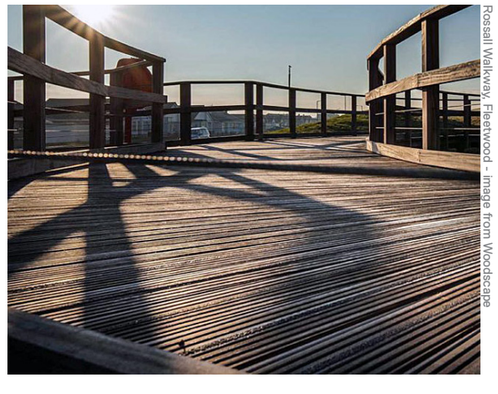

Image by James Fitzgerald on Unsplash


Image by Nancy Hann on Unsplash


Rossall Walkway, Fleetwood - image from Woodscape

Precedent Images for Northern Coastal Edge

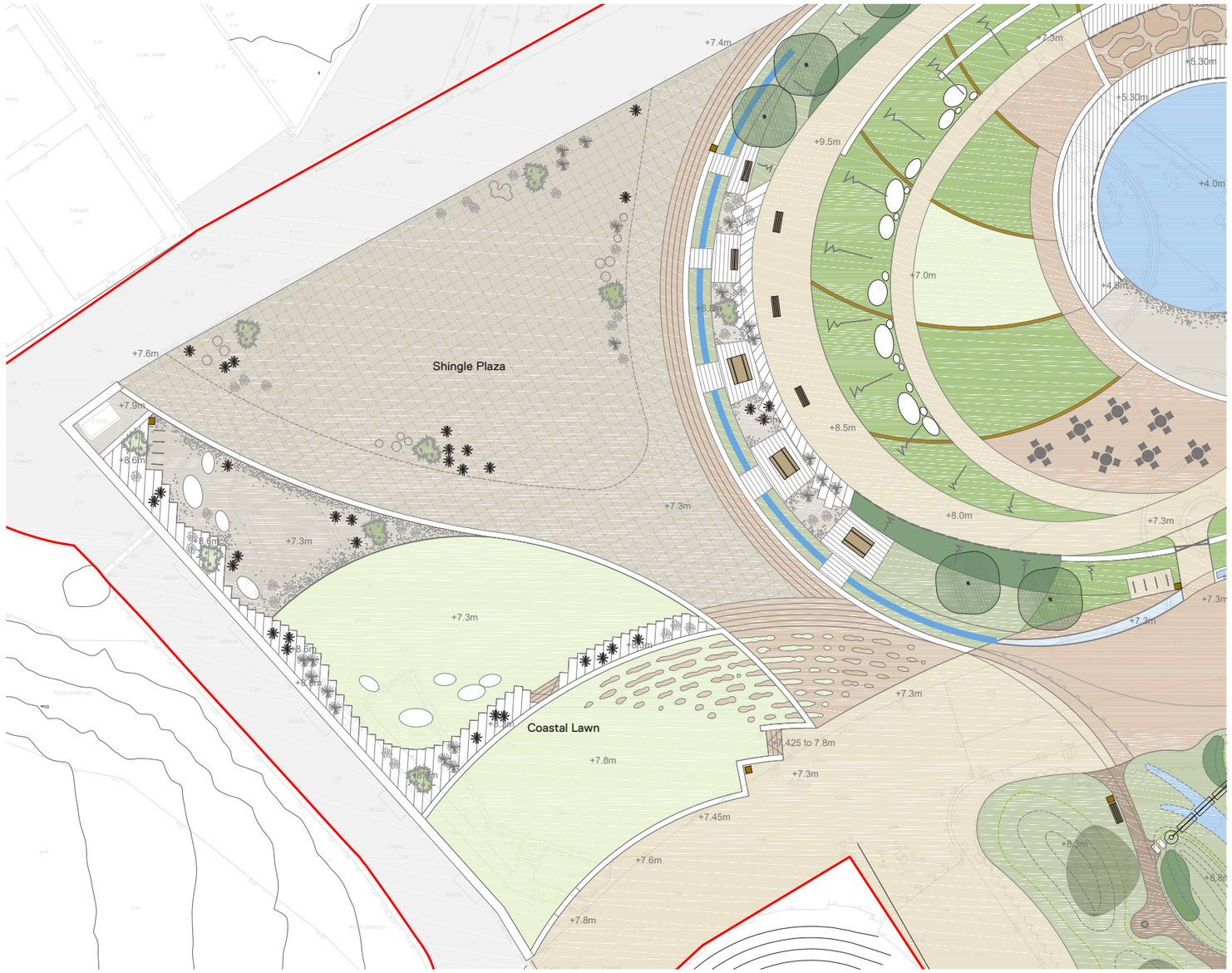
# 4.6 WESTERN SPACE - SHINGLE PLAZA & COASTAL LAWN



## 4.6.1 Description

The area to the north of the Midland Hotel and west of Eden Project North is intended to provide permissive access for the public, and designed to help facilitate the flow of pedestrians toward the Stone Jetty and around to the northern promenade. This space will comprise a coastal lawn at the southern end, divided into upper and lower areas, separated by a 0.5m level change. The shape of the upper lawn area is defined by the circular geometry of the Rotunda Bar at the Midland Hotel. This lawn will be slightly raised at +7.8m with low natural stone retaining walls to its edges, in order to create a level surface separate from the surrounding pedestrian routes, so that the space could be used as an overflow terrace by the hotel during the summer months. At-grade access is provided into the area from the promenade in the southwest corner, and elsewhere stepped accesses are incorporated. The eastern edge of the upper coastal lawn and adjacent paving incorporates a reinforced grass type artwork in the ground plane, which is an abstract representation of limestone pavement and will add interest to the space, softening the transition between hard and soft landscape areas. The upper and lower lawn areas will be planted with a low growing coastal grassland and wildflower mix.

To the north of the coastal lawn is the Shingle Plaza. This will provide an informal, but attractive space that is flexible enough in its arrangement to support the vehicle access requirements to and from the RNLI lifeboat station (via a direct route south to Marine Road Central - see Section 4.4 for reference to this). The area will be surfaced in shingle gravel to match that found locally on Morecambe's beaches and will be colonised with drought and salt tolerant native coastal plants typically found in 'strandline' communities.




Proposed Layout of Coastal Lawn and Shingle Plaza

# 4.6 WESTERN SPACE - SHINGLE PLAZA & COASTAL LAWN



### 4.6.1 Description (continued)

Plants will be randomly dispersed throughout the space, with increasing density toward the edges of the space.

Across the majority of the space the shingle will be reinforced using a recycled plastic mesh, so that it can support vehicle movements and pedestrian use. Whilst the reinforced gravel will be less suitable for wheelchairs and other mobility aids, a 2.0m wide natural stone path route at the eastern edge of the space provides a connection between the southern and northern promenades that is suitable for all and takes the shortest route between the two.

The edges of the Shingle Plaza and lower lawn area will be defined by low cliff-like forms constructed from a combination of stacked natural stone and concrete slabs (utilising demolition waste). At the western edge of the space, the low-cliff feature will sit to the rear of the existing wave wall and will sit at the same height or below it, helping to soften and integrate the wall. This edge will help to create localized shelter for seating with polished concrete or natural stone forming sculptural seating pebbles. On the opposite side of the space, the same low-cliff detail will be used to form the belvedere causeway edge to the Tide Garden. Below this edge further seating pockets are proposed (including picnic table provision) that will be accessed via timber deck crossings over a narrow drainage swale that also defines the edge of the plaza. The low-cliff type features will incorporate further planting opportunities for drought and salt tolerant native coastal plants.

The Tide Garden and Western Space drawing (TEP reference EDNN-TEP-ZZ-Z4-DR-LA-007) provides further detail on the features and design of the Shingle Plaza and Coastal Lawn.





Rough and Ready picnic table from Streetlife



Marloise Level Botanic Garden, North Carolina - image from



Teardrop Park, NY by Michael Van Valkenburg - © MVVA in





© Chris - image from Geograph



Image from Ben Barrel Sculpture



Precedent Images for Coastal Lawn and Shingle Plaza

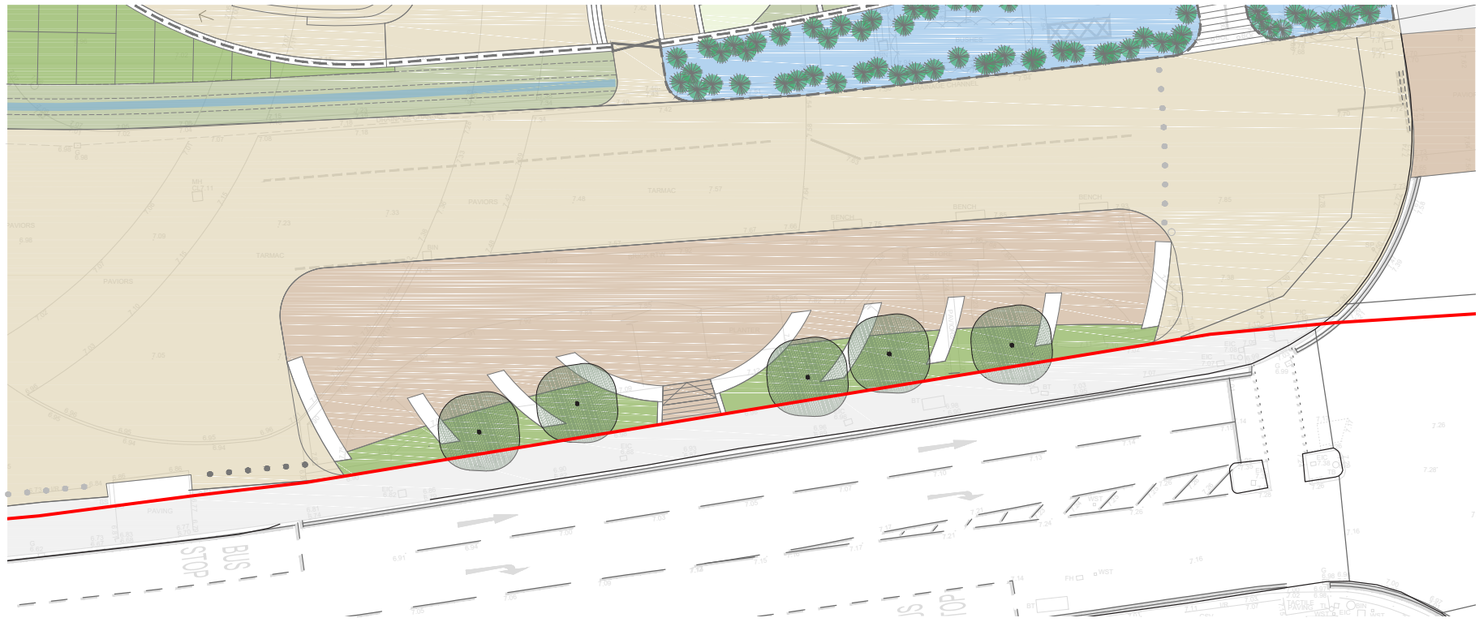
# 4.7 SEASONAL SUPPORT SPACE



## 4.7.1 Description

The Seasonal Support Space is to the south of the Rhythm Garden and directly opposite the Winter Gardens on the south side of Marine Road Central. It is intended that this area will provide a flexible space, that can accommodate temporary uses and pop-up facilities when the Rhythm Garden is being used for events, but offering a useful outdoor gathering space that could also serve the Winter Gardens. At other times the space could be used to showcase or promote exhibitions being held in the seasonal programming space within the Natural Observatory. During the summer months, temporary planters could be used to demonstrate coastal vegetable growing ideas.

The geometry of the space has been designed to reflect the architecture of the Winter Gardens and the detailed design will also look to pick out detailing seen on the listed building's façade. There is an existing level change across the space, with the promenade level to the north some 0.3m – 0.9m higher than the pavement level to the south. In order to provide the flexibility needed, the space will primarily be hard landscaped, paved in natural stone, with levels tying in with the promenade at the northern edge. On the southern edge a short set of natural stone steps provide a connection down to pavement level, and are centered on the main entrance into the Winter Gardens. To each side of the steps a gently sloping soft landscape edge is proposed to accommodate the level change. This area will be planted with a mixture of ornamental and native coastal planting, selected for their seasonal interest and decorative effect. This planting, together with a row of five ornamental trees will contribute to the greening of this part of Marine Road Central.



Proposed Layout of Seasonal Support Space

# 4.7 SEASONAL SUPPORT SPACE

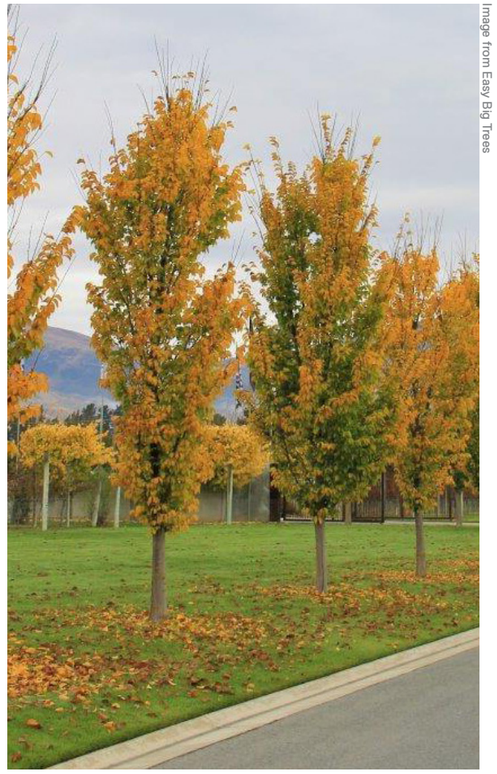


## 4.7.1 Description (continued)

A series of flat topped curved natural stone ‘fin’ walls, overlap both the hard and soft landscaped parts of the space and run across the level change, drawing the space together (and reflecting the semi-circular window detail on the Winter Gardens). The fin walls will be set at 0.5m above the level of the paving at their northern ends, so that they can be used as informal seating, with an increase in their depth on the south side of the space as the levels drop away toward the pavement.

The Rhythm Garden and Seasonal Support Space drawing (TEP reference EDNN-TEP-ZZ-Z2-DR-LA-005) provides further information on the design of this space.

The precedent images on this page illustrate some of the design elements and give an idea of the intended look and feel of the Seasonal Support Space.


Image from Easy Big Trees


Marshalls Scoutmoor sandstone


Image from London Stone


Image from Florus garden design


Image from North Coast Gardening



National Memorial Arboretum - image from Marshalls

Precedent Images for Seasonal Support Space

# 4.8 HARD LANDSCAPE MATERIALS



### 4.8.1 General Principles

The following general principles have been applied to the hard landscaping proposals:

- Ensure that materials proposed are sufficiently robust and of high quality in order to withstand the coastal environment, offering longevity and minimising the need for repair or replacement.
- Minimise carbon cost through retaining existing elements where these work with the proposed design and are in a suitable condition.
- Maximise the use of natural and locally sourced materials, such as natural stone and FSC UK sourced timber.
- Seek opportunities to re-use or recycle existing materials on site, where excavation or demolition material could be used to provide fill within raised landform, or as fill for gabion wall systems or within the low-cliff features to the edges of the Shingle Plaza.
- Minimise the use of plastic products and where it is used ensure that it is from a recycled source.
- Complement existing hard landscape materials found in the locality, whilst creating a simple palette of materials that unifies the site and is distinctive to Eden Project North.
- Utilise traditional and alternative construction methods to minimise the use of concrete, for example utilising gabions and vegetated retaining structures as opposed to more conventional reinforced concrete retaining walls.

### 4.8.2 Surfacing

The proposed surfacing is shown on drawing EDNN-TEP-ZZ-ZZ-DR-LA-008.

#### Retention of Existing

In the first instance, where existing surfacing is in reasonable condition this would be retained, rather than re-surfacing being carried out throughout the site. The northern promenade is consistently surfaced in a hot rolled asphalt with red coated chippings and is in a good condition and so it is proposed that this surface is retained as is. There are two small areas where there are locally raised levels at its southern edge (linked to the previous site design) that will need to be removed and the surfaced patched in to match. Similarly there is no immediate need to re-surface the existing pavement along the northside of Marine Road Central. Where surfacing is proposed for replacement then as far as possible, existing surfaces and build-up below ground will be used as a starting point, rather than excavating out and replacing.

#### Natural Stone

Natural stone paving will be used across The Energy Field to the south of the Visitor Centre. This plaza area forms the main approach to the building and a high quality finish in this area is considered important. A mixture of locally sourced natural stone is envisaged, with the predominant material intended to be a Pennine sourced sandstone. Smaller elements of limestone and slate could be used to add detailing linked to the interpretation of the energy story of the building and depicting the flow of wind and water through the space.



Existing surfacing to northern promenade



Buff Asphalt used in most recent resurfacing works along the promenade

# 4.8 HARD LANDSCAPE MATERIALS



## Natural Stone (continued)

A similar palette of natural stone will also be used to pave:

- the Seasonal Support Space opposite the Winter Gardens with detailing reflecting features of the listed building's facade;
- the permanent stage within the Rhythm Garden with the potential for incorporating elements of interpretation/ story telling in the detailing;
- the stepped accesses leading up from the northern promenade (with contrasting stone tactile paving units integrated);
- the scalloped seating pockets to the edge of the northern promenade (in order to complement and contrast with the retention of the existing hot rolled asphalt surface and with the potential to include elements of interpretation in the detailing);
- the garden terraces and rockpool and salt marsh water features in the Tide Garden; and
- the abstract limestone pavement artwork to the edge of the Coastal Lawn and paved edge to the Shingle Plaza.

## Buff Asphalt

This bound material has been used in the most recent resurfacing works along the promenade (as part of the flood defence scheme) including the section of promenade to the immediate north of the Midland Hotel and extending up toward the Stone Jetty, and appears to be coping well with conditions. For consistency, it is proposed that this material is also used to resurface the southern promenade within the site, to each side of the Energy Field, and also the controlled vehicle access route along the east side of the Midland Hotel's grounds. The existing surfaces in these areas are in need of replacement as they are in variable condition, with some asphalt sections already having been patched-in, and they also include areas of block paving in part, which are not consistent with the proposed design. The use of a bound asphalt material will provide a smooth surface suitable for pedestrians and for vehicle over-run. For consistency, this material will also be used to surface the service accesses to the building.

As a bound surface, this material will be particularly suited to being laid within the curved shapes of the Rhythm Garden terraces, and so this material is also proposed for the surfaced areas in this space, and also for the curved path routes within the Tide Garden.



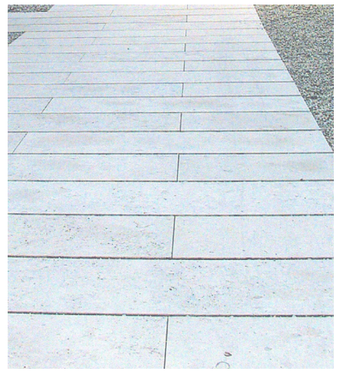
Marshalls Scoutmoor sandstone

Sandstone paving



Image from Welsh Slate

Slate



LImestone



Tarmac Ulticolour at Surf Snowdonia

Buff Asphalt

# 4.8 HARD LANDSCAPE MATERIALS



## Hardwood Timber Decking & Boardwalks

In order to achieve the access levels required across the Northern Coastal Edge and within the Tide Garden, raised hardwood timber boardwalks and decks are proposed here. The Glade Café Deck will also be constructed as a timber deck with the 1:21 gradient access route forming a timber boardwalk that curves from the terrace southeast to the southern promenade. Hardwood is proposed for its longevity and bauxite resin strips will be incorporated into deck boards to ensure that surfaces are anti-slip.

Smaller areas of timber decking are also included within the breaks in the water feature at the Visitor Centre edge and also a small sections of boardwalk are incorporated into parts of the children's play area.

The decking will offer a point of contrast to the bound and natural stone surfaces seen elsewhere within the scheme, and will celebrate the site's coastal location.

## Self-binding Gravel

Locally sourced buff coloured self-binding gravel will be used to surface the network of paths that will provide access through the main part of the children's play area, with treated softwood timber edges.

## Loose & Reinforced Shingle Gravel

A combination of loose and reinforced shingle gravel will be used within the Shingle Plaza to the west of the site, and will also be used within the beach area, adjacent to the tidal pool in the Tide Garden. The shingle gravel will be approximately 10-35mm aggregate size, with the colour mix and stone type matching that found on the beaches in Morecambe. Recycled plastic mesh will be used to reinforce the gravel where pedestrian use will be greatest and where vehicle over-run (by RNLI) is anticipated. The grade and depth of reinforcement will be adjusted to suit the loading requirements.



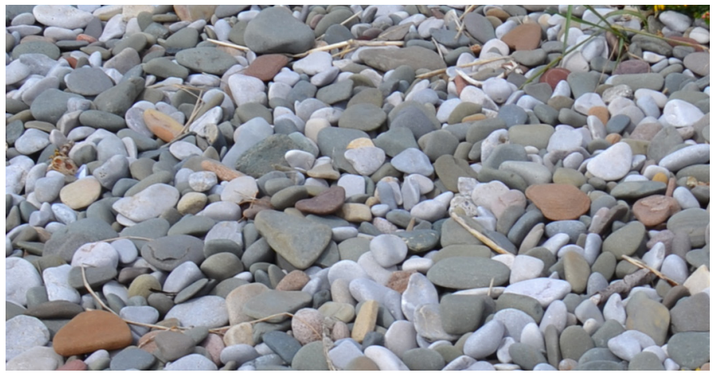
Image from NBS Source

Hardwood timber decking with anti-slip strips



Image from Soft Surfaces

Self-binding gravel



Shingle gravel

# 4.8 HARD LANDSCAPE MATERIALS



### 4.8.3 Retaining walls & structures

For the main retaining structures in the landscape either welded mesh gabion baskets or vegetated retaining wall systems will be used.

It is anticipated that gabions filled with either graded stone or graded and suitable demolition waste will be used to form the landform edge to the north and northeast of the Rhythm Garden and Glade Café Deck, as well as the retaining structures to each side of the adjacent service access. Gabion retaining structures will also likely be used within the Tide Garden to help form some of the level changes.

Along the Northern Coastal Edge, sections of the existing secondary defence wall (approximately 1.0m high) will be retained, with new sections added to accommodate the scalloped seating pockets and service accesses. The entire wall will be clad in locally sourced natural stone in order to create a unified finish. Behind the secondary flood defence wall, a vegetated retaining wall system will be built using interlocking geotextile bags filled with growing media and pre-seeded with a cliff-top coastal grassland seed mix. It is anticipated that a similar vegetated retaining wall system will also be used to form the northern edges of the Rain Garden adjacent to the Bay Hall service access.

Elsewhere low height retaining walls will be required, such as to the edges of the raised Coastal Lawn in the western part of the site, the viewing terraces in the Rhythm Garden and the raised channel water feature running in front of the Visitor Centre. It is anticipated that these will either be finished in natural stone or entirely constructed from natural stone.

For the rippled lawn areas in the southern part of the Energy Field, 0.5m high retaining edges will be constructed from hardwood timber sleepers.

In the Shingle Plaza, the low cliff-edges comprising stacked concrete slab (demolition waste) and/or natural stone slabs will be used to form retaining structures on the east and western sides of the space.



Gabion baskets



Image from ACF Environmental

Vegetated retaining wall system



Image from Marshalls

Natural stone low height retaining edges



Image from Sikkens

Timber sleeper edge



Landform Park by Michael Van Valkenburg - © MVVA in

Stacked natural stone forming retaining edge

# 4.8 HARD LANDSCAPE MATERIALS



### 4.8.4 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 proposed boundary treatments are shown on drawing EDNN-TEP-ZZ-ZZ-DR-LA-009.

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.

At the edges of the raised decks on the Northern Coastal Edge and to the edges of the Glade Café Deck and Outdoor Restaurant Terrace, it is anticipated that a taller 2.0m high balustrade will be used to create shelter from the wind.

The boundary treatment palette predominantly uses a combination of glass balustrade and vertical slat hardwood timber balustrade. Where these are used at a height of 1.0m, a hardwood timber handrail will be incorporated to marry the two styles. The glass balustrade will be used in locations where uninterrupted views from the building and/or landscape are particularly important. As some of the precedent images illustrate on this page, the use of vertical timber slats or fins to the timber balustrade will create a sense of flow and rhythm as users walk alongside as the angle of view alters the pattern of the verticals. To the southern edge of the Rhythm Garden, it is envisaged that the vertical timber slats used within the fencing could rotate, similar to louvred blinds, to allow control of views into the space and help contain sound.

Part of this fenceline will be removable so that during full-scale events the area can accommodate a larger temporary stage and backstage area.

To the southeast edge of the Rhythm Garden, a 0.5m high hardwood timber knee rail will be installed to the edge of the waterbody.

To the southern edge of the Tide Garden, a curved 2.0m high freestanding natural stone wall is proposed to separate the southern promenade and Eden Café terrace outside the pay boundary from visitors to the garden. There is potential for this wall to incorporate artwork and interpretation.

A curved 2.0m high freestanding wall is also proposed at the southeast corner of the Rhythm Garden to protect this edge and control views in and out of the space at this point. It is anticipated that this wall will have a masonry finish to match that used on the nearby Bay Glade building.

At controlled pedestrian access points onto the promenades 2.0m high decorative metal gates will be used. The only other gates will be the flood gates, installed at the northern service access points off the promenade. It is anticipated that these will be approximately 1.0m high steel and timber gates, which will also function in protecting the building edge.



Hastings Pier by dmm architects - image from ArchDaily

Hardwood timber vertical slat balustrade



Hereford College of Arts by BD Landscape Architects

Slats acting as louvres to control views and sound



Hastings Pier by dmm architects - image from ArchDaily

Glass balustrade



Freestanding stone wall incorporating artwork

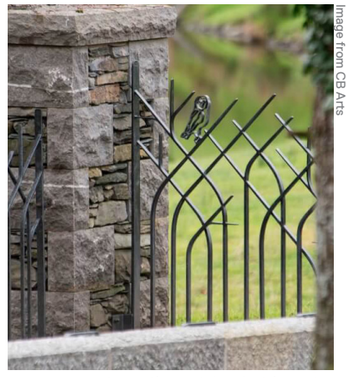


Image from CB Arts

Decorative metal pedestrian gates

# 4.8 HARD LANDSCAPE MATERIALS



### 4.8.5 Furniture

A distinct and complementary palette of street furniture will be installed in the landscape surrounding the visitor attraction, using a combination of off-the-shelf and/or bespoke elements. The street furniture proposed will seek to maximise the use of natural materials, with the use of hardwood timber elements in seats, picnic tables, litter bins and cycle stands. Obviously the use of metal will be unavoidable for certain items, such as fixed and retractable bollards, and for elements of cycle stands. In these instances, the quality of the item will be important and the use of 316 grade stainless steel to ensure a robust finish suitable for the coastal location.

As the precedent images on this page shows it is envisaged that the wave and pebble forms will be used for seating, and the incorporation of an undulating wave form could also be used in the detailing of other items of street furniture. Sculptural pebble seats could be made from polished natural stone, or recycled concrete from demolition waste, and also from timber.

### 4.8.6 Children's Play Elements

The majority of elements in the children's play space within the Energy Field will be bespoke, designed to work with the site specifics and surrounding context, and will predominantly use hardwood timber for frames and supports. TEP drawing EDNN-TEP-ZZ-Z3-DR-LA-006 provides further detail on the different play elements included in the design and the precedent images on this page give an idea of the intended character of the naturalistic play space. It is anticipated that the maximum height of any play structures will be 3m to 4m above the general surrounding ground level, when taken into account together with the proposed landform mounds (up to 2m in height).


Tumbling Playground, London by LUC - image from Landezine

Children's play - climbing net


Image from Green Play Project

Children's play - tunnel

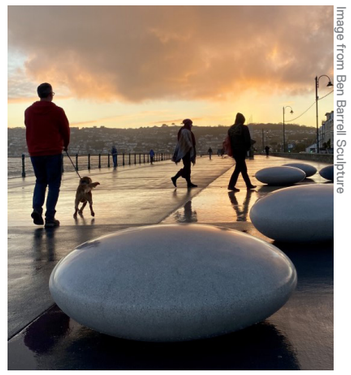

Le Parcours du Chemin by Mutabilis LA - © Herve Abbadie in

Children's play - stepping stones

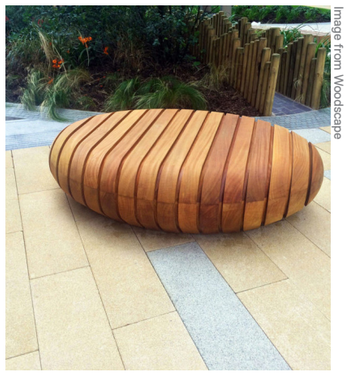

Children's play - interactive vortex


Bereg Severnaya Embankment, Moscow by Wowhaus - image in

Furniture - curved timber seating


Image from Ben Barrell Sculpture

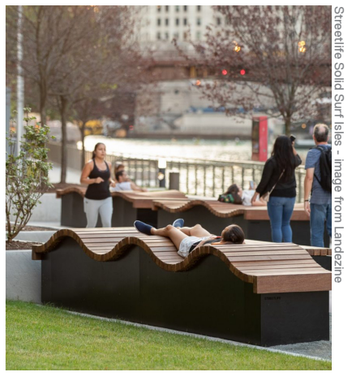
Furniture - polished stone pebble seat


Image from Woodscape

Furniture - timber pebble seat


Steelwood bike rack Hermes by Union - image from Stylepark

Furniture - cycle stand


Streetlife Solid Surf Isles - image from Landezine

Furniture - wavy timber bench


Image from Perimeter Solutions (Automation) Ltd

Furniture - stainless steel retractable bollards

# 4.9 PLANTING STRATEGY



## 4.9.1 Overall Approach

The planting strategy for the site seeks to incorporate the use of native species found in coastal habitats in order to maximise the biodiversity and potential habitat value of the site. This approach to planting will offer an alternative to traditional ornamental and amenity seaside planting, and will provide an educational opportunity. By using plants suited to local coastal conditions, planting will be suitably robust, able to withstand the levels of salt and weather exposure (including drier periods), representing a sustainable approach to the long-term management of the landscape.

### 4.9.2 Trees

There is limited scope for wide scale tree planting across the site, although proposed trees have been included wherever appropriate, to add to the character and diversity of the bayscape.

A mixture of native and non-native species will be used. This is with the aim of avoiding the creation of a monoculture, which would make the tree stock more vulnerable to diseases in the future. Native species have been included to complement the coastal habitats represented and for their particular wildlife value. All have been chosen for their ability to withstand coastal exposure.

An ornamental elm cultivar (Ulmus 'Lobel') is proposed for the row of five trees opposite the Winter Gardens. This cultivar has a particularly upright and tidy form, is suitable for street planting, and will be able to withstand the levels of exposure.

The Energy Field will include the retention of the existing Corsican pines (Pinus nigra subspecies Maritima). These will be added to, together with Pinus nigra (another non-native pine that is very well suited to the conditions) and native Scot's pine (Pinus sylvestris). This assemblage of pine trees will create a striking visual effect on the approach to Eden North.

Further north, around the edges of the Tide Garden and Rhythm Garden, and along the Northern Coastal Edge, a good proportion of native tree species are proposed with a smaller number of non-native included for interest, including some pine species to provide continuity moving away from the Energy Field. The intention is that the trees along these edges will not have regular, symmetrical canopies, but will become windswept over time, adding interest and character. For this reason, where available multi-stems and some smaller specimens will be used to encourage interesting forms to develop. The following trees are proposed for these coastal edges:

Native trees:

- Alnus glutinosa (as a multi-stem)
- Betula pubescens (as a multi-stem)
- Crataegus monogyna
- Ilex aquifolium
- Pinus sylvestris

Non-native trees:

- Hippophae salicifolia 'Robert' (male form that does not produce seed)
- Pinus nigra
- Pinus nigra subsp. Maritima
- Tamarisk gallica



Existing Pinus sylvestris on site



Image from Plant Partner

Ulmus 'Lobel'



Image from Plant Partner

Crataegus monogyna flowers



Image from Wyevale Nurseries

Pinus nigra foliage



Image from Barcham Trees

Tamarisk gallica



Image from Barcham Trees

Betula pubescens catkins

# 4.9 PLANTING STRATEGY



### 4.9.3 Shrub & Groundcover Planting (incl. Grassland)

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, as well as to create an assemblage that is representative of the original plant community.

The native plant communities proposed for different parts of the site 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
- Rain Garden (between the Rhythm Garden and Energy Field): stream gulley plant community

In addition the dunescape roof to the building will also be planted with a mixture of low growing coastal grassland and dune plants.

Some areas of mixed ornamental and native coastal planting are also proposed. These will comprise 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. This mixed coastal planting will also include native species in order to add to the wildlife value of this planting and to showcase a hybrid approach, which visitors could use in their own gardens.



Cliff-top and headland plant community



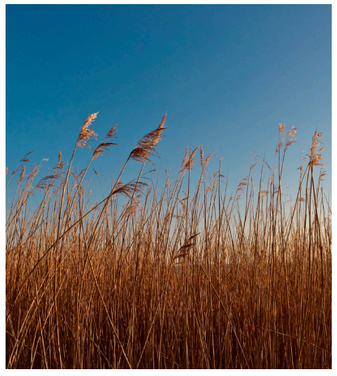
Cliff edge plants



Dune habitat



Low growing coastal grassland



Reed Bed habitat



Strandline plants

### 4.9.4 Plant Sourcing and Sizes

Some of the plant stock proposed will likely need to be specially grown for the project, with the potential to grow plants from seed collected locally (with landowner agreement). In the case of the coastal grassland areas, this could involve the seeding and establishment of turf offsite, before being lifted and installed.

All other plants will be sourced as locally to the site as possible and all plants used on the project will be grown in peat-free media. Acclimatisation of all plants will be very important, with the project likely to look for a holding site nearby where plants can be looked after for this period. Successful establishment will also rely on the right soils and good ground preparation, planting, and aftercare.

It is proposed that planting is supplied in a mix of sizes, to add robustness to the planting strategy.

Perennials will likely be specified in container sizes ranging from plug cells (50cc) through to 5 litres, and shrubs from 1 litre through to 15 litres.

Within the Energy Field, Tide Garden and Rhythm Garden edges, and Northern Coastal Edge trees of the same species will also be specified in a range of sizes on the basis that those planted the smallest will likely establish better in the long-run, but some larger specimens will be included for their early impact. Trees specified will range in height from 175-200cm to 350-400cm. The larger deciduous tree stock and all evergreen trees will be supplied in containers or as root balls.

The Ulmus ‘Lobel’ (elm cultivar) trees proposed opposite the Winter Gardens will be specified as container grown, 16-18cm girth Extra Heavy Standard trees, with a height of 400-450cm and clear stem of 200cm minimum.

### 5.5.5 Initial Planting Palettes

The plant lists on the following pages provide an initial palette for each of the planting types.

Strand Line Planting

- Atriplex laciniata (frosted orache)
- Armeria maritima (sea thrift)
- Beta vulgaris (sea beet)
- Cakile maritima (sea rocket)
- Crambe maritima (sea kale)
- Crithmum maritimum (rock samphire)
- Eryngium maritimum (sea holly)
- Euphorbia paralias (sea spurge)
- Honkenya peploides (sea sandwort)
- Juncus gerardi (saltmarsh rush)
- Ligusticum scotium (Scots lovage)
- Leymus arenarius (lyme grass)
- Mertensia maritima (oysterplant)
- Plantago coronopus (Buck’s horn plaintain)
- Rumex crispus (curled dock)
- Silene maritima (sea campion)


Image from Gardenia
Eryngium maritimum


Image from Maryland Biodiversity Project
Juncus gerardi


Image from Enchanted Gardens Kent
Crambe maritima


Image from Wildflower by Derek Mayes
Mertensia maritima


Image by Kristian Peters on Wikipedia
Leymus arenarius


Image from Ray Cannon’s Nature Notes
Euphorbia paralias

## 4.9 PLANTING STRATEGY



### Cliff Edge Planting

- Armeria maritima (sea thrift)
- Festuca rubra (red fescue)
- Ligustrum scoticum (Scots lovage)
- Lotus corniculatus (bird’s foot trefoil)
- Matricaria maritima (sea mayweed)
- Plantago coronopus (buck’s horn plantain)
- Plantago maritima (sea plantain)
- Primula vulgaris (primrose)
- Rhodiola rosea (roseroot)
- Sedum acre (biting stonecrop)
- Silene maritima (sea campion)
- Spergularia rupicola (rock sea-spurrey)


Image from Magic Garden Seeds

Armeria maritima


Image from Global Food Book

Juniperus communis


Image from Native Plant Trust Go Botany

Plantago maritima


© P.Shannon on Online Atlas of the British and Irish Flora

Scilla verna


Image from ukwildflowers.com

Silene maritima


© Jim Wilson on Flickr

Rhodiola rosea


Image from freenatureimages.eu

Matricaria maritima


Image from Cumbriabotany.co.uk

Crithmum maritimum

### Cliff Top/Headland Planting

Shrubs:

- Juniperus communis (common juniper)
- Ligustrum vulgare (wild privet)
- Rosa canina (dog rose)
- Ulex europaeus (common gorse)
- Salix cinerea (grey willow)

Perennials:

- Achillea millefolium (yarrow)
- Agrostis stolonifera (creeping bent)
- Carex distans (distant sedge)
- Centaurium erythraea (common centuary)
- Crithmum maritimum (rock samphire)
- Festuca rubra (red fescue)
- Holcus lanatus (Yorkshire fog)
- Lotus corniculatus (bird’s foot trefoil)
- Plantago lanceolata (ribwort plantain)
- Scilla verna (spring squill)
- Silene maritima (sea campion)
- Trifolium repens (white clover)

## 4.9 PLANTING STRATEGY



### Low Growing Coastal Grassland

- Achillea millefolium (yarrow)
- Anthyllis vulneraria (kidney vetch)
- Armeria maritima (thrift)
- Agrostis stolonifera (creeping bent)
- Carex caryophyllea (spring sedge)
- Carex distans (distant sedge)
- Centaurium erythraea (common centuary)
- Crithmum maritimum (rock samphire)
- Festuca rubra (red fescue)
- Holcus lanatus (Yorkshire fog)
- Leontodon autumnalis (autumn hawkbit)
- Lotus corniculatus (bird’s foot trefoil)
- Plantago coronopus (buck’s horn plantain)
- Plantago lanceolata (ribwort plantain)
- Plantago maritima (sea plantain)
- Potentilla erecta (tormentil)
- Scilla verna (spring squill)
- Sedum anglicum (English stonecrop)
- Spergularia rupicola (rock sea-spurrey)
- Trifolium repens (white clover)



Achillea millefolium



Ammophila arenaria



Anthyllis vulneraria



Salix repens



Festuca rubra



Centaurea nigra agg.

### Dune Planting

- Achillea millefolium (yarrow)
- Ammophila arenaria (marram grass)
- Anthyllis vulneraria (kidney vetch)
- Campanula rotundifolia (harebell)
- Centaurea nigra agg. (knapweed)
- Erodium cicutarium (common stork’s bill)
- Eryngium maritimum (sea holly)
- Euphorbia paralias (sea spurge)
- Leymus arenarius (lyme grass)
- Luzula campestris (field woodrush)
- Ononis repens (restharrow)
- Plantago coronopus (buck’s horn plantain)
- Salix cinerea (grey willow)
- Salix repens (creeping willow)
- Sedum acre (biting stonecrop)
- Thymus praecox (wild thyme)
- Trifolium arvense (hare’s foot clover)
- Trifolium campestre (hop trefoil)
- Vicia sativa (common vetch)
- Viola riviniana (common dog violet)

## 4.9 PLANTING STRATEGY



### Low Growing Wetland Planting

- Anagallis tenella (Bog pimpernel)
- Carex hirta (hairy sedge)
- Carex nigra (common sedge)
- Dactylorhiza purpurella (northern marsh orchid)
- Epipactis palustris (marsh helleborine)
- Galium palustre (marsh bedstraw)
- Hydrocotyle vulgaris (marsh pennywort)
- Juncus articulatus (jointed rush)
- Lycopus europaeus (gipsywort)
- Mentha aquatica (water mint)
- Oenanthe lachenalii (parsley water dropwort)
- Ranunculus flammula (lesser spearwort)

### Reed Bed Planting

- Phragmites australis (common reed)
- Sparganium erectum (branched bur reed)


Image from Chiltern Seeds

Mentha aquatica


Image from The Palm Centre

Asplenium scolopendrium


Dr Mary Gillham - Image from Flickr

Oenanthe lachenalii


© Erik the Cat - Image from Flickr

Iris foetidissima


Image from First Nature

Sparganium erectum


Image from Plants for Ponds

Dryopteris filix-mas


Image from Raw Edible Plants

Fragaria vesca


Image from mygarden.org

Blechnum spicant

### Stream Gulley Planting

- Asplenium scolopendrium (hart's tongue fern)
- Asplenium trichomanes (maidenhair spleenwort)
- Blechnum spicant (hard fern)
- Dryopteris filix-mas (male fern)
- Fragaria vesca (wild strawberry)
- Iris foetidissima (gladwyn iris)
- Linum catharticum (fairy flax)
- Osmunda regalis (royal fern)
- Polypodium vulgare (common polypody fern)
- Polystichum setiferum (soft shield fern)

## 4.9 PLANTING STRATEGY



### Mixed Coastal Planting

- Achillea species including A.millefolium (yarrow)
- Armeria maritima (sea thrift)
- Aster species including A.tripolium (sea aster)
- Crambe maritima (sea kale)
- Cistus x pulverulentus ‘Sunset’ (rock rose)
- Erica carnea (heather)
- Erigeron karvinskianus (Mexican fleabane)
- Eryngium species (sea holly)
- Euphorbia paralias (sea spurge)
- Festuca glauca ‘Elijah Blue’ (blue fescue)
- Genista lydia (Lydian broom)
- Hebe x franciscana ‘Blue Gem’ (shrubby veronica)
- Leymus arenarius (blue lyme grass)
- Libertia grandiflora (New Zealand satin flower)
- Perovskia atriplicifolia ‘LIttle Spire’ (Russian sage)
- Phlomis russeliana (Turkish sage)
- Rosmarinus officinalis (rosemary)
- Santolina rosmarinifolia ‘Lemon Fizz’ (cotton lavender)
- Sedum telephium ‘Purple Emperor’ (stonecrop)
- Stipa tenuissima (Mexican feather grass)


Gail Hampshire on Flickr
Euphorbia paralias


Image from Norfolk Quality Plants
Citus x pulverulentus ‘Sunset’


Image from Pinterest (hedging.co.uk)
Perovskia atriplicifolia ‘Little Spire’


Image from Hopes Grove Nurseries
Santolina rosmarinus ‘Lemon Fizz’


Image from 4seasons seeds
Crambe maritima


© Carl Farmer - Image from www.plantidentification.co.uk
Aster tripolium


Image from Givetrees
Libertia grandiflora


Image from Palmstead
Hebe x franciscana ‘Blue Gem’


Image from USPerennials
Achillea millefolium ‘Moonshine’


Image from Gardens4You
Festuca glauca ‘Elijah Blue’


Image from Dorset Perennials
Sedum telephium ‘Purple Emperor’


Image from Gardenia
Stipa tenuissima

SECTION 5

# Accessibility & Inclusivity

**Considers the way people travel to, enter and exit the development. Includes the servicing, parking, pedestrian and cyclist strategies.**

ACCESS & INCLUSIVITY

# 5.1 TRANSPORT STRATEGY OVERVIEW

5.0

It is important to note that Eden Project North will employ a strict timed-ticket, advance-booking system where the number of visitors per day and hour will be controlled and limited.

The operational calendar is split into:

- Peak (100 days at 3,750 visitors per day)
- Inter-peak (200 days at 2,500 visitors per day)
- Off-peak (60 days at 1,250 visitors per day)

Similarly, the ticketing system and the building design allows a maximum of 750 visitor arrivals per hour. These figures have been developed after numerous demand/capacity modelling studies carried out by EPIL and their appointed consultants.

The 100 peak days will occur on summer holidays, school holidays, bank holidays, summer weekends, school holiday weekends and bank holiday weekends.

It should be noted that not all 100 peak days are likely to attract 3,750 daily visitors. There will be 'super peak days' within the peak season which attract up to 3,750 daily visitors, but many of the 100 peak season days will attract much less than 3,750 daily visitors.

The Eden Transport Strategy has been developed based upon the original Eden Transport Vision which looks at using the development as a catalyst for more sustainable travel and an improved environment in the town centre. Collaboration with statutory and non-statutory stakeholders has been key to develop a transport strategy that aligns with the proposed development's ethos and sustainability aspirations whilst providing a realistic Opening Year solution that complies with planning policy.

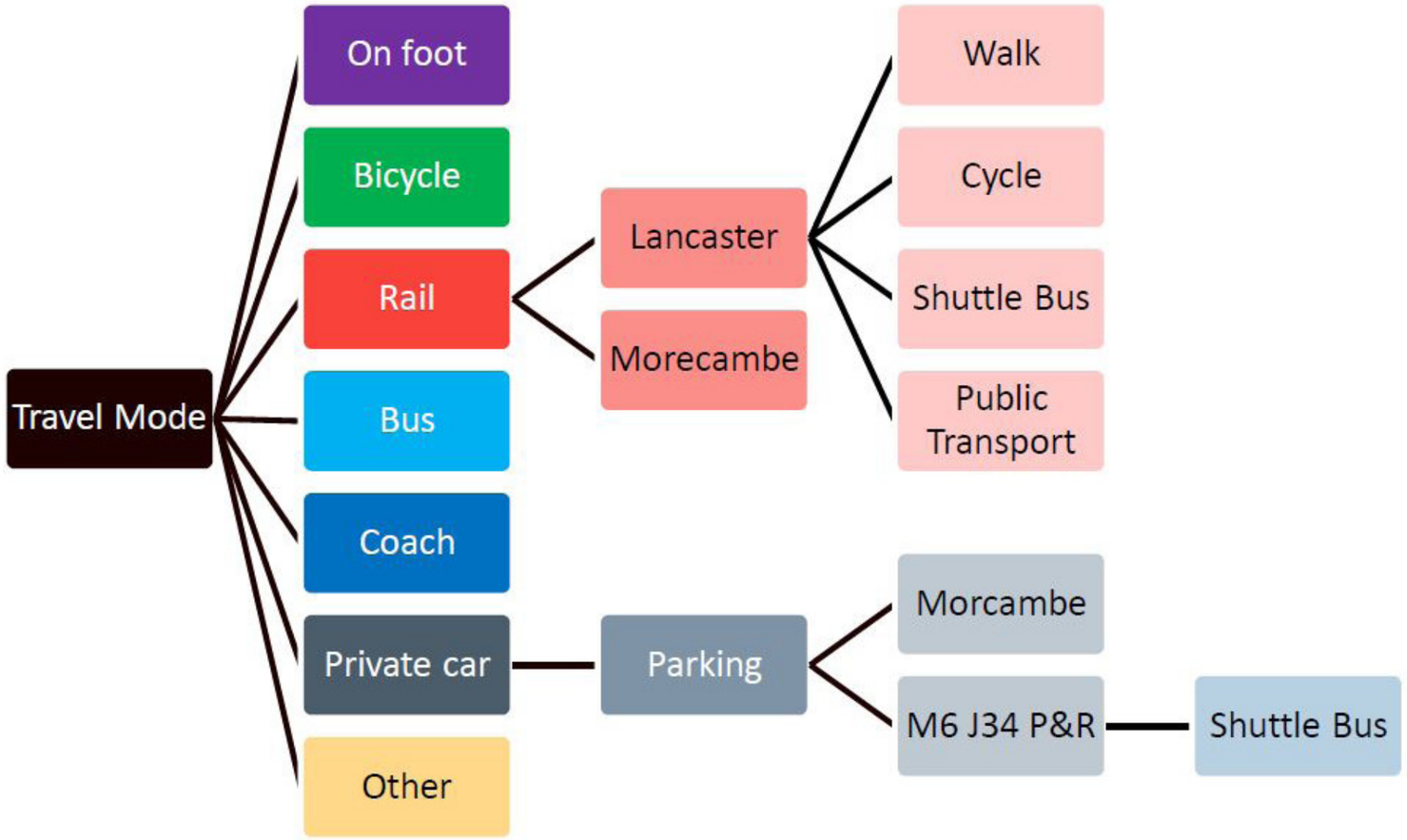
The multi-modal transport strategy is 'live' and will continue to evolve as EPIL has demonstrated at Eden Project (Cornwall), where over the past 20 years the site and transport strategy has continued to adapt to latest trends and technologies.

However, it needs to be acknowledged that a series of internal and external interventions (e.g. regeneration of the Festival Market area, better rail services between Lancaster and Morecambe and/or public transport integrated ticketing options) are anticipated to be brought forward by a range of parties, with full support from EPIL, following the submission of this planning application, and as highlighted in greater detail in the Transport Assessment and Travel Plan.

# 5.1 TRANSPORT STRATEGY OVERVIEW



The key principle of the EPN Transport Strategy is to encourage people to arrive by non-car modes, particularly for their 'last mile' of the journey. However, there is also a practical reality that in the Opening Year many visitors will still seek to travel by car, as 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 itself has limited congestion, with a large proportion of visitors arriving by car, the aim is to intercept as many car trips as possible as they leave the Motorway at the M6 Junction 34, where there is an underused and recently built Park and Ride amenity. Others would use readily available, underutilised existing parking in the town centre, with these two amenities being linked through ticketing to allow a dynamic and flexible response according to demands.




Multi-modal Strategy, Travel Methods

[1] The listed sites provide pre-booked time controlled booking systems as per July 2021.

[2] Museums run by Lancashire CC requiring pre-booked tickets include Clitheroe Castle, Gawthorpe Hall, Helmshore Mills Textile Museum, Judges' Lodgings Lancaster and Queen Street Mill Museum.

# 5.1 TRANSPORT STRATEGY OVERVIEW

5.0

A time controlled and advance booking system will allocate visitors a specific time slot to arrive and enter the site. This will allow EPIL to control, manage and influence the visitors demand throughout the day and year, smoothing out traditionally large peak demand in terms of both 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.

As with all time controlled and advance booking systems, there will be some degree of flexibility to recognise visitors experiencing unexpected events on their journey to the proposed development (e.g. booked rail service delayed so visitor would arrive late to their booked time slot). However, visitors will be strongly encouraged to visit the proposed development at their booked time slot.

The time controlled and advance booking system is a way of spreading visitor numbers throughout the day to avoid any large peaks, enhancing the overall visitor experience.

This system was an innovative vision developed by EPIL in 2019 which was not commonly used amongst major leisure attractions at that time. However, the COVID pandemic and associated visitor limits have resulted in most leisure developments introducing time controlled and advance booking systems. Some examples include the Lancaster Castle and all Museums run by Lancashire CC , the recently opened RHS Bridgewater Garden, Chester Zoo, Alton Towers, Blackpool Pleasure Beach, The Forbidden Corner, Fell Foot Park and the Eden Project (Cornwall) itself. In Cornwall the EPIL team has learnt invaluable lessons on how to manage a time controlled and advance booking system, and how it can enhance the visitor experience to Eden Project (Cornwall) as visitors have been spread out across the day effectively removing the large arrivals peaks that used to occur in the early morning hours.

Whilst this pre-booked time controlled booking system was for many sites forcibly introduced in light of COVID Government guidelines, many sites have reported a positive experience and are likely to continue encouraging visitors to book their tickets in advance. Eden Project (Cornwall) will definitely be amongst those sites that will continue to do so, aligning with what was originally proposed in 2019 for EPN in Morecambe.

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).

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.

This system will enable EPIL to control, manage and influence/incentivise how visitors travel to the proposed development. EPIL 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 EPIL 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 EPIL to make use of existing underused resources in a sustainable manner.

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 EPIL to collaborate with both Councils and relevant transport bodies to ensure that transport demand is accommodated accordingly. For example, EPIL 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 either additional rail/EPN staff may be required at Lancaster Railway Station.

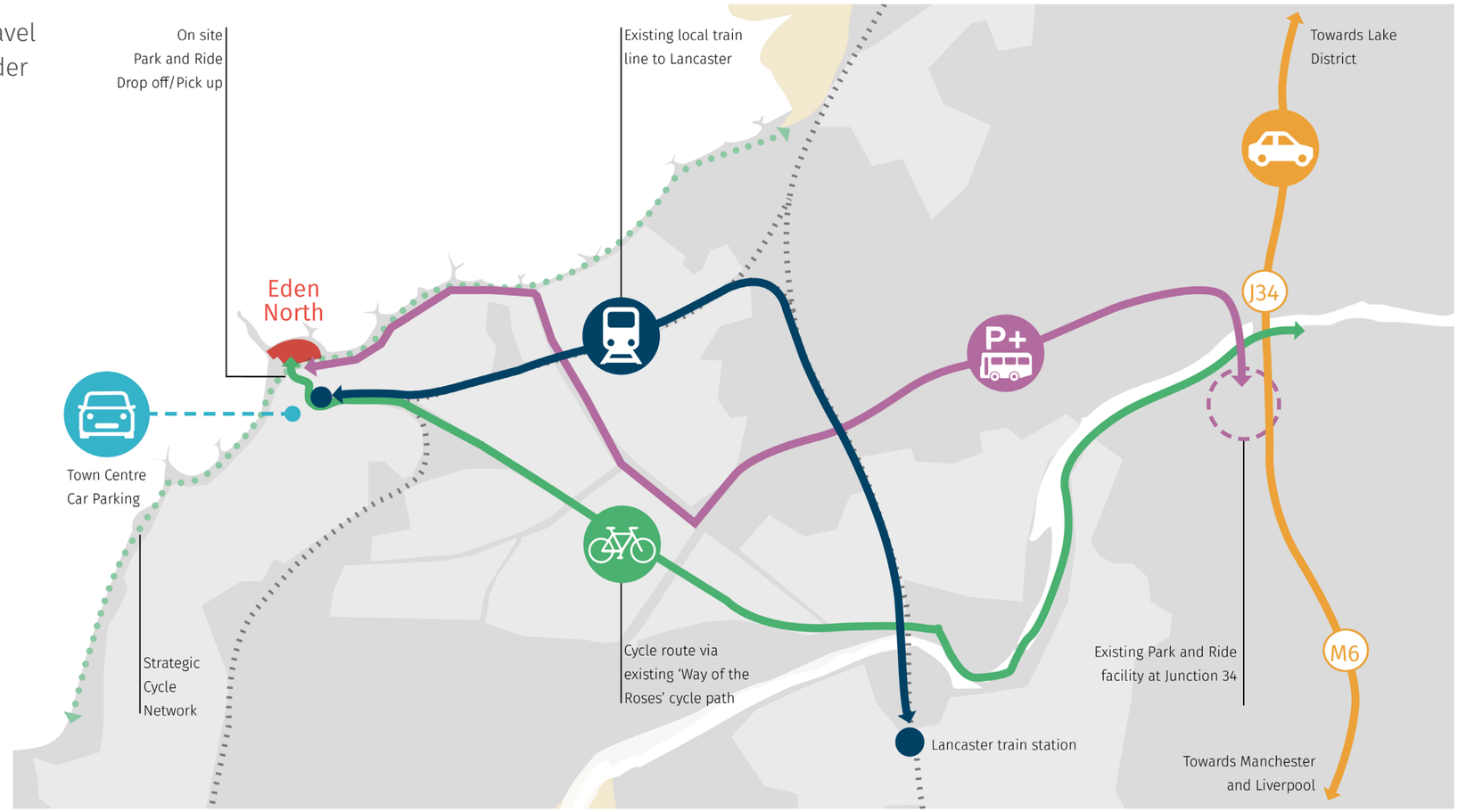
# 5.1 TRANSPORT STRATEGY OVERVIEW

5.0

This system is not only about transport and will enable EPIL to plan ahead regarding how many employees are required on site, how many meals they need to prepare or how much waste will be generated on any given day. These are just some examples of how controlling the visitor demand to a major leisure attraction enables achievement a site-wide sustainable strategy.

Please refer to the Transport Assessment and Travel Plan contained within the ES which cover the wider transport strategy in detail.

Eden Project North Transport Strategy



## 5.2 EXTERNAL ACCESSIBILITY



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.

The traffic free environment of the site also includes cycling, a key activity along the Promenade. In fact, the Sustrans Route 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.

Morecambe Railway Station is located just 300 metres to the south of the proposed development. It provides regular services to Lancaster, Leeds and Heysham, where wider regional services are available.

The rail services across the north west, Lake District and wider cities such as Edinburgh, Manchester, Birmingham and London robustly underpins the multi-modal transport strategy for visitors arriving to Morecambe from their homes and overnight locations.

The proposed development location can provide a key role in enabling multi-modal journeys thanks to the Morecambe Railway Station being located just 300 metres away. This will help in promoting linked rail journeys to both Morecambe and Lancaster and enabling the last portion of the trip to be undertaken on foot or bike.

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.

The multitude of buses passing by and near the site and their frequency show that bus travel robustly underpins the multi-modal transport strategy for employees and visitors starting their trip from Morecambe and Lancaster.

The Caton Road Park and Ride located at the M6 Junction 34 provides 650 car spaces for Park and Ride into Lancaster City Centre. 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 in/out of Lancaster.

It can act as the key site that intercepts motorised trips into Morecambe and Lancaster thanks to its modern bus facilities and signalised toucan crossing points connecting the facility with the Way of the Roses for both pedestrians and cyclists.

Visitors using public transport will have the opportunity to access integrated ticketing (the process of which will continue to be ceveloped post planning application).

The Visitor Group Strategy covers all visitors arriving to the proposed development as a group. This could take various forms, including:

- School and higher educational groups; and
- Organised tours.

Within 25 miles of the proposed development there are 427 educational institutions. The proposed development expects to attract over 70,000 students annually. It is expected that all educational groups will be travelling to the site by private bus / coach, with the single exception of Morecambe local schools within walking distance to the proposed development.

In accordance with the Transport Strategy and the booking system, school and higher education group visits will be distributed evenly across the year. Similarly, their arrival times will also be spread out throughout the morning to ensure that arrival times are appropriate subject to their origin.

Students are expected to visit the proposed development on inter peak weekdays (circa 150 days a year). This results on circa 470 students a day, equivalent to an average of 10+ private buses / coaches per day.

As per general visitors, group visits will be offered with the most appropriate route into the proposed development according to their origin. This route could include the ‘ceremonial route’ described in the

## 5.2 EXTERNAL ACCESSIBILITY



Shuttle Bus section, where a boulevard style linear, greenery and ample route (Broadway) gives way to the Morecambe Bay before turning left into Marine Road overlooking the proposed development building shell forms by the Midland Hotel.

Private buses and coaches are proposed to have the possibility to drop off group visitors on the northern section of Marine Road Central.

This area will be subject to a Traffic Regulation Order. And is expected to only allow private buses and coaches to drop off and pick up passengers, with a time restriction of 15 minutes with no return within 30 minutes.

The landscape design incorporates multiple walking routes from this area to the visitor centre of the proposed development. This allows for EPN visitors and general public to interact with the various landscaped areas.

As with any visitor group strategy, the aspect that needs a more careful management is the departures. Whilst on arrival most passengers are expected to directly access the proposed development as this is the main purpose of their visit, on departure further considerations are required.

The visitor centre will have a series of real time information transport screens that will inform EPN visitors for next rail, bus and shuttle bus departures. These screens could also incorporate group information departure times to inform certain visitor groups on when their private bus/coach is expected to depart from the pick up area.

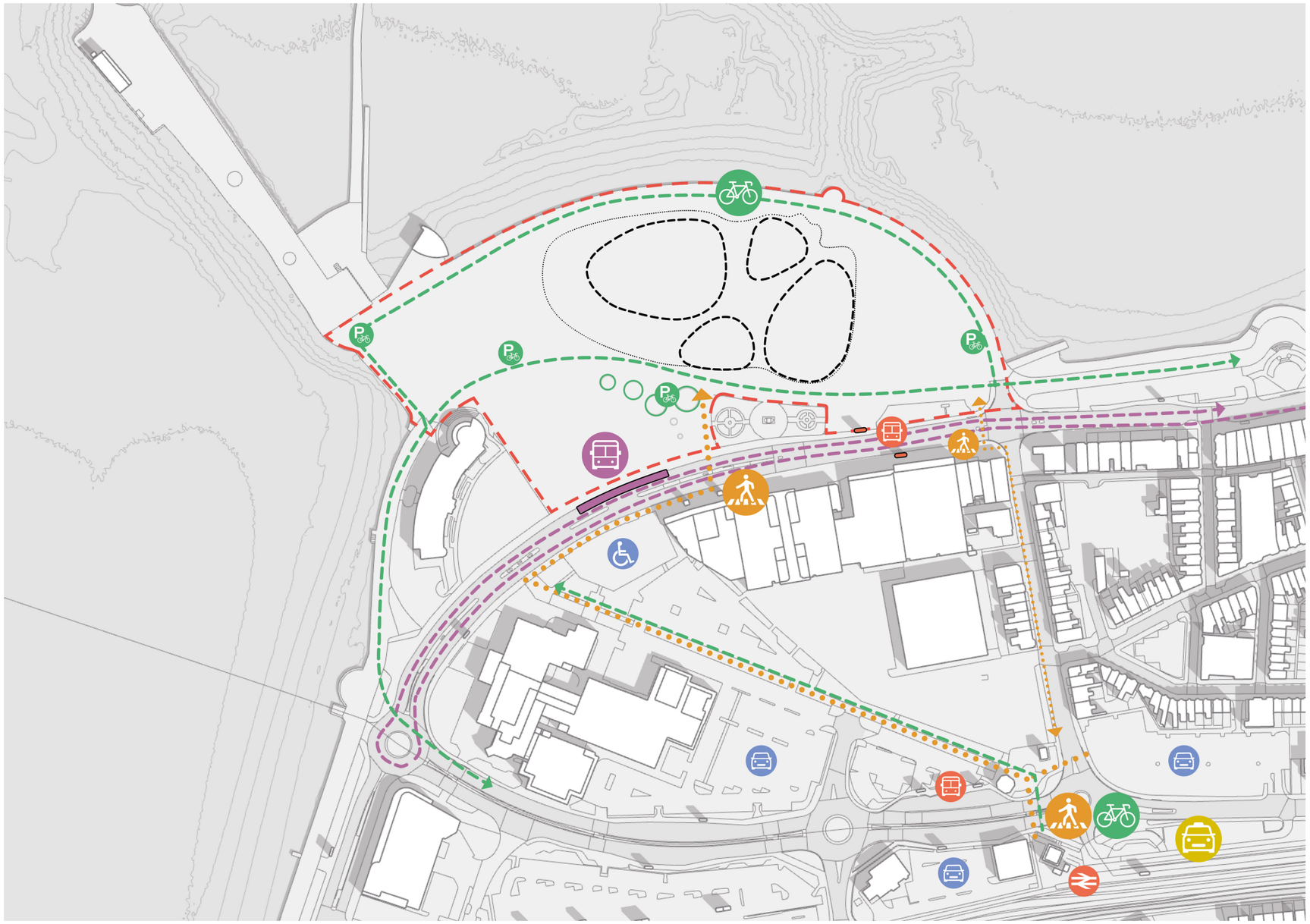
In addition to this, it is important to recognise that certain visitor groups will spend time around Morecambe after their visit to the proposed development. As such, EPIL will continue to work with both Lancaster City Council and Lancashire County Council to explore the possibility of having a series of pick up points across Marine Road Central and East so visitor groups could be picked up at different locations across the Promenade. This will encourage visitors to explore Morecambe after their visit to Eden Project North.

It should be noted that visitor group private buses and coaches are a private transport service. And as such, operators may have designated waiting facilities in the region or even other services booked whilst the visit to the proposed development.

## 5.2 EXTERNAL ACCESSIBILITY



- Site boundary
- Cycle routes
- Cycle parking
- Pedestrian routes
- Local bus stops
- Shuttle bus and Coach trip drop off
- Car parking
- Blue badge parking
- Taxi pick up/drop off
- Train station



## 5.3 CYCLE PARKING & PEDESTRIAN CIRCULATION



The pedestrian and cycling isochrones show that the site is well connected to local and regional transport networks, including several bus stops, Morecambe Bus Station and Morecambe Railway Station, as well as the entirety of Morecambe Town Centre and key residential areas as indicated below. This enables cycling trips to the proposed development to all employees living in Morecambe. As well as visitors to the proposed development staying overnight in the region.

As highlighted in the Transport Vision and the Transport Strategy, staff and visitors arriving to the site by active travel modes will have certain benefits over car users (e.g. ticket discounts, Eden vouchers etc). In addition, staff and visitors will have certain facilities such as:

- Cycle parking;
- Changing Room
- Drying Facilities
- Locker Facilities and
- Free e-bike battery charging whilst visiting the proposed development.

The Landscape General Arrangement will provide the following cycle parking spaces:

- 116 covered spaces under the sea foam shelter.
- 20 uncovered spaces off the northern prom at the edge of the Rhythm Garden
- 8 uncovered spaces off the southern prom at the southern edge of the Tide Garden
- 8 uncovered spaces at the western corner of the Shingle Plaza (closest to the Stone Jetty)

The Active Travel Strategy will focus on the immediate vicinity of the proposed development (the site and Marine Road Central). However, it will also focus on capturing potential walking and cycling trips to the proposed development from the Caton Road Park and Ride, the Lancaster Railway Station and from overnight visitors staying in the vicinity of the site.

As such, the existing staggered signalised pedestrian crossing in front of the Winter Gardens is proposed to be relocated circa 70 metres to the west to:

- Ensure EPN and Morecambe visitors have crossing facilities at the desire line from the Promenade and the Railway Station, Bus Station and several car parks in the town centre;
- Align with wider town centre regeneration aspirations, where the Flock of Words may be slightly reconfigured to provide a more direct route between the Promenade and the Railway Station, Bus Station and several car parks in the town centre; and
- Provide space for safe drop off.

The proposed relocation is accompanied by the introduction of a drop off point and a build out to reduce the crossing distance between footways, removing the need for a staggered crossing. This is possible as on street parking on both sides of Marine Road Central is currently permitted.

All existing pedestrian and cycling movements around the site will be retained. The area shown in green on Application drawing *A02 1005 Proposed Site Access Plan* will be available for permissive access all year to all users, regardless of being a ticket holder, a local resident or a Morecambe visitor.

Sustrans has been engaged in relation to the existing NCN Routes 69 and 700. After discussions, it has been agreed that Sustrans would like to introduce changes to both routes passing through the site to avoid duplication and confusion of cyclists. This would result in the NCN Route 69 (Way of the Roses) being realigned to start / finish by the existing Way of the Roses start / finish point to the southwest of the Midland Hotel. The NCN Route 700 will be slightly extended to connect with this point via the Promenade to the north of the Midland Hotel and the proposed development.

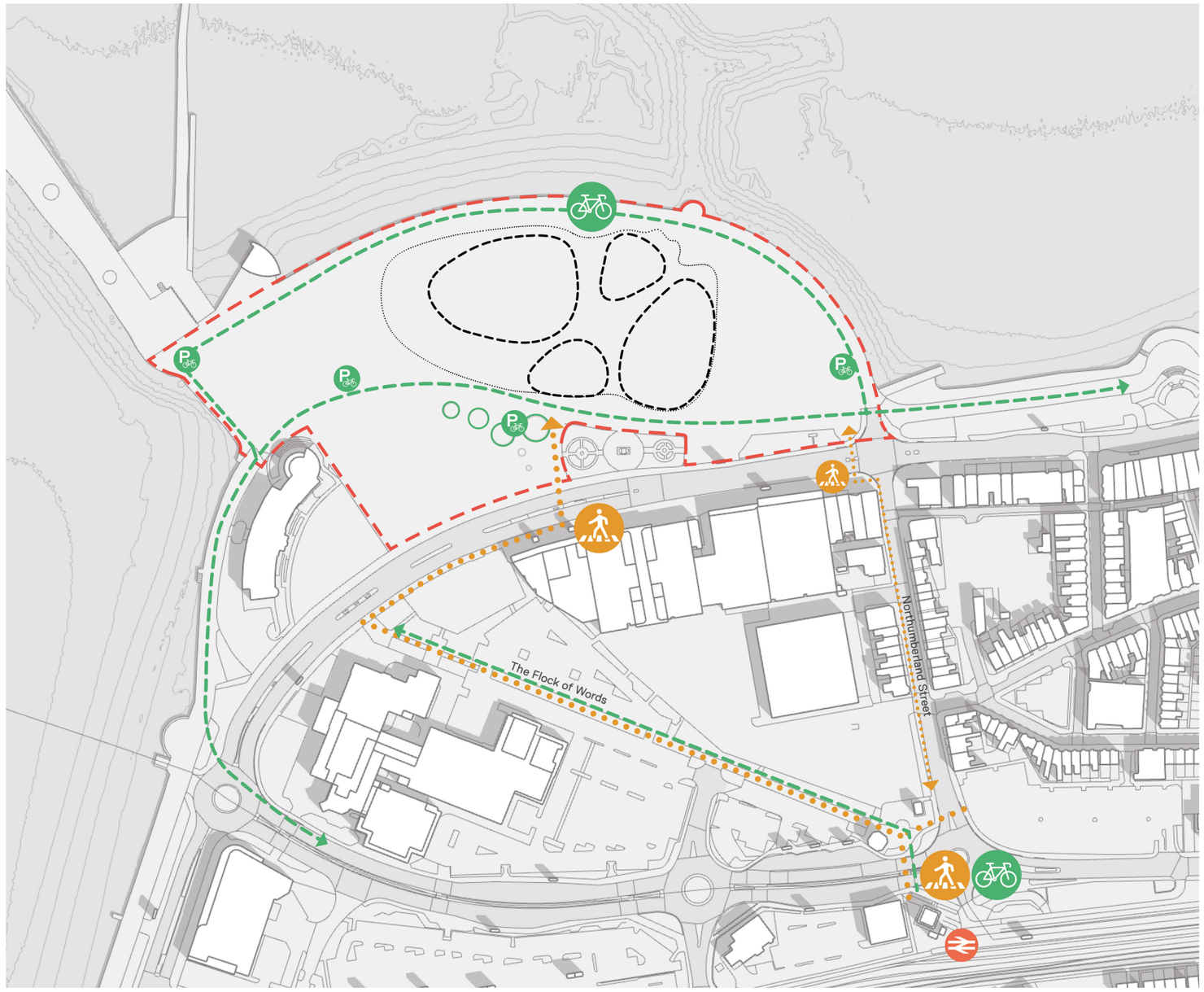
As part of the wayfinding and signage budget allocation, a series of wayfinding posts will be included around Morecambe Town Centre, the Promenade and the Way of the Roses indicating active travel directions to the proposed development.

## 5.3 CYCLE PARKING & PEDESTRIAN CIRCULATION



Additionally, EPIL will continue to work with relevant stakeholders to introduce further active travel enhancements such as a bike hire scheme and bike taxi services for Eden Project North visitors, local residents and Morecambe visitors.

- Site boundary
- Cycle routes
- Cycle parking
- Pedestrian routes
- Morecambe Train station



# 5.4 INTERNAL ACCESSIBILITY



Eden Project North has been designed to go beyond the minimum standards set out in the building regulations, taking into account good practice guidance for internal accessibility.

All floors are fully accessible inside of the building to assure all visitors are able to enjoy a seamless experience.

Main entrance and exit zones will be clearly identifiable and all corridors will be at least 1500mm.

Accessible toilets have been provided on every floor making sure users do not have to travel long distances until reaching an accessible W.C. with wider cubicles as illustrated in the diagrams on the following page.

As with Eden Cornwall we will work with the Sensory Trust to go beyond statutory norms of for example the 'Changing Places' initiative.

The internal accessibility plan of the building has been designed using the following references:

- BS 8300:2009+A1:2010 Design of buildings and their approaches to meet the needs of disabled people – Code of practice, British Standards Institution
- BS 5395-1:2010 Stairs: Code of Practice for the design of stairs with straight flights and winders
- Building Regulation Approved Document K – Protection from falling, collision and impact 2013 (AD K)
- Building Regulation Approved Document M – Access to and use of Buildings Vol 2: Buildings Other Than Dwellings, 2015 (AD M)

### Emergency Egress

Evacuation of people requiring assistance will be a combination of physical and management procedures plus a liaison between the building managers and occupants.

The evacuation strategy for people requiring assistance was developed in conjunction with the fire strategy and management policies with reference made to AD B, good practice recommendations within BS 9999:2008 and 'Means of Escape 'for Disabled People' which outlines building management's responsibilities under the Regulatory Reform (Fire Safety) Order 2005.

Finally, protected stairs with refuge points have been provided according to building regulations to ensure safe egress in case of an emergency.

### Supplementary Guidance

Lancashire County Council have published the following guidance and advisory notes in relation to access;

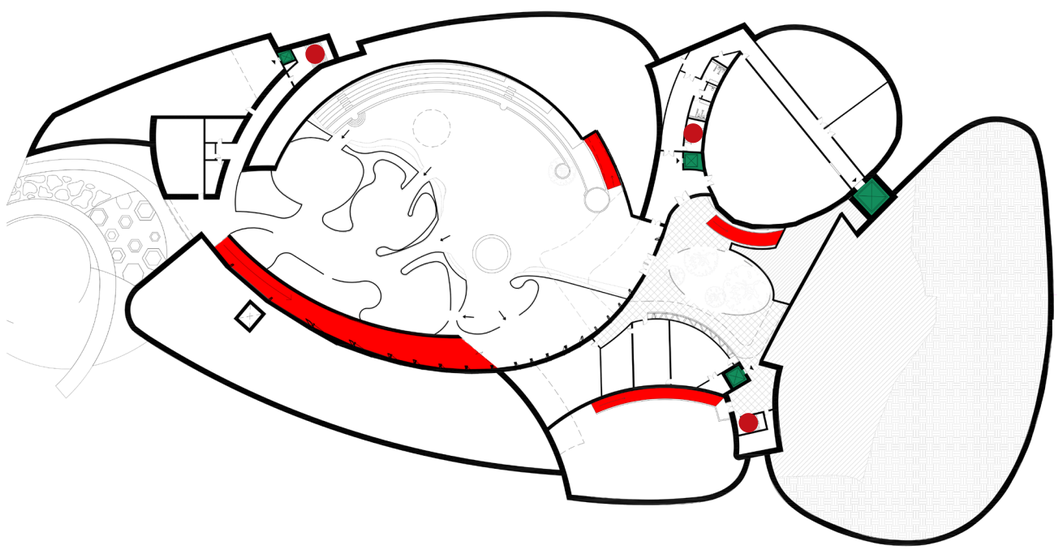
- Creating Civilised Streets: Policy & Design Guidance February 2010 (Revised June 2010)
- Active Design and Spatial Planning - Public Health Advisory Note



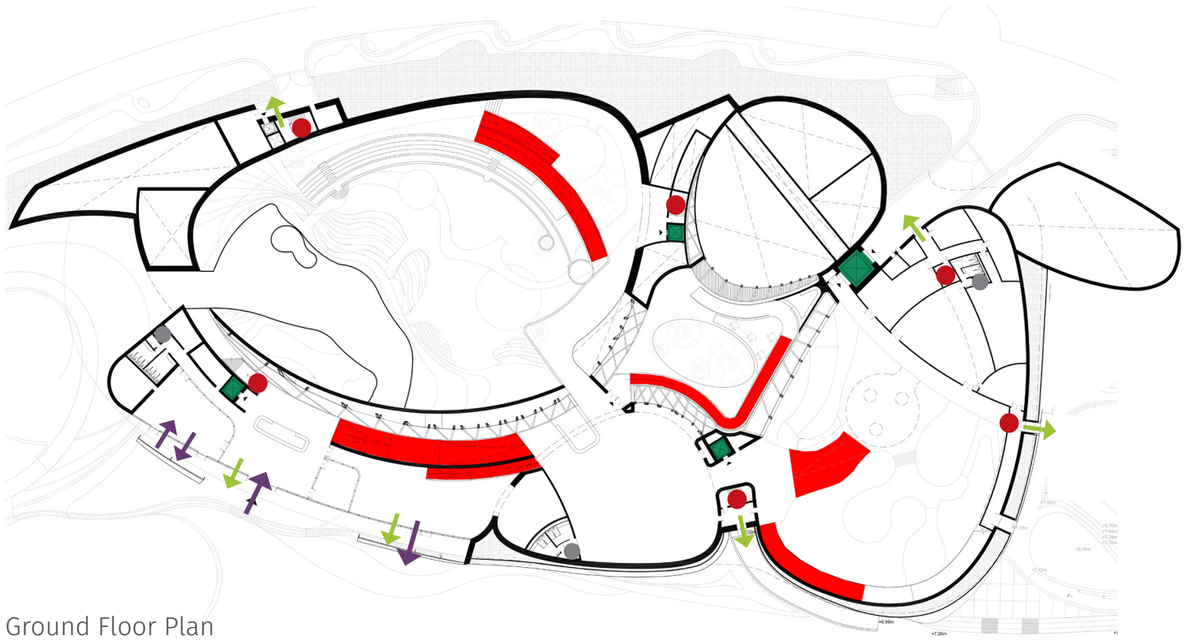



## 5.4 INTERNAL ACCESSIBILITY



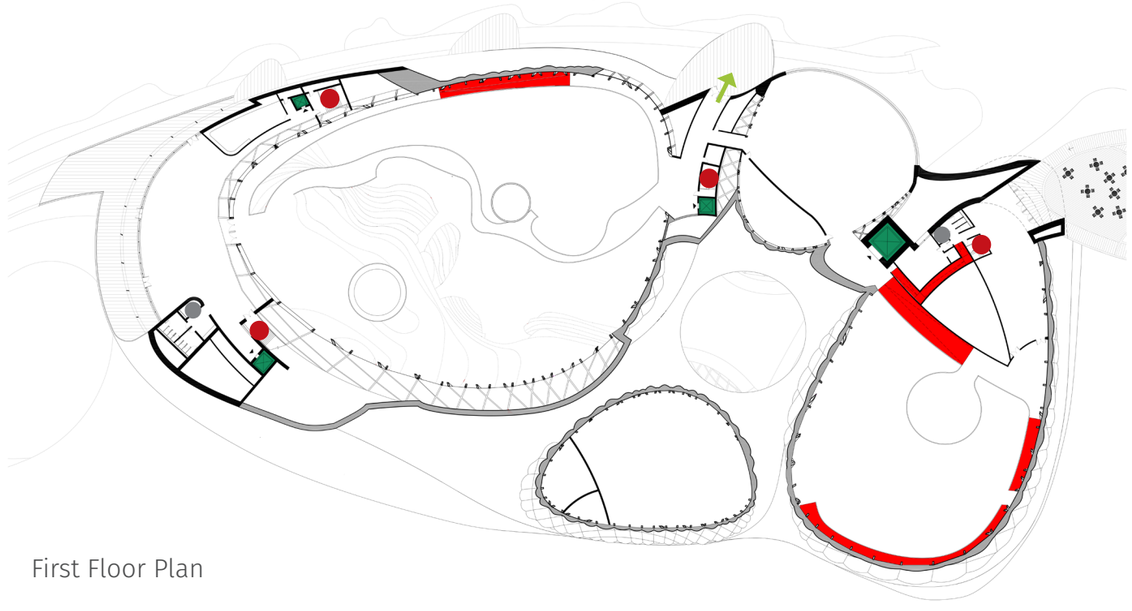


Lower Ground Floor Plan



Ground Floor Plan

- Accessible Lift
- Protected Stairs with Wheelchair Refuge Points
- Accessible Entrance/Exit
- Emergency Egress Point
- Internal Ramp
- Accessible W.C



First Floor Plan

# 5.5 SERVICING STRATEGY



EPN has a minimum local supplier target of 80%. In Eden Project Cornwall the local supplier proportion is even greater. This would result in reducing the need for servicing the site by large vehicles. Instead, a series of small vans are expected to be the main vehicle type servicing the site.

All servicing manoeuvres will be subject to different TROs and access restrictions.

The proposed development has four servicing requirements as set out in this strategy. All swept path drawings presented.

The service yard is located to the northeast of the proposed development. Vehicular access is proposed to take place from the Marine Road Central/ Northumberland Street junction via the Promenade.

The restaurant is located to the northwest of the proposed development. It will be serviced via the service yard. But on limited occasions, small vans and rigid HGVs may have to access a secondary servicing point located underneath the restaurant.

The visitor centre is the access and egress point for visitors. It will include food and beverage options as well as the gift shop. All these units are proposed to be serviced by the main service yard. However, occasional and very limited access may be required at certain times of the year.

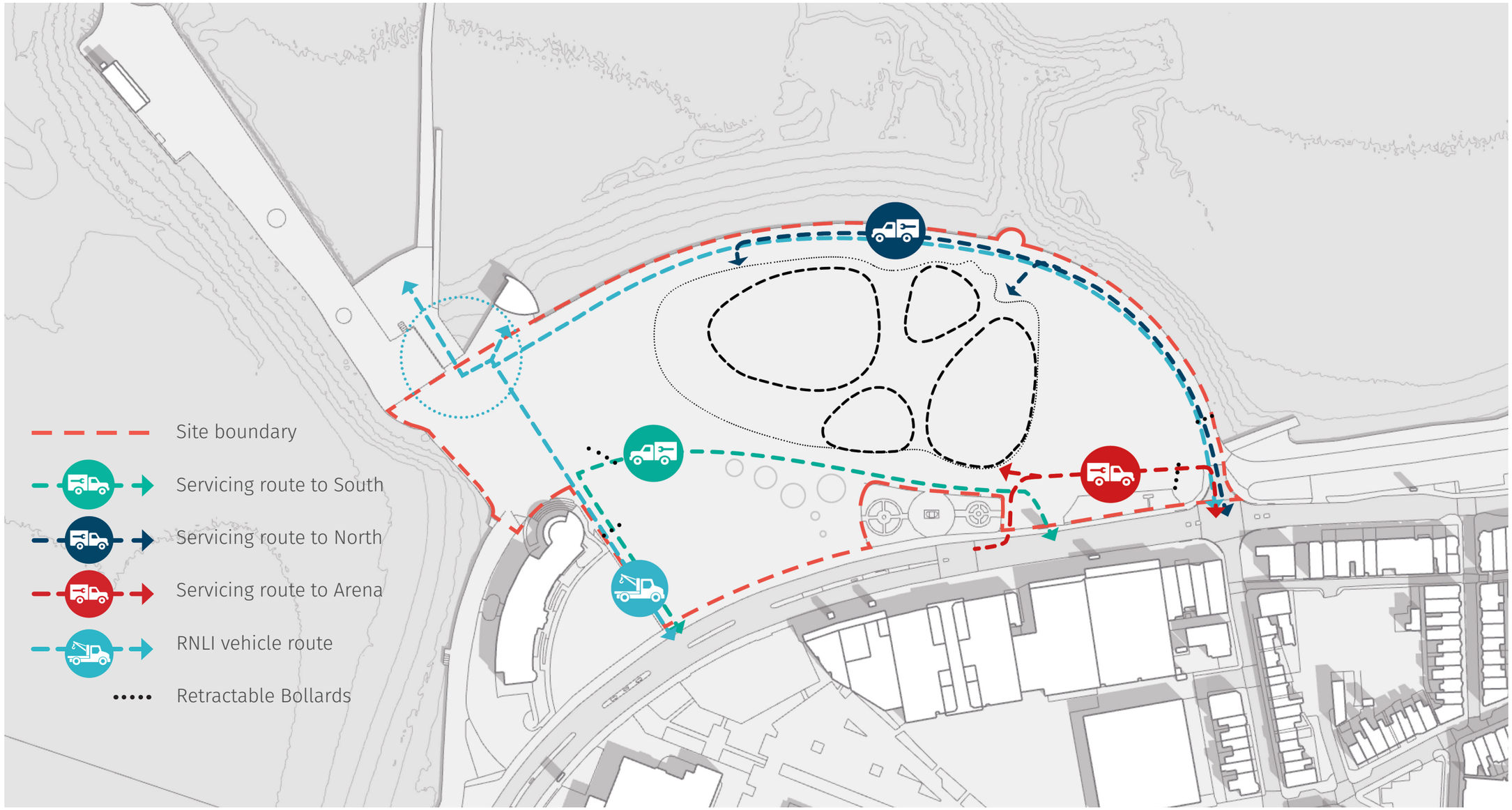
Music events are proposed to take place at this location to the east of the site. These will be limited to eight a year and during summer months only.

EPIL and Design Team have undertaken regular engagement with the RNLI to understand their access requirements and future aspiration to incorporate these into the proposed development. Access to the RNLI building is proposed to use the most direct route from Marine Road Central.

The Transport Assessment includes vehicle swept path analysis for all different servicing manoeuvres to/from and around the site.

## 5.5 SERVICING STRATEGY





# 5.6 FIRE STRATEGY OVERVIEW



The design of Eden Project North is unique and innovative, containing elements that are not typical for a building designed to contemporary guidance. As a result, there are several key areas of the fire strategy that will not follow conventional design guidance and a fire engineering approach is proposed. High level discussion and agreement with the Approval Authorities is recommended at the earliest possible opportunity to ensure all stakeholders are on board with the approach.

The spaces will be designed to meet the functional requirements of the Building Regulations 2010 and the Client's brief. This will be achieved by adopting a design approach as follows:

- BS 9999 Code of Practice for fire safety in the design, management and use of buildings, 2017 will be used as the basis for the design,
- BS 7974, Application of fire safety engineering principles to the design of buildings, BSI, 2019 will be used to detail the engineering assessments for the shells,
- The Purple Guide to Health, Safety and Welfare at Music and Other Events, Events Industry Forum will be consulted as guidance on appropriate management measures relevant to the fire strategy,
- Various other British Standards will provide more detailed technical guidance for specific elements.

Fire engineering designs for smoke control will be supported by calculations and additional provisions where necessary. CFD analysis will be required as the design progresses to support this approach. It is proposed that this approach will be a robust framework to satisfy the approving authorities that the fire safety of the development has been suitably designed for such a significant project and its intended use.

Over the course of the design process, the design team have engaged with the Local Authority Building  Control (LABC) several occasions in a bid to ensure that the base line principles are in alignment with the relevant code of practice.

### 5.6.1 Means of Escape

Means of escape provisions have been based on the guidance contained with BS 9999 with regards travel distances and exit widths from individual spaces. The whole building evacuation will be based on a progressive approach moving away from the shells of fire origin and progressing to external in a place of relative safety.

Four escape cores are provided across the building and occupants predominantly have multiple escape routes from each area, either directly to outside, into a stair or into an unaffected adjacent Shell.

Tenable escape from the shells, in particular the Bay Forest and Tree Houses will be demonstrated utilising CFD and smoke ventilation which is hoped to be achieved naturally via openable vents in the Shell roofs. Disabled means of escape will be a managed approach via the protected escape cores and wherever possible, utilising the ramped walkways throughout the development.

### 5.6.2 Fire Safety Systems

The venue will be provided with automatic fire and smoke detection within enclosed spaces. Within the Shells we will explore the potential for aspiration or beam detection however, due to the height of these Shells, there is the potential for stratification therefore detection may not be appropriate for the space.

In this instance it would be proposed that detection will be based on staff and occupant alert with the provision of manual call points. Due to the high level of management within the spaces this will allow for sufficient warning to initiate a safe evacuation.

The Shells will be provided with natural day to day ventilation in the form of openings within the Shell roof. The fire strategy will try to utilise these openings to encourage smoke to dissipate in the event of a fire to aide in means of escape and fire fighting provisions.

### 5.6.3 Passive Fire Protection

Eden Project North will be constructed utilising a timber frame and ETFE roof. The structural elements will be provided with 60 minutes fire resistance. Hazard rooms and ancillary spaces will be enclosed in fire resisting construction. Stair cores will be protected enclosures to enable safe means of egress and provide fire service access into the building.

# 5.6 FIRE STRATEGY OVERVIEW



### 5.6.4 External Fire Spread

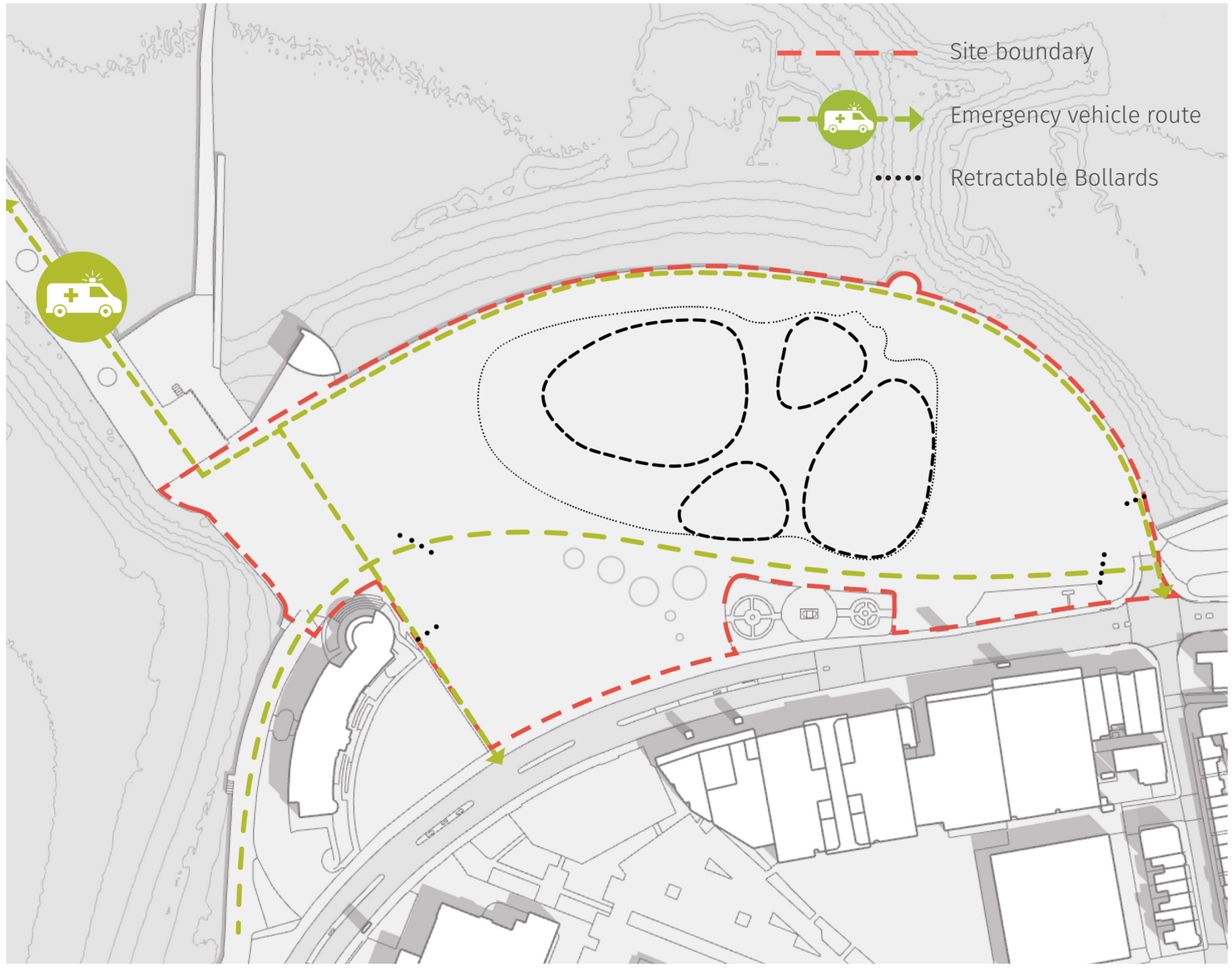
The building is situated on the sea front at Morecambe and due to landscaping associated with the development is well spaced from the surrounding buildings. An external fire spread assessment will be carried out as the design progresses however it is not envisaged there is any risk of undue fire spread.

### 5.6.5 Fire Service Access

Perimeter access is afforded around the building by means of the RNLI access and service road. The fire tenders will be able to reach the stair cores and key entry points to the building which affords access to the majority of the buildings floor plate.

To supplement this it is proposed to provide dry risers within each of the stair cores which will allow hose laying distances within 45m of the majority of spaces. There are some areas which have extended hose laying routes which are within 60m and although the development will not be provided with suppression, the fire load will be relatively low with high “ceilings” in the Biome which will aide in fire fighting conditions.

Early consultation with building control and the fire service has been initiated and the design team will work with the fire service to ensure the most practical approach to fire service access for the development.



## 5.7 SECURED BY DESIGN



Eden Project North will be developed to achieve Secured by Design (SBD) security standards.

An initial engagement and briefing session with Lancashire Police (including its Counter Terrorism Unit), LCC Civil Contingencies and LCC Public Realm Officers took place on 20th May 2021, this highlighted some key considerations for the scheme:

- Anti-social behaviour is a key local issue, and for this project in particular; risk of criminal damage, rough sleeping, illicit activity in sheltered areas along the northern promenade and begging;
- Use of electric scooters in the area and potential conflicts with pedestrians and visitors;
- Addressing the risk of vehicle attacks;
- Ensuring a strategy for security monitoring, and physical on-site security presence;
- The proposal includes the following key features in relation to designing out crime:
- The building configuration and surrounding urban realm are highly legible, preserving clear sight-lines and promoting natural surveillance;
- Clear access control between public, paid and private areas of the venue with a well-defined primary entrance for visitors and consolidated service access points into the building;
- Landscape architecture with embedded security and counter-terrorism features and a combination of fixed and retractable bollards located where required for vehicle access control;
- A clear hierarchy of  circulation routes, reinforced through hard and soft landscape features;
- Provision of new external lighting, designed to promote safety and support discouragement of anti-social behaviour;
- Use of robust materials around the base of the building and within the landscape, with lightweight cladding materials located out of reach;
- Provision of a central security control room (SCR) within the building for security personnel and CCTV monitoring

Further specialist consultant input and engagement with the Designing out Crime team and Counter Terrorism Unit will be conducted as the project moves forward to ensure that all aspects related to security of the project are considered and to inform more detailed specification of building systems and components.

SECTION 6

# Engineering & Sustainability

**Summary of how environmental, social and economic considerations have influenced the design proposal. Description of the sustainability agenda and BREEAM targets are described in detail. Key engineering elements that form critical parts of the scheme are also described.**

ENGINEERING & SUSTAINABILITY

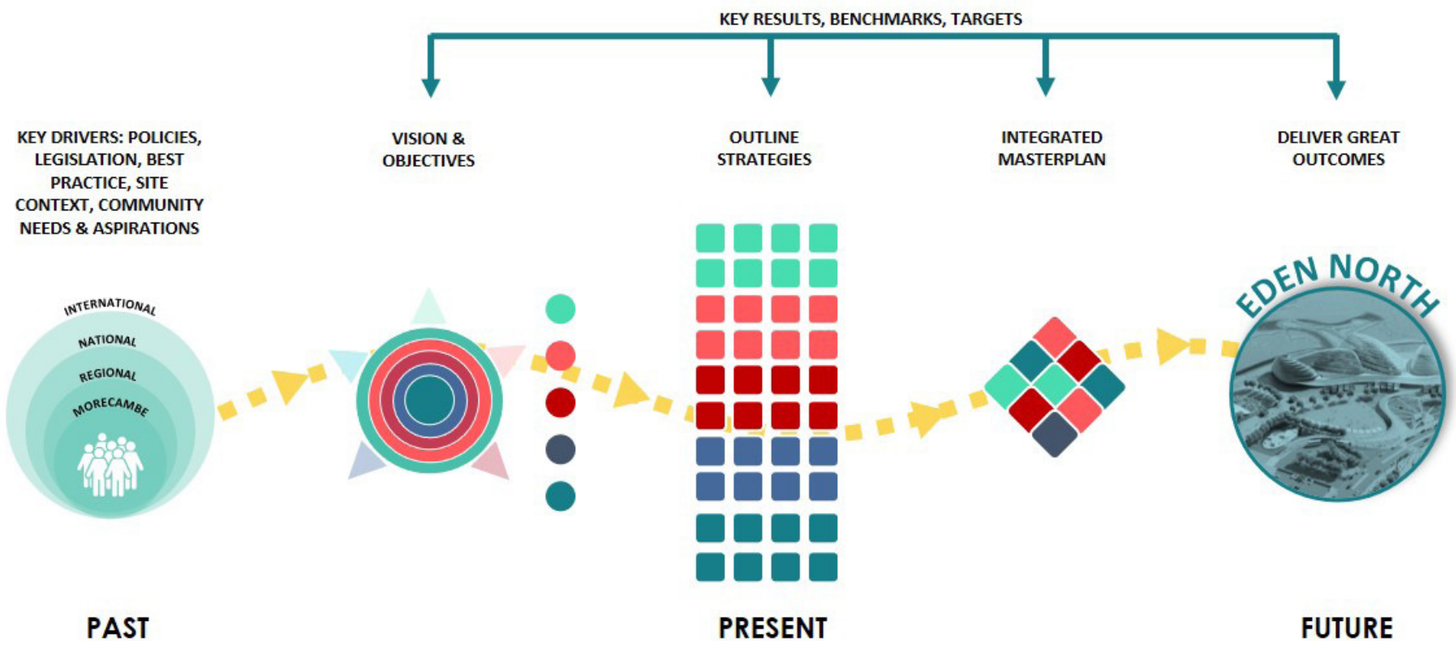
# 6.1 OVERVIEW

# 6.0

Eden Project North will be a leading example of regenerative sustainability. This means that 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. To support this approach a regenerative sustainability framework has been developed for the project based upon a capitals-based model for 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.

The regenerative sustainability framework is evidence-led responding to key drivers, such as policy and best practice, from the international through to the local level. The framework then translates the key drivers and the project vision into a set of objectives, which then inform strategy opportunities to be explored and developed by the project team with the aim of delivering great outcomes for Eden Project North, Morecambe and the wider region. A suite of key results and targets are also defined to continuously monitor and evaluate performance from project inception through to operation.

An overview of the framework structure is presented opposite.



# 6.1 OVERVIEW



Under each of these capitals a series of themes covering detailed aspects have been presented with accompanying performance targets aligned with best practice and proposed strategies for how this will be delivered.

The table opposite provides a summary of each themes with greater detail provided in the sustainability statement.

| THEME | STRATEGY |
|---|---|
| **ENERGY & CARBON** | The **energy & carbon** strategy will follow a hierarchical approach to first minimise energy demand before the deployment of low and zero-carbon (LZC) technologies, supporting its aspiration to be a Net Zero Carbon building. Heat pump technology is proposed to meet all the building's heating and cooling requirements, and a combination of on and off-site solutions will deliver a 100% renewable energy supply. |
| **WATER** | The **water** strategy will follow a hierarchical approach to minimise consumption as much as possible, before utilising alternative sources to municipal potable supplies. A combined rainwater harvesting and SUDS system is proposed to meet the majority of the site's non-potable water demands. |

# 6.0

## 6.1 OVERVIEW

| THEME | STRATEGY |
|---|---|
| MATERIALS | The **materials** strategy aims to minimise the impact of construction materials as well as waste outputs from operation. Embodied carbon of construction materials has been minimised using a lifecycle analysis, and operational waste impacts will be minimised by designing out waste at source and providing comprehensive recycling facilities. |
| BIODIVERSITY/ ECOLOGY | The **biodiversity/ecology** strategy aims to deliver improvements on an otherwise low ecological value site. The landscape proposals will include species mixes which are similar to coastal priority habitats, with the intention of increasing the habitat value of the site. |
| COMMUNITY | The **community** strategy will seek to make Eden Project North an asset for the local community. Through creating high quality public realm and a comprehensive outreach programme, which has already begun, it is hoped to work with the local community to support local initiatives aligned with Eden's ethos and values. |
| ACCESSIBILITY | The **accessibility** strategy will ensure that Eden project North is open and accessible to everyone. Wayfinding throughout the venue and the experiential design will accommodate the needs and access requirements of as many user groups as possible to deliver this successfully. |
| HEALTH & WELLBEING | The **health and wellbeing** strategy aims to deliver positive outcomes to both visitors and the local community through improving peoples' connection to nature. This is a guiding principle of the visitor experience, and outreach with the local community is planned through social prescribing activities. |
| EDUCATION & RESEARCH | The **education and research** strategy aims to educate and inspire, maximising the opportunity presented by both its audience reach and location within an area of exceptional natural value. This will be achieved through both curation of the exhibits, as well as partnership with local institution in both curriculum delivery and research undertaking. |

| THEME | STRATEGY |
|---|---|
| BUILT ENVIRONMENT & INFRASTRUCTURE | The **built environment & infrastructure** strategy aims to deliver a high performing asset which can stand the test of time. This will be achieved through delivery of an integrated building management system, as well as systems and infrastructure which are resilient to the projected effects of climate change. |
| TRANSPORT | The **transport** strategy aims to encourage visitors to utilise sustainable modes of transport wherever possible. Integrated ticketing systems are proposed to support this such as discounts for rail travel, as well as booked car parking options to maximise use of existing Park & Ride services and reduce parking and congestion around the venue itself. Measures are also proposed to support active travel in the vicinity of the project site, and make this an attractive option for staff commuting. |
| LONG-TERM VALUE | The **long-term value** strategy considers the economic benefits Eden Project North can bring to Morecambe and the region. The project aims to regenerate the visitor economy in the local area as well as supporting development of local, sustainable supply chains which can benefit the venue and other local organisations. |
| EMPLOYMENT | The **employment** strategy aims to maximise the local benefit from the direct and indirect employment created by the project. It is proposed to prioritise jobs for local residents, as well as developing apprenticeship schemes for younger residents in collaboration with local education institutions. |

## 6.2 BREEAM & TARGETS OVERVIEW



In response to policy DM35 which states that 'non-residential building development should enable achievement of the BREEAM 'Excellent' standard', a pre-assessment for Eden Project North has been completed.

At this stage of design, a pre-assessment of the scheme has been completed with the wider design team to ensure the project proposals are aligned with the BREEAM 'Excellent' requirements. Strategies proposed to achieve this level of performance are discussed in detail within each theme presented in the sustainability statement, and will be refined in future design stages.

The graph below demonstrates the current credit score for the scheme of 74.5%, increasing to 78.3% when including 'additional' credits to be confirmed with further design and refinement in the next design stages. The threshold for an Excellent rating is 70%, therefore this has been achieved including a number of credits above the threshold as a 'buffer' to manage any risks as the project progresses.

The potential to achieve an 'Outstanding' rating has also been explored with the design team, to ensure it remains an option for future consideration. At present this is not targeted, but design strategies required to 'futureproof' this rating have been co-ordinated with the design team and detailed implications of this on the design and the cost plan will be explored in further detail in the next design stages.



# 6.3 MEP STRATEGY



## Energy

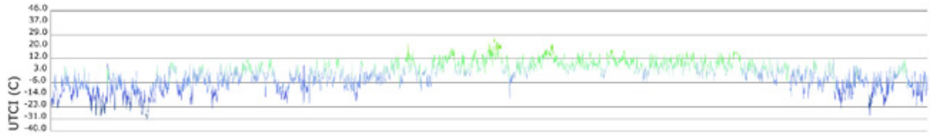
Eden Project North will be an exemplar net zero or net positive development. The energy system design for Eden North has followed the Lean > Clean > Green approach as outlined in the image below.

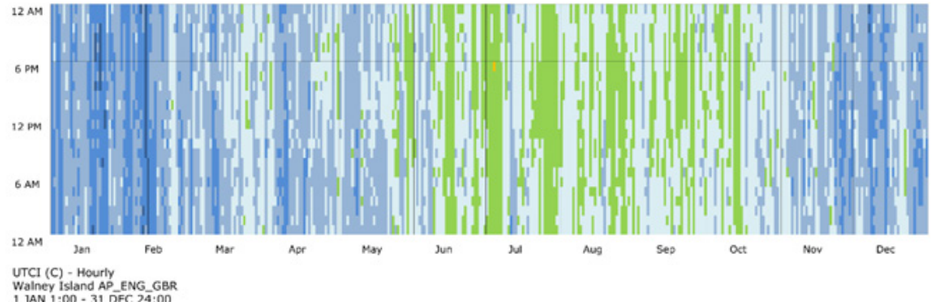



This process looks to maximise passive design opportunities with the heating and cooling provided in a clean and energy efficient way. Renewables are then used to offset the carbon produced in the provision of electrical power for the heat source.

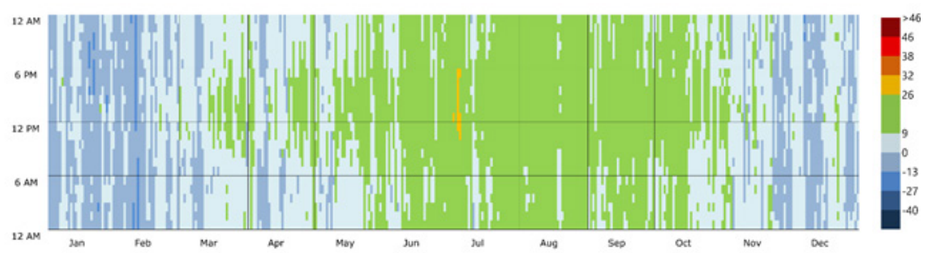
## Lean

An initial UTCI study showed the performance of the site in Morecambe to be primarily too cold for comfort. The graph below shows comfort in green and cold discomfort in blue.




The site remains comfortable for 17% of hours in the year. Further studies showed wind was the largest contributing factor as indicated below.



## 6.3 MEP STRATEGY



Because the Shells attenuate the wind, this indicates that natural ventilation and passive design strategies are suitable for Eden Project North.

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 Shells of Eden Project 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.

### 6.3.1 Clean

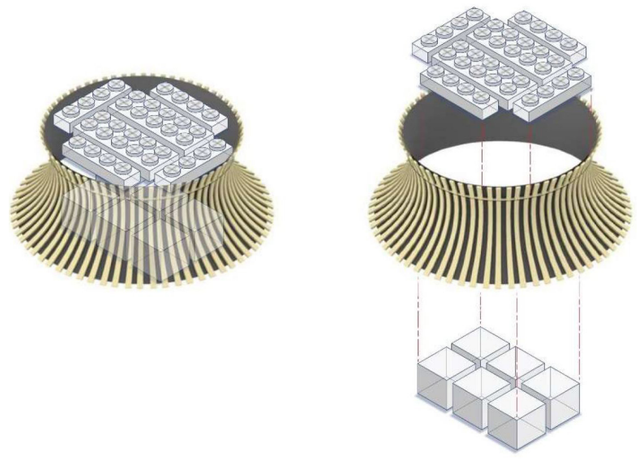
The strategy for operational carbon reduction for Eden North is electrification. The production of heat will take advantage of grid decarbonisation and use heat pumps

The current proposal allows for full provision of heat from air source heat pumps however the use of ground source heat pumps will be further investigated in the next stage of design in order to maximise the system efficiency. Currently the system has a coefficient of performance of approximately 2 at -4°C, however, improvement on this figure will be sought during technical design stage. The current installed capacity is proposed to be 2.8MW.

The air source heat pumps are to be housed in bespoke energy pods to celebrate the clean energy source. These will form an important part of telling the energy story to the general public to improve their knowledge.

The energy pods will be multi function both housing the heat pumps and evaporators as well as providing a location for bicycle storage and places to interact with the energy story of the development.

The image below shows an exploded view of the energy pod with the constituent parts and how the evaporators are concealed.



A key focus for the design of these elements at the next stage will be when humid air condenses in the summer.

The energy pods will also house thermal stores which provide buffer storage to both ensure the heat pumps do not cycle on and off excessively, but also enable demand side management control. It is proposed Eden Project North will use demand-side management to take full advantage of when the grid has a very low carbon intensity by charging the thermal store. When the grid has a high carbon intensity the thermal stores will discharge so the heat pumps do not need to run.  The thermal stores are estimated to be 100m3 at this stage.

The energy system at Eden Project North will work on a heat recovery basis whereby heat rejection by any cooling required is captured by the energy network and used usefully elsewhere rather than rejected to atmosphere. This increases the efficiency of the energy system. This is proposed to be combined with solar thermal collectors which will primarily heat domestic hot water for low energy hot water generation.

# 6.3 MEP STRATEGY



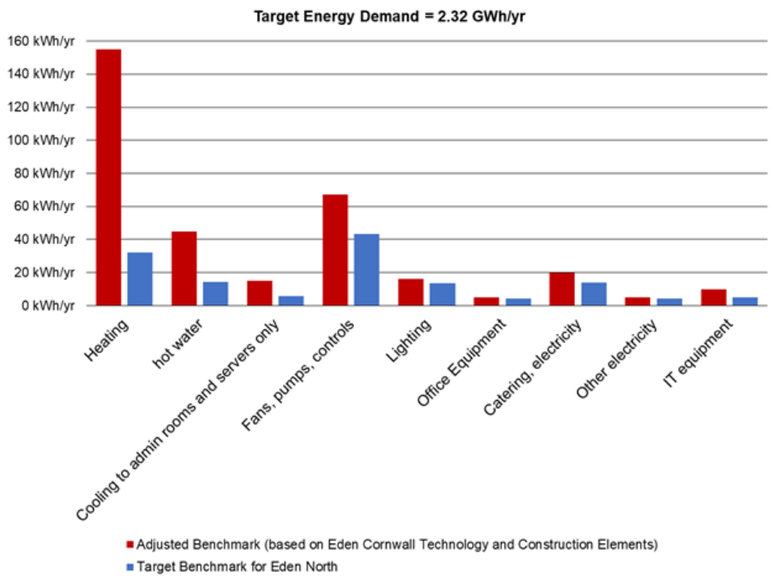
### 6.3.2 Green

On site renewables are being used to generate up to 5% of the total on site energy consumption. These are in the form of building integrated PV on the ETFE roof structure. This south facing PV also provides shading to the internal spaces to reduce unwanted heat gain.

The remaining energy requirement will be satisfied by offsite renewables and green energy purchasing.

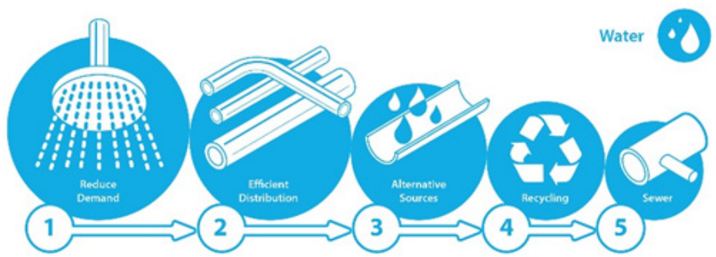
### 6.3.3 Energy Demand

Eden Project North is targeting an annual energy consumption of 2.32 GWh/yr. The anticipated savings over the adjusted benchmark model based on Eden Cornwall is provided below.




### 6.3.4 Water

Water conservation is key to Eden Project North's commitments to sustainability. The following design hierarchy is used to inform the water design.




The hierarchy focuses on reducing demand as far as practicable followed by alternative source and recycling to provide water demand.

### 6.3.5 Reduce Demand

Potable water demand will be reduced as far as practicable on Eden Project North. Several composting toilets are proposed which will reduce water demand for WC flushing.

All fixtures, fittings and equipment will be low flow and low water consumption to minimise potable water use.

It is advised that the planting within the Shells is sympathetic to the climate and low water consumption.

### 6.3.6 Efficient Distribution

The water distribution systems will be metered and monitored by the BMS to detect abnormal water usage or leakage. Zones will be shut off via solenoid valve when they are not in use to limit water loss through pipe failure during unoccupied hours.

### 6.3.7 Alternative Sources

The groundwater at Eden Project North is highly saline and so not suitable for use within the building for potable uses or WC flushing / irrigation. It is however suitable for use within an open loop ground source heat pump, and this will be explored further at the next stage.

### 6.3.8 Recycling

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 to this, rainwater harvesting will also be used. This will be collected from the build area and the landscaping surrounding Eden Project North. 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 but that rainwater storage is maximised.

### 6.3.9 Environmental Design

The Shells at Eden Project North will be naturally ventilated to provide comfort in summer in addition to purging excess heat in the winter.

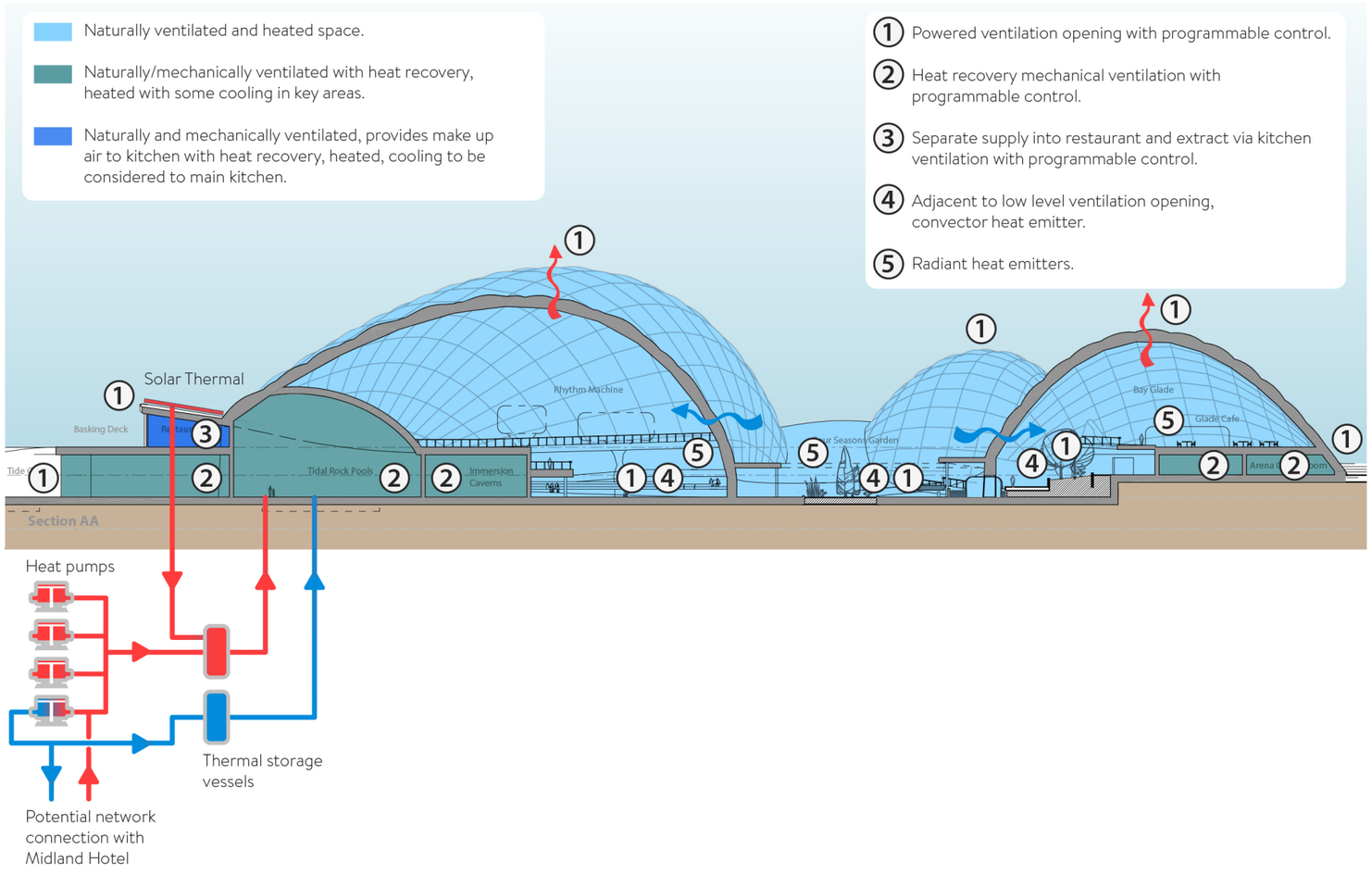
Natural ventilation will be provided through openings in the biomes with intakes at low level and exhaust at high level. These openings will be provided on the windward and leeward sides of the biomes to ensure correct airflow movement.

Due to the large internal volume of the space, the air will be heated and rise before it becomes heavily laden with CO2. Because of this, air can be captured at high level after it has warmed and be usefully introduced back at low level to provide thermal comfort.

The internal spaces will be mechanically ventilated and cooled if necessary. The heat rejected by the cooling process will however be recovered in to the heat loop.

Rather than conditioning the volume of the biome, which would be energy inefficient, the strategy will focus on a suitable habitat for the planting as a minimum with local comfortable microclimates for the occupants.

This suits a radiant system which warms the skin of the occupant and not the air around them, which would ultimately rise and be lost to the shells.



# 6.4 SUSTAINABLE DRAINAGE



Sustainable Urban Drainage Systems are used to reduce the impact of surface water from storm events on the existing environment mimicking the natural run-off characteristics of the site and removing pollutants from the urban run-off at source. There are various solutions which are described in the SuDS Manual (CIRIA C753) and include ground level features including swales and ponds, below ground systems (such as tanks, and infiltration techniques like soakaways). In addition, there are above ground solutions such as green roofs.

The Proposed Development considers the use of sustainable drainage techniques in accordance with local 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.

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. The hierarchy of SuDS techniques is shown in the following table:

| | SUDS Technique | Flood Reduction | Pollution Reduction | Landscape & Wildlife Benefit | Suitability for the Proposed Development | Comments |
|---|---|---|---|---|---|---|
| **Most Sustainable** ↑ | **Living roofs** | √ | √ | √ | **Yes** | Yes considered for the lower roof areas. The feasibility of this working alongside the dunescape style is to be confirmed at the next design stage. |
| | **Basins & ponds** | √ | √ | √ | **Yes** | Permanent water features have been considered by the landscape architect and storage will be available in these. Swales are to be utilised in the landscape features. |
| | Constructed Wetlands | | | | **No** | |
| | Balancing ponds | | | | **No** | |
| | Detention basins | | | | **No** | |
| | Retention ponds | | | | **Yes** | |
| | **Filter strips & swales** | √ | √ | √ | **Yes** | |
| | **Rain Gardens** | √ | √ | √ | **Yes** | Rain gardens to form parts of the proposed swales. |
| | **Infiltration devices** | √ | √ | √ | **TBC** | Existing soakaways to be retained as per option one. This is subject to further investigation and information. |
| | soakaways | √ | √ | | **TBC** | |
| | infiltration trenches & basins | | | | | |
| | **Permeable surfaces** | √ | √ | | **Yes** | Permeable surfaces are being prioritised over hard standing |
| | gravelled areas | | | | **Yes** | Subject to landscape design, currently included in scheme |
| | solid paving blocks | | | | **Yes** | Subject to landscape design |
| | porous pavers | | | | **Yes** | Subject to landscape design |
| ↓ | **Tanked systems** | √ | | | **Yes** | Considered to store additional required volumes that isn't available in the current proposed SuDS features. |
| **Least Sustainable** | over-sized pipes/tanks | | | | **Yes** | |
| | attenuation cells | | | | **Yes** | |

Table 6.4.1 SuDS Techniques

# 6.4 SUSTAINABLE DRAINAGE



The SuDS features included in the design for this site are listed below, with the location shown on the proceeding Figure 6.4.3

## Blue/Green Roofs

The blue/ green roofs are proposed for the scheme. These will be present on the low roof areas known as the dunescapes, at current it is assumed that blue roofs are feasible, however this is to be confirmed at a later stage where more design information is available on the dunescapes. The green roof aspect will include topsoil/ planting medium to allow for local plants to cover the roof areas, providing ecological benefits. Below the green roof will be a blue roof system which will capture the rainwater and act as storage for the rainwater to be reused as part of the sites irrigation demand. An example of this a blue/green roof is shown in Figure 6.4.1 adjacent.

## Swales/Raingardens

Two swales/raingardens will be located on site, as shown in Figure 6.4.3. The swales will capture run off from the neighbouring walkways. The swales across the site are proposed to have a filter trench below to provide additional attenuation and water treatment capacity. An example of this is shown in Figure 6.4.2.



Fig. 6.4.1 Example of Green Roof



Fig. 6.4.2 Example of Swale

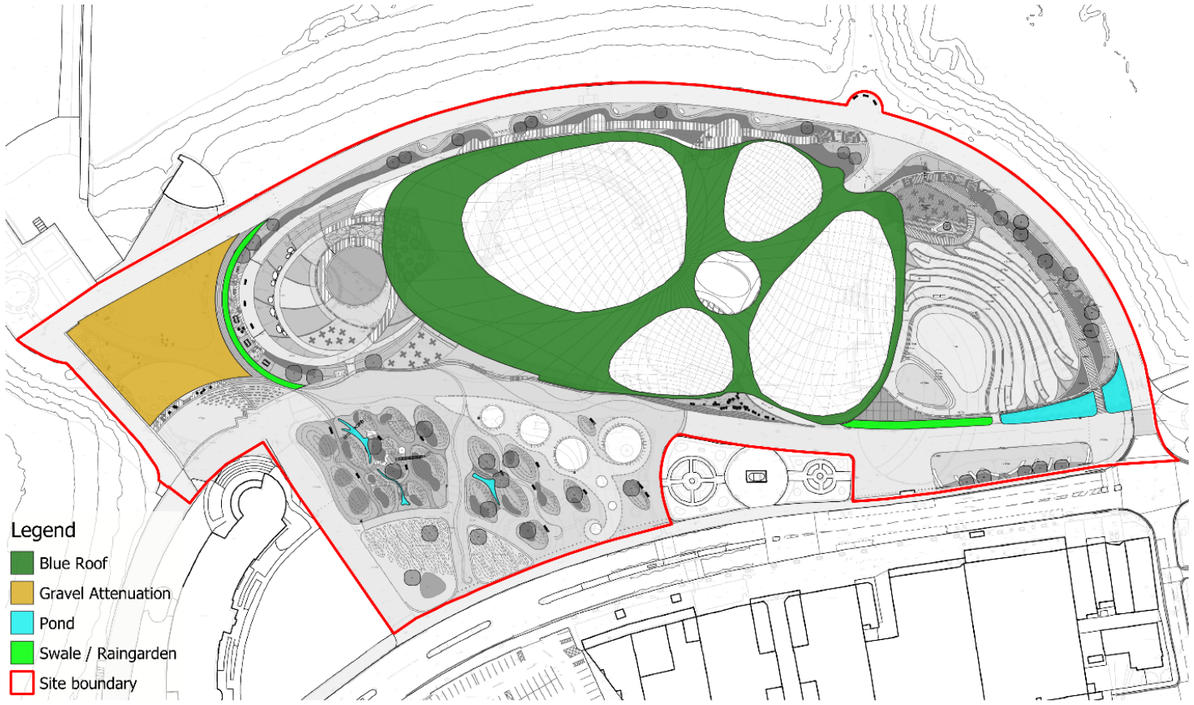



Figure 6.4.3 Proposed SuDS Features

# 6.4 SUSTAINABLE DRAINAGE



## Pollution Control

The appropriateness of proposed SuDS for the proposed development has been evaluated based on the CIRIA Report C753 Simple Index Approach. This is based on a simple index system, in which SuDS components and types of sites are assigned an index value for pollutant mitigation/hazard levels. To deliver adequate treatment, the SuDS component should have a total pollution mitigation index equal to or larger than the pollution hazard index. The following table summarises the mitigation indices of the proposed SuDS.

These values are then compared to the pollution hazard levels of each type of area within the site to evaluate the adequacy of proposed SuDS.

Due to the multiple levels of treatment the proposed the SuDS are deemed sufficient for treating the pollution hazard level.

| **Mitigation indices** | | | |
|---|---|---|---|
| Type of SuDS | TSS | Metals | Hydrocarbons |
| Swale | 0.5 | 0.6 | 0.6 |
| Pond | 0.7 | 0.7 | 0.5 |
| Permeable Paving | 0.4 | 0.4 | 0.5 |

Table 6.4.2 Mitigation indices of proposed SuDS components

| **Pollution hazard level** | **Total suspended solids** | **Metals** | **Hydrocarbons** | **Proposed mitigation measure** | **Adequacy** |
|---|---|---|---|---|---|
| Low | 0.5 | 0.4 | 0.4 | Swales/ Rain Gardens, Permeable Paving and Ponds | √ |

Table 6.4.3 Pollution hazard indices of areas within the proposed development

# 6.5 BIODIVERSITY



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 , 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.

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.

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.

[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



Oystercatchers, Morecambe Bay



Waders, Morecambe Bay

# 6.6 WASTE STRATEGY



The overall waste management strategy for construction and operational waste at the Eden North 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.

During operation, the Eden Project North development is expected to generate approximately 700 tonnes of waste per year. Space provision for waste storage has been included as part of current design proposals.

Waste will be produced across the site from different land uses such as food and beverage, exhibition areas and general public areas. Operational waste generated at the proposed development is expected to be managed either through the local authority (Lancaster City Council) or a private waste collector. 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 the East of the site (illustrated in Figure 1) at off-peak hours. Waste will be collected from the main waste store and transported for treatment on and off-site.

Operational 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. Operational landscape waste is expected to be generated on-site, this waste is assumed to be managed by a private contractor. Some or all of this waste may be sent to the on-site composting facility, and the remainder off site for treatment. Estimations of the quantities of this waste will be determined at next design stages. Small service vehicles will move waste from the western servicing area to the main waste store in at the east of the site.  Large refuse vehicles will collect from the main servicing area to the east of the site (illustrated in the diagram overleaf).

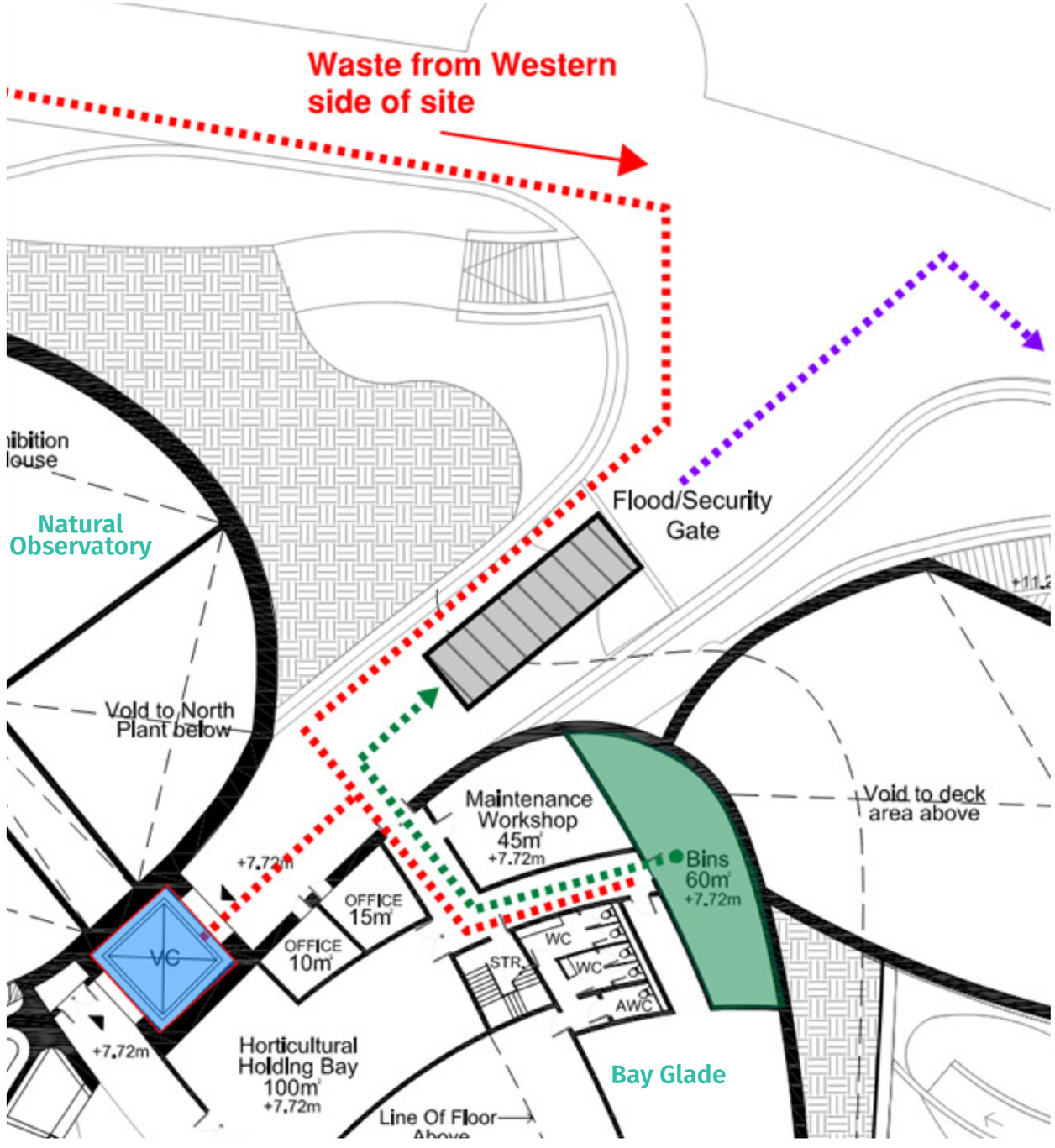
Full details of the waste management requirements, including an Operational Waste Management Strategy will be produced as a condition at next stages for future approval.  An Outline Waste Strategy has been produced at this stage (which can be found within supporting application documents).

The development is expected to generate approximately 4,000 tonnes of construction waste and 5,600 tonnes of demolition waste. This is indicative of a worst-case scenario where no mitigation measures are implemented. Excavation waste is also expected to be generated and tonnage estimations will be determined at the next stage. Construction, demolition and excavation waste is also expected to be managed through a private waste contractor(s). At design stages, measures will be implemented to reduce 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. As outlined in the Outline Waste Strategy (which can be found within supporting application document).

Reduction and recycling measures will be carried out during design and construction stages. These will be detailed further at next stages where a full Construction Waste Management Plan is produced.

## 6.6 WASTE STRATEGY






Service lift

Waste storage

Waste movement route from waste store to collection

General servicing and waste route

Waste vehicle movement off-site

Waste and servicing vehicle area/loading bay

Ground floor waste movements on at the Eastern side of the proposed development, including main waste store (highlighted in green). Plan from Grimshaw Architects dated 06.08.21

# 6.7 EXTERNAL LIGHTING STRATEGY



**Landscape Lighting:** 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.

It is therefore critical that the area is well illuminated in relation to its context, not only to meet the requirements of safety and security of the staff and visitors but also to provide the appropriate character and atmosphere to the landscape. This section of the Design and Access statement aims to briefly summarise the lighting design intent.

**Views & Visual connections:** Distant and immediate views have been considered throughout the design. The landscape and public realm lighting proposals across the site are coordinated to create a cohesive design which responds to the site constraints and opportunities.  The different zones have been designed with appropriate lighting typologies suitable for the intended uses. Maintenance of the public realm lighting has also been considered.

**The Lighting Characteristics:** The design strategy for the lighting of the external landscape of the site is based on four key characteristics:

**Safety & Security:** The primary role of the lighting is to keep people safe and secure during the hours of darkness. Lighting design standards and best practise have therefore been selected to harmonise the Eden Projects requirements and to provide both horizontal and vertical illuminance that is appropriate to the landscape area.

The proposal includes warm white light sources with a broad spectrum to ensure good facial recognition and the accurate rendering of colours.

**Sustainability & Flexibility**: The need for light for both safety and security and social interaction needs to be a balance against potential adverse environmental impacts, including energy use, light pollution and damage to local ecologies. The lighting design has taken a progressive approach by avoiding over-lighting and retaining natural darkness in areas where appropriate. The use of low energy light sources (LEDs) and area controls (dimming and scene setting) will assist in managing energy. Having a flexible lighting system will support the need to programme for events after dark.

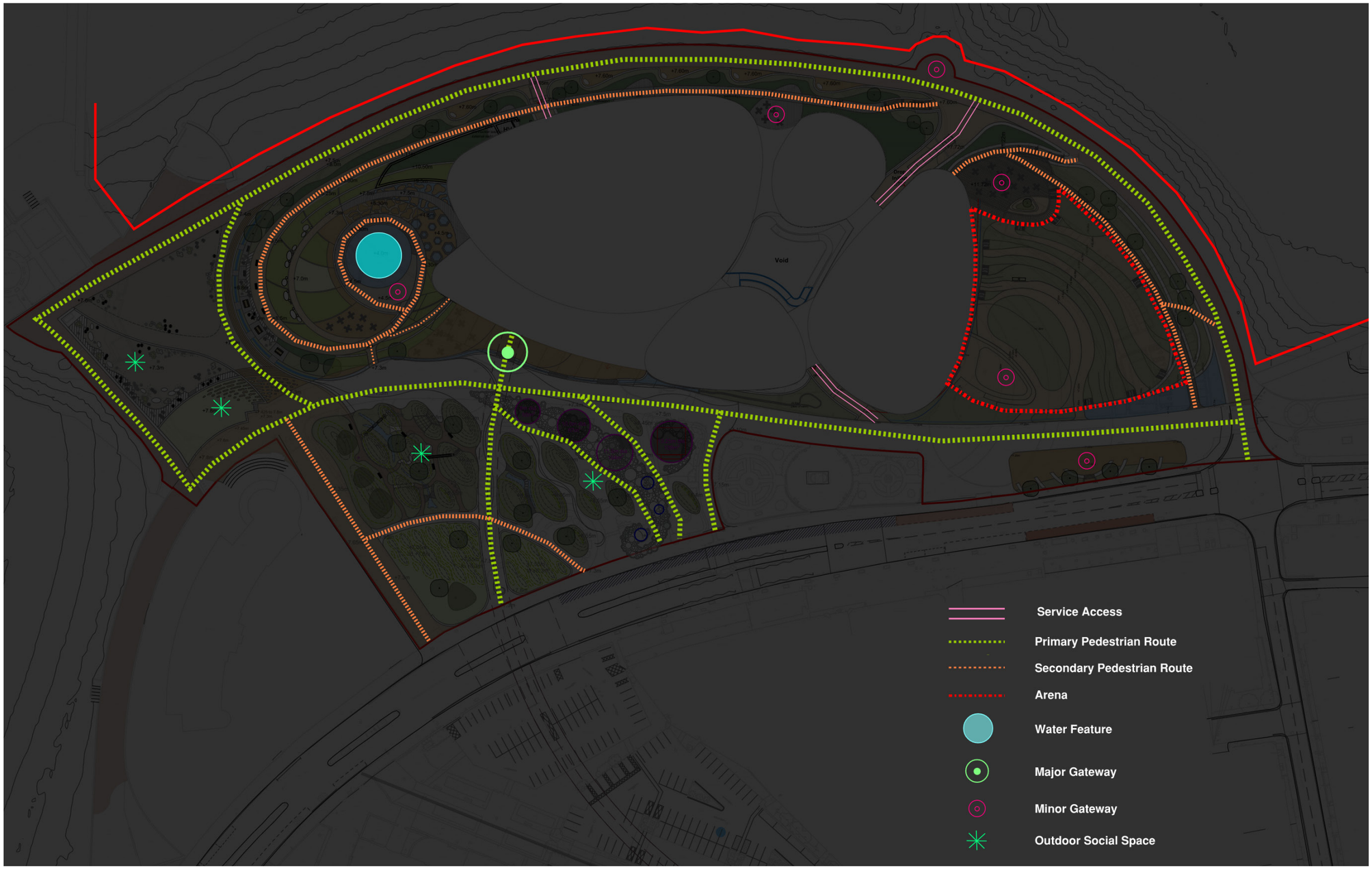
**Connectivity**: The lighting has been designed to support both the overall building and landscape concept, supporting movement and promoting interaction between people and the landscape. This is to be achieved by clearly illuminating pedestrian routes to their respective hierarchy, creating dwell spaces and highlighting intersections and meeting places through the landscape. Entrances shall be clearly highlighted to create an inviting entrance on approach from the landscape. The lighting design is designed to meet the requirements for accessibility and equity for all.

**Ecology**: Considering the high ecological value of the neighbouring site, light colour temperature plays an important role in the preservation of the identified species and migrating birds. Lighting levels and extent needs to be limited where necessary.

Most nocturnal species display high sensitivity levels to the short wavelength end of the light spectrum (blue component and UV), LED sources typically feature no UV component and therefore considered a better choice compared to other light sources.

## 6.7 EXTERNAL LIGHTING STRATEGY






Lighting Design strategy plan layout

# 6.7 EXTERNAL LIGHTING STRATEGY



### The Quality of Light

The light quality for the Eden Project North has been carefully selected as follows:

**Intensity of Light:** The intensity of the lighting has been harmonised to reduce contrasts that will create problems with the perception of the lit environment. Bright areas can create dark adjacencies. Utilising broad spectrum white light sources with fixtures places to provide a good uniformity to key routes and spaces allows good adaptations of the eye using carefully controlled light levels.

**Colour of Light**: The colour temperature of the light will be warm for all routes (3000K) and cool (4000K) to water features. Very warm light sources (2700K) will define dwell spaces and meeting zones. Colour rendering of the light sources will be goof to accurately reveal colours of materials, skin tones, foliage etc.

**Texture:** Discrete lighting of key landscaping features such as timber walkways and planting, water features etc introduce texture and colour into the visual scene on a seasonal basis, this adds visual interest and enhances the landscape design after dark.

**Shade**: The luminaires and intensity of light strategy is to create a human scale to the area surrounding the Eden Project buildings after dark. The primary routes will be lit more brightly allowing the secondary and tertiary routes, key views and vistas to be lower in light level retaining views after dark.




Lighting Intensity plan diagram




Lighting Colour plan diagram

# 6.7 EXTERNAL LIGHTING STRATEGY



### Lighting Character Areas

The following describes the lighting design to the landscape area. In general, the lighting to the public realm is characterised by:

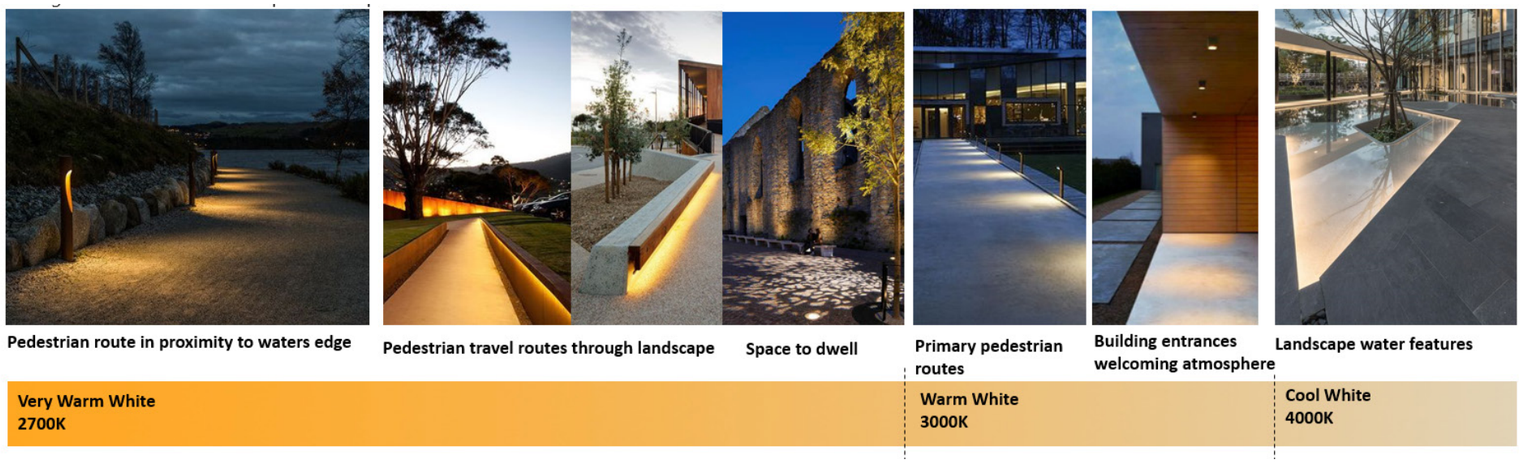
- Low level lighting via bollards to primary pedestrian routes and designated vehicle routes providing general circulation lighting
- Integrated lighting to landscape furniture creating dwell zones and places of rest.
- Wall mounted directional lighting to ramps and designated character zones.
- Integrated lighting to water features highlighting landscape features.
- Directional down lighting to entrance canopies providing functional lighting to entrances and creating a welcoming atmosphere.
- Tree mounted spotlights providing a dappled light to highlight dwell zones
- Integrated lighting to delineate edges, connecting shells, experiences, and overall landscape.
- Integrated lighting to sheltered and shaded areas creating places for interpretation, interaction and performance.
- Luminaire selection shall complement the surrounding area, offering a level of resistance to impact and vandalism, as well as having an established, clear and accepted method of access and maintenance regimes.

### Lighting Colour Temperature & Associated Areas

The experience of a space is a combination of its appearance, balance and juxtaposition of horizontal and vertical surfaces. By altering the location, orientation, typologies and light characterises, we aid to create ambiance, variation and an attractive visual visitor experience.

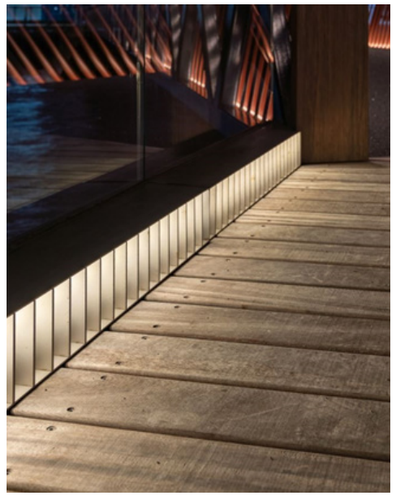
Furthermore, having a balanced combination of layers of light within a space provides an enhanced spatial experience, which would leave bolder, long-lasting memories.

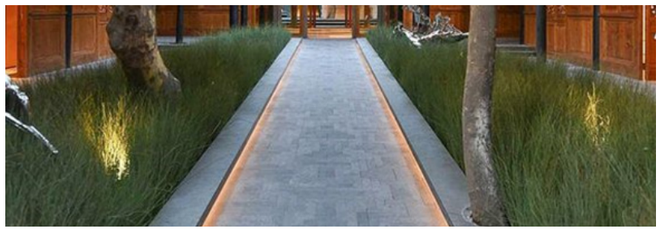
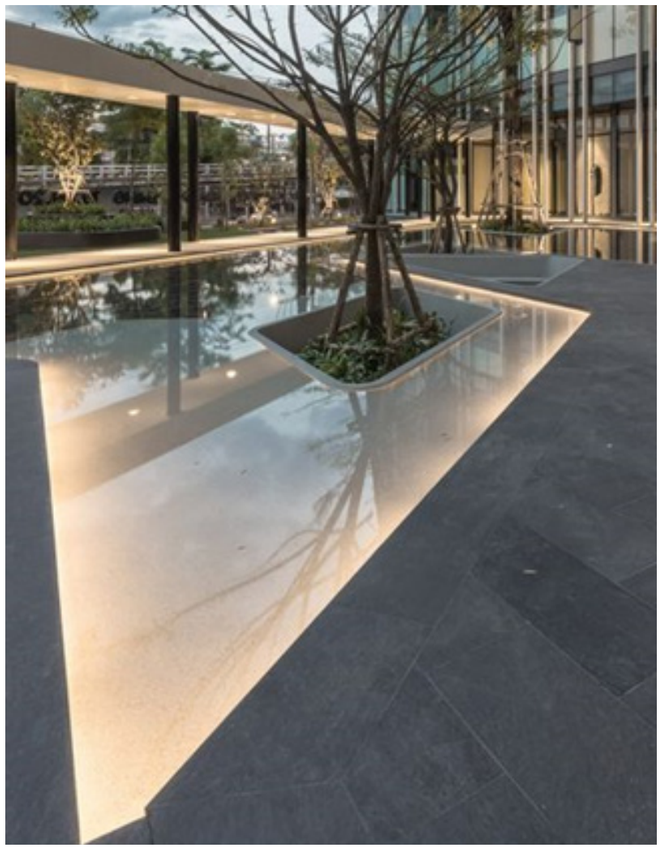
Taking into account its purpose, lighting can be categorised as functional and experiential. The lighting proposals combine suitable elements of functional and experiential whilst being sensitive to the sites receptors and operational scenarios.



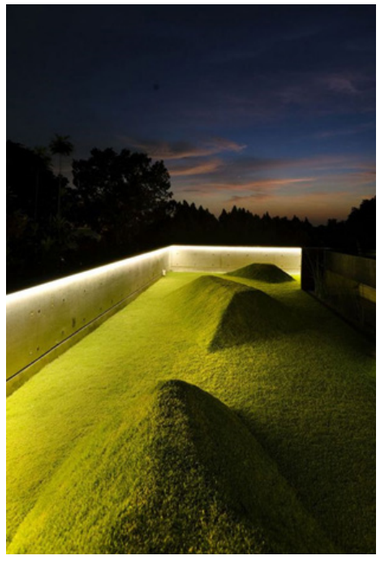
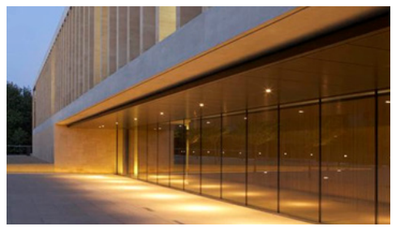
## 6.7 EXTERNAL LIGHTING STRATEGY







Lighting Design Principles and Character

# 6.7 INTERNAL LIGHTING STRATEGY



The internal lighting strategy sets out the recommendations, applicable regulations and best practice, to be adopted for the Proposed Development.

Consideration for internal lighting is assume to have negligible impact based on adherence to the construction and design standards, in-line with those noted within this report, together with the statutory requirements, standards, and recommendations for internal lighting, to include but not limited to those of British Standards Institute, Health and Safety Executive and CIBSE Society of Light and Lighting.

The adhesion of the internal lighting designs to the above standards and recommendations ensures that the internal lighting from the proposed development will not exceed the permissible levels of light spill or light pollution onto the surrounding areas and night sky. Specific considerations of migrating birds and marine life shall be addressed with suitable mitigation measures adopted to ensure their natural preservation with minimal impact from artificial lighting.

The adoption of variations in colour temperature for the internal lighting shall be considered with variation in warm and cool white light. This allows the lighting to cater for variations in the colour of natural light during the seasons and also facilitate syntonisation with the human circadian sleep/wake cycle. Promoting wellbeing and being adaptable to benefit wildlife and the sensitivity to flora and fauna.

Whilst the proposed development would have a visual impact with an increase in brightness to existing baseline conditions, the artificial lighting shall be addressed to provide a warm and welcoming space, adding a sense of security and a vibrant character to enhance the existing waterfront and visitor destination.

Details of the interior lighting, if required, are to be provided during the future developed design stages and construction process.

Smart lighting control systems linked to the proposed developments experiential activities and exterior lighting equipment can help reduce energy consumption in a more efficient way. These systems support interfacing with meteorological measurements, data collection and artificial intelligence development to create smart operation cycles. By installing a smart lighting controls systems, light scenes can be configured informed by time, seasonality, events and other factors. This directly affects the running cots and prolongs maintenance intervals.

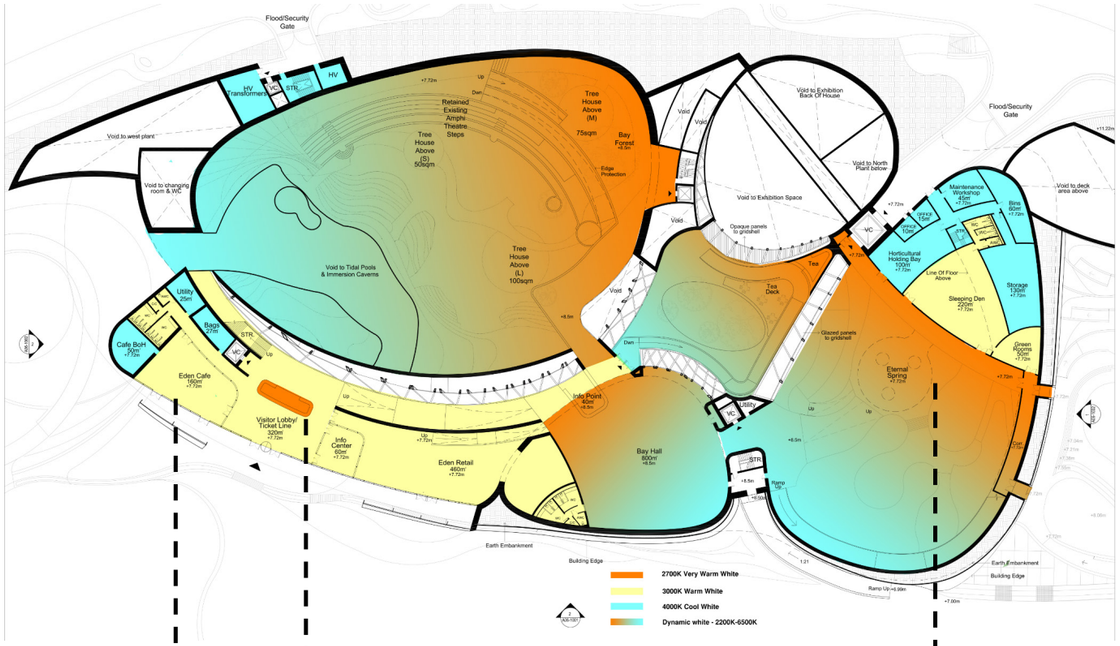
Standards:

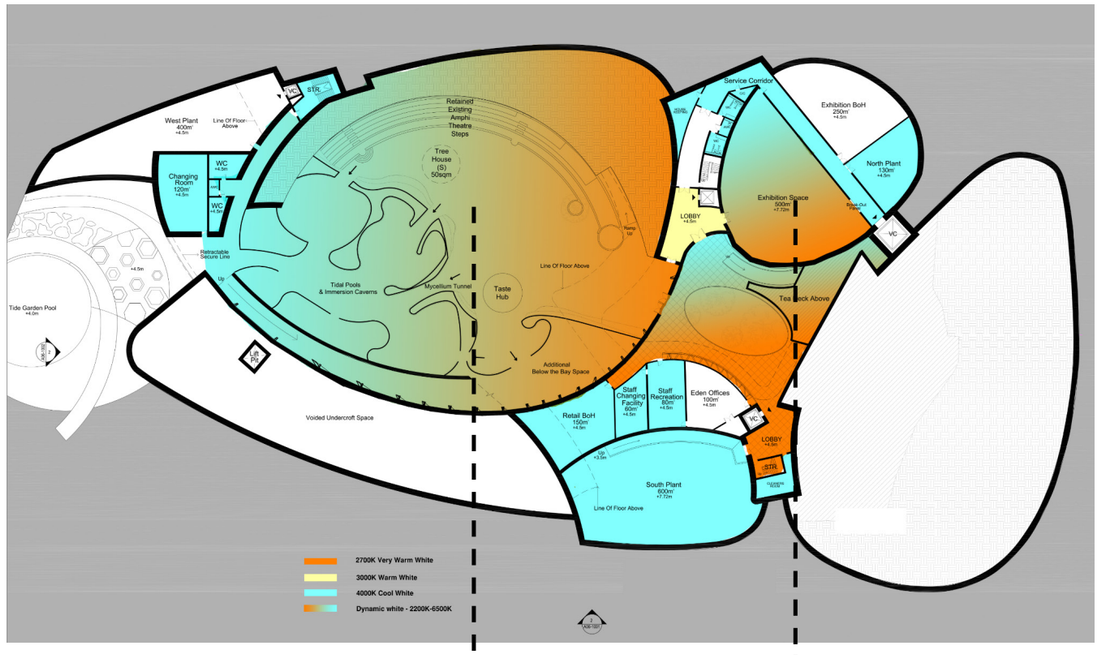
- CIBSE – SLL Code for Lighting
- CIBSE LG14 – Control of electric lighting
- CIBSE LG05 – Lighting for Education
- CIBSE LG16 – Lighting to stairs
- BS EN 12464-1:2011 Lighting for workplace
- BRE DG498: Selecting lighting controls
- BRE IP2/99: Photoelectric control of lighting design

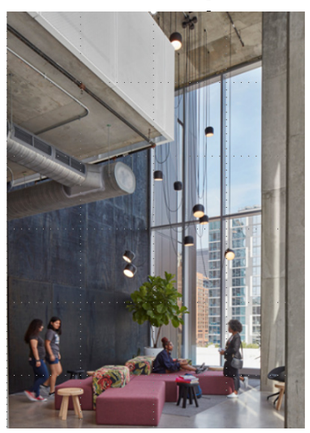
# 6.7 INTERNAL LIGHTING STRATEGY



## Interior Lighting Colour Temperature Principles

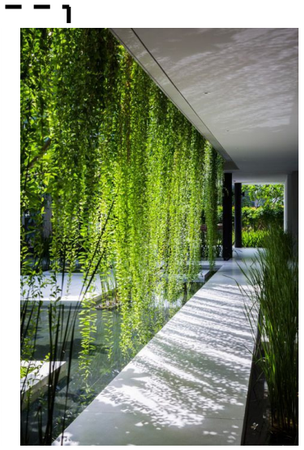


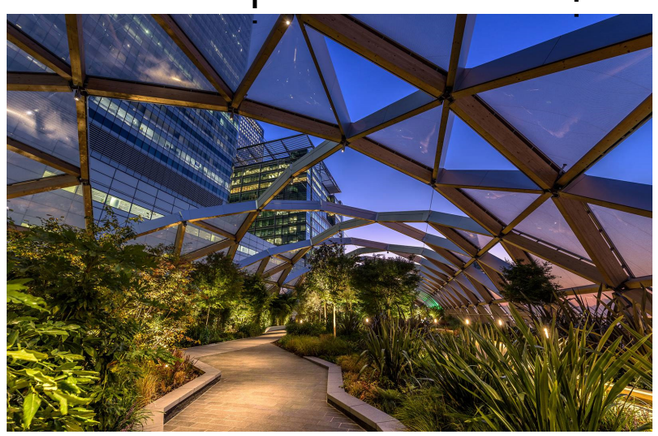











# 6.8 SURFACE WATER STRATEGY



The surface water strategy for the site currently has two potential drainage strategies options. Limited information at this stage means a single strategy cannot be confirmed. Once survey information is available the most appropriate strategy will be progressed.

The site is split up into areas defined by the surface characteristics as indicated in the following image. The figures and calculations presented in this section are based on this catchment plan.

### Drainage Hierarchy

The proposed surface water drainage strategy for the site is required to follow the design guidelines set out by CIRIA SuDS manual, particularly the hierarchy for surface water drainage discharge. The hierarchy is as follows:

1. Discharge to the ground via infiltration
2. Discharge to a watercourse or the sea
3. Discharge to existing drainage infrastructure




Catchment Plan

# 6.8 SURFACE WATER STRATEGY



### Discharge Via Infiltration

Historic information provided by Lancashire County Council shows two soakaway manholes located on the rock armour, it is believed that the site currently drains to these. Current information of these soakaway manholes is limited to a historic drawing proposal, and visual confirmation of the manhole covers. Further investigation will be required to understand the rate of infiltration and the condition of these manholes, to determine if they can be reused. This proposed strategy is continued below as “Option 1”.

Infiltration testing will also be carried out within the site boundary to determine if infiltration potential is available on site. This will be undertaken during the site investigation and the results will form the detailed strategy.

### Discharge to a Watercourse or Sea

There is a culverted watercourse crossing the site which ultimately discharges to the sea. CCTV survey information of the culvert shows no existing connection, however, due to standing water in the culvert at the time of the survey only approximately 75% of the culvert was actually surveyed. It may be that there are existing site connections in the section of culvert not surveyed. The proposed strategy of discharging to the culvert is continued below as “Option 2”.

### Discharge to Existing Drainage Infrastructure

The current existing information provided from United Utilities asset plans indicates that there are no existing public surface water sewers within the site. There is a combined sewer in Marine Road Central that previously served a portion of the site, however, to reduce the impact on the existing drainage infrastructure this discharge options is being discounted in favour of the two options included below.

### Proposed Surface Water Strategy – Option 1 (discharge to soakaways)

Surface water strategy option 1 proposes to reuse the existing soakaways as shown in the historic information provided.

A blue roof system is envisaged to capture rainfall from the roof 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. As information at this stage is limited, a number of assumptions have been made to calculate the proposed discharge rate. Due to the nature of the soakaways being placed within the rock armour, it is assumed that the infiltration rate is very high (~x10-1m/s) and the restriction will come instead from the size of the pipework entering the soakaways.

It is assumed that the pipe entering the soakaway manholes is a 300mm diameter pipe, this is based upon the size of the soakaway manholes (1200mm diameter). An assumed gradient of 1:100 for the 300mm diameter pipe gives a maximum capacity flow of 111.1l/s for each soakaway. This value will be refined once more information is available for the soakaway manholes and existing network. Once this information is available, a hydraulic model will be progressed to replicate the existing soakaway in order to calculate a more accurate discharge rate for the site.

### Option 1: Attenuation Requirements

Based on the proposed discharge rate for Option 1, a quick storage estimate calculation has been carried out for the 1 in 100 year storm event plus 40% climate change. The estimated attenuation storage required for the site is 1,375m3.

# 6.8 SURFACE WATER STRATEGY



### Proposed Surface Water Strategy – Option 2 (discharge to culvert)

Surface water strategy option 2 proposes to create a new connection to the existing culvert which crosses the site and discharges runoff to Morecambe Bay. The invert level of the existing culvert at the connection point is 1.14 m AOD, therefore, runoff will be conveyed by gravity.

A blue roof system is envisaged to capture rainfall from the roof and this will be retained for reuse. Surface water captured in the public realm area of the site will be conveyed where possible to the proposed SuDS features, reducing the need for a conventional drainage system such as channel drains and gullies. A greenfield runoff discharge rate of 12.6l/s is proposed due to lack of existing information and confirmation of any existing connection from the site. A CCTV survey carried out at a later design stage may determine if any existing connections are present on site, if this is the case there may be scope to increase the discharge rate based on the capacity of the identified connections in line with guidance from the LLFA.

### Option 2 Attenuation Requirements

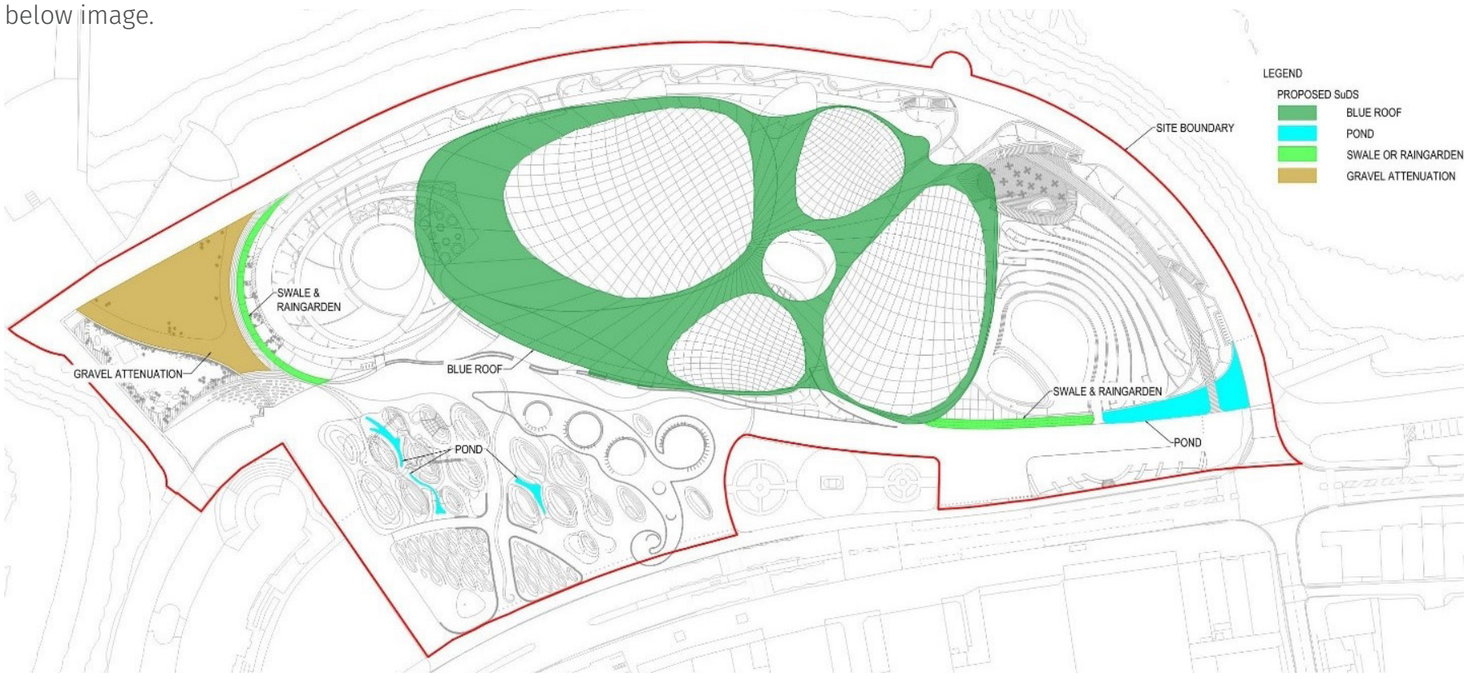
Based on the proposed discharge rate for Option 2, a quick storage estimate calculation has been carried out for the 1 in 100 year storm event plus 40% Climate change. The estimated attenuation storage required is 3,540m3.

### Sustainable Drainage Systems

For both options a number of SuDS features will be implemented in the scheme, this includes:

- Green/blue roof systems
- Swales
- Raingardens
- Ponds
- Gravel permeable surfacing

The proposed location of each feature is indicated in the below image.




Proposed SuDS Features

# 6.9 UTILITIES



The existing utility infrastructure network around the Eden North site, has been assessed with regards to the proposed development. A summary of the anticipated requirements for each utility is included below, with a more detailed summary following.

**Power:**

- Existing substation on site to be relocated.
- New connection provided to serve approximate 2.5MVA demand.

**Gas:**

- No diversion required and no new connection anticipated.

**Foul Water:**

- No diversion anticipated; new connection required.

**Potable Water:**

- No diversion anticipated; new connection required.

**Telecommunications:**

- No diversion anticipated; new connection required.

### 6.11.1 Power

Information received from Electricity North West show that low voltage (LV) and 6.6kv cables were found across the site, with a secondary substation located in the West of the site. LV cables across the existing site will be abandoned as part of the proposed works. A medium voltage (MV) branch also leads from Marine Road Central northwards to a central area of the site. This is also assumed to be abandoned.

LV and MV cables feeding the existing substation serve the adjacent Midland Hotel and will need to be maintained throughout the works. The existing secondary substation is to potentially be relocated as part of the proposed scheme to suit the proposed Eden layout. Supplies to the Midland Hotel will be maintained during the relocation and associated cables will be diverted to the new substation location.

An initial power demand calculation has been developed for the proposed site, indicating a total demand of 2.5MVA. The online ENWL mapping tool indicates that the two closest substations to the development site do not have significant capacity, however, the Broadway (33kv/6.6kv) primary substation has approximately 11MVA capacity available.

An initial application for a connection has been submitted to ENWL and a budget quote response has been received. The budget quote estimates a cost of £115,200 (incl. VAT). Clarification is required from ENWL regarding the inclusions.

### 6.11.2 Gas

Cadent records show no existing gas routes that cross the proposed site, however, there is a low-pressure gas network located south of the prosed site located in Marine Road Central. No alteration is proposed to the existing network as there are currently no gas connections envisaged for this development.

### 6.11.3 Foul Water Drainage

United Utilities records show that there is no foul or combined network present in the proposed development site. A combined network is present under Marine Road Central, with the head of the run starting South West of the site. As the site was previously a Lido between the years of 1936 to 1975 it is assumed that there was foul discharge from the site. Any private sewers serving the existing site are to be grubbed up and removed.

The connection point and flow rate of 5l/s has previously been agreed with United Utilities. The current proposal for the foul water strategy will include internal foul water only from the proposed building. It is envisaged that the foul network will follow the external line of the building before discharging to an agreed connection point located in Marine Road West.

## 6.9 UTILITIES



The existing manhole has an approximate invert level of 4.00m AOD, based upon this, it is envisaged that any foul water from ground floor level (7.72m AOD) should be conveyed via a gravity system. As the lower ground level is at 4.5m AOD, it is envisaged that a pumped system will be required.

### 6.11.4 Potable Water

Distribution water mains run along Marine Road Central and lead into the site on the west side, adjacent to the Midland Hotel. The existing water main that enters the site is believed to have served the Lido until closure in 1975. The diameter of the water main that runs along Marine Road Central is 12" with the main which leads towards and slightly into the site being a 6" diameter. It is expected that a spur connects into the RNLI building, however, this is not picked up on the record drawings. The assumption is that this spur can be maintained in place.

Based on the statutory records and the previous use on site it is assumed that there should be sufficient capacity available for the proposed development within the surrounding network. The estimated peak demand for visitor potable water has been calculated as 75,000 l/day. A pre-development enquiry was submitted to United Utilities and a budget quote had been received for two connection options.

The quotes are as followed:

Option 1 – Total cost of £886.00 plus an additional £76.00 for any site visits required.

Option 2 – Total cost of £1933.60 plus an additional £76.00 for any site visits required.

United Utilities also provided a traffic management quote which equates to a total of £6468.00.

It is proposed that rainwater will be harvested from the roof areas for use as irrigation. The amount potentially captured is based on the monthly average rainfall data multiplied by the total roof surface area and a capture coefficient of 85%. It has been calculated that annually a total of approximately 12,500m3 could be captured from a total roof area of 14,000m2. Across the whole site there is a rainfall capture potential of 27,000m3 annually.

Required irrigation demands for the site have been calculated based on the current demands of the Mediterranean biome at Eden Cornwall. This has indicated a demand of:

Winter (October-March) 300-450m3/month

Summer (April-September) 600-840m3/month

### 6.11.5 Telecommunications

Asset plans from Openreach show the site is currently well served with telecommunications and supporting infrastructure from previous development. It is envisaged that a connection will likely be available from existing infrastructure on site.

Boxes located within the site boundary will be abandoned and removed as they are no longer required. The connection serving the Midland Hotel and RNLI will be protected in place.

SECTION 7

# Engagement

**Summary of the various methods and results of engagement with local authorities, stakeholders and the local community undertaken to date.**

ENGAGEMENT

# 7.1 COMMUNITY ENGAGEMENT

7.0

### 7.1.1 Overview

The EPIL team has always been clear that it wants the Morecambe community to feel a sense of ownership and pride in Eden Project North. Engaging with the local community throughout development phases, to ground the project within its place, has always been fundamental to our approach.

Communication throughout the entire planning and development process has been two-way, robust, creative and fun, not just a statutory box-ticking exercise.

Involving the local community in decision-making processes regarding the development of their neighbourhood has always been the team's way of ensuring positive and sustainable outcomes for everyone.

The EPIL team set out to integrate its core values and aspirations for 'well-being' from the very earliest moment in the project's lifecycle, including our approach to community engagement. Accordingly, the aim of the community engagement exercise has been:

- To use an accessible and inclusive consultation process that is receptive, stimulating and diverse, providing a variety of entry points from the very early stages of design.
- To gather and share evidence and inspiration with the people of Morecambe, Lancaster and the wider Bay area to feed into the development of Eden Project North and the regeneration of Morecambe Bay.
- To act as a broker for both existing networks and building new sustainable local networks and partnerships.

Community engagement will continue throughout the planning application process, construction phases and ultimately once Eden Project North is operational.

Full details of the community consultation approach, results and how feedback received has helped shape the proposals is set out in the Statement of Community Engagement (SCE). A summary is provided in the following sections.

### 7.1.2 Earlier Engagement

EPIL initiated an intensive local consultation across the Morecambe area between 18 and 22 October 2019, where, for the first time, plans were shared with the public.

EPIL welcomed over 2,000 participants to this event and received rich feedback that fed into the next stage of design and we have addressed comments and concerns raised in the subsequent engagement events and incorporated them in the evolving design.




EPIL continued its community engagement drive with monthly, virtual 'Community Conversations' during 2021, covering a wide range of topics to gauge as broad a spectrum of feedback as possible to influence the proposals.

# 7.2 SUMMER 2021 ENGAGEMENT

7.0

### 7.2.1 Consultation Approach

Community engagement intensified further during Summer 2021 as the proposals evolved and were developed towards application submission. EPIL shared the proposals with the local community and wider public, seeking feedback prior to the submission of the application.

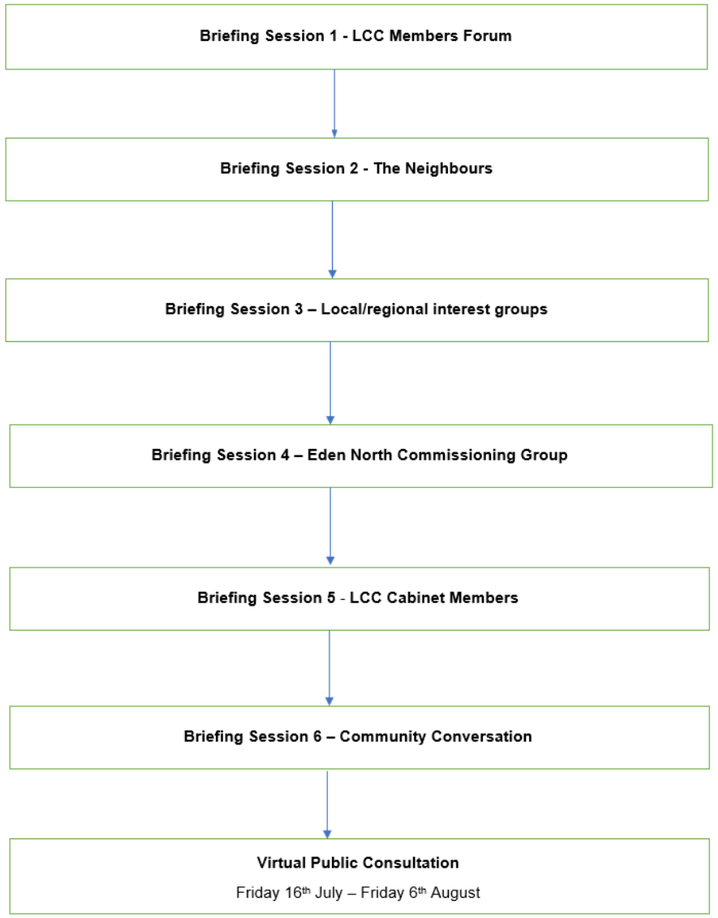
Given current COVID regulations, the public consultation undertaken was virtual in nature. In addition to the Eden Community Conversations, a comprehensive and interactive website/consultation room was created which allows visitors to review the emerging designs and learn about the various aspects of the scheme. An interactive 'room' was designed to let people experience a taste of the Eden Project brand and the Rainforest Biome at Eden Cornwall. The room was designed as all Eden engagement is - to be robust, provide detailed information but also be creative and fun. The on-line platform was designed to be accessible by both computer and smartphone.

The virtual consultation also allowed visitors to submit feedback on the proposals which has subsequently been reviewed directly by EPIL and the design team and included within the final design where possible.




A number of targeted briefing sessions were also held prior to and during the consultation period to ensure local and regional interest groups and the neighbouring stakeholders were provided with bespoke engagement sessions as well as access to the virtual consultation materials.

The full list of briefing sessions undertaken between 14th July – 16th July is set out in the adjacent diagram.



## 7.2 SUMMER 2021 ENGAGEMENT



### 7.2.2 Summer 2021 Consultation Feedback

In addition to the series of interactive boards and features in the the virtual consultation room, an online community feedback questionnaire was embedded in order for the community to provide feedback.

The questions asked and the percentage of respondents in support were as follows:

- Are you in support of Eden Project North? 97% in support
- Do you believe the benefits of Eden Project North will be felt throughout Morecambe, and the wider area? 94% in agreement
- Do you support the general design principles and approach for Eden Project North? 97% in support
- Do you understand and support the overall approach to the transport strategy for Eden Project North? 88% in support
- Are you in support of the Landscape Strategy for Eden North? 95% in support
- Are you in support of the Sustainability Strategy for Eden North? 96% in support

The consultation feedback received demonstrates a continuance of the overwhelming public support for the proposals.

EPIL is mindful that there are nevertheless some members of the community who raise valid concerns, for instance around the perceived transport impact of the proposals.

Details as to how these concerns have been addressed as part of the scheme design and technical assessment work in support of the application are set out in the Statement of Community Engagement.



# 7.3 PRE-APLICATION & STATUORY CONSULTEE ENGAGEMENT



Pre-application engagement has been undertaken with LCC and key stakeholders since April 2019, as part of the pre-application process, intensifying from February 2021 in the lead-in to planning submission.

Engagement has taken place with statutory consultees since February 2021 but also with a variety of non-statutory consultees in order to ensure a comprehensive approach is taken with engagement and that a variety of interested parties can be provide feedback.

Fortnightly meetings have been held with LCC's planning department since February 2021 to ensure that EPIL, the project team, LCC and consultees have worked closely and collaboratively in the formulation of the planning application.

Meetings have also taken place with the Planning Policy team in addition to the Climate Change/Sustainability Officers. Discussions focussed on ensuring that the development would meet the Council's emerging sustainability/climate change policies which are being revised as part of the ongoing Local Plan Review.

Pre-application feedback received has been used to inform the detailed design, feed into each ES chapter and the application as a whole.  Full details are set out in the Planning Statement.

Engagement with LCC, statutory and non-statutory consultees will continue throughout the application determination period and right through to implementation of the development.

eden project

# EDEN PROJECT NORTH
## DESIGN AND ACCESS STATEMENT

AUGUST 2021