



**Northfleet
Harbourside**

Framework Sustainability and Energy Statement



Gravesham Borough Council

Northfleet Harbourside
Northfleet Central 1 Ltd

Framework Sustainability & Energy Statement

Revision 01
29/09/2022

Scotch Partners LLP

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Project Particulars

Client Name: Landmarque Property Group

Project Name: Northfleet Harbourside

Project Number: 5385

Document Reference: Framework Sustainability & Energy Statement

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Revision History

Revision	Description	Date	Prepared By	Checked By
00	For review	23/09/2022	RM & KE	KE
01	Final	29/09/2022	RM & KE	KE

Contents

Executive Summary	4
1 Introduction.....	6
1.1 Framework Sustainability & Energy Statement	6
1.2 Development Description	6
1.3 Policy Context	7
1.4 Developing the Framework Sustainability & Energy Strategy	8
2 Sustainability Aspirations.....	9
2.1 Sustainability Goals and Targets	9
2.2 BREEAM	9
2.3 LEED.....	9
2.4 WELL	9
2.5 Active Score	9
2.6 UN Sustainable Development Goals	10
3 Sustainability Assessment.....	11
3.1 Background.....	11
3.2 BREEAM New Construction 2018	11
4 Land Use & Community	13
4.1 Sustainable Land Use	13
4.2 A Sustainable Community - Site Layout	14
4.3 Local Community Benefits	14
4.4 Promoting a Digital Economy and Smart Community.....	15
5 Energy & Carbon.....	16
5.1 The Energy Hierarchy.....	16
5.2 Approach to a Net Zero Carbon Development	16
5.3 Renewable Energy	20
5.4 Energy Strategy Options for Northfleet Harbourside	22
5.5 Potential for a Smartgrid	22
6 Health & Wellbeing.....	23
6.1 Key Considerations	23
6.2 Health Impact Assessment	23
6.3 WELL Building Standard & Community.....	23
7 Water Efficiency.....	24
7.1 Water Demand	24
7.2 Water Recycling.....	24
9 The Circular Economy	25
9.1 Circular Economy Principles for the Existing Site - Demolition & Refurbishment	25
9.2 Circular Economy Approach for the Masterplan.....	25
9.3 Circular Economy Approach for Municipal Waste During Operation.....	26
10 Adapting to Climate Change & Greening The City	27
10.1 Introduction	27
10.2 Possible Risks for Northfleet	27
Conclusion	28
Appendix A – UN Sustainable Development Goals	29

Executive Summary

This Framework Sustainability and Energy Statement forms part of an outline planning application with all matters reserved, except for the primary means of access, for a mixed-use redevelopment involving the demolition of existing buildings and structures including site preparation / remediation works, and the development of residential units (Use Class C3), Use Class E floorspace including floorspace for retail, food and beverage, office floorspace and flexible Class E floorspace, floorspace for a new multi-use stadium with associated business and leisure facilities, floorspace for a hotel (Use Class C1), floorspace for community uses (Use Class F2) and other sui generis uses, delivery of open space and the realignment of the A226 Galley Hill Road / Stonebridge Road with hard / soft landscaping, car and cycle parking, highways works, infrastructure works, ancillary and associated works.

The proposal contributes to Gravesham Borough Council’s (GBC) regeneration priorities and delivers a range of benefits to the local community. This Framework Sustainability & Energy Strategy has been developed for the Masterplan of Northfleet Harbourside in accordance with the sustainability objectives and aspirations of the Applicant and GBC The strategy sets out the high level approaches to achieving a Net Zero Carbon community and underpin the Masterplan’s response to climate change and resource management.

Key opportunities for implementing sustainability measures and solutions appropriate to the Masterplan have been identified and these align with the UN Sustainable Development Goals.



To further assist and secure an advanced sustainability performance across the Site, a number of accreditations and approaches have been considered. These include, but are not limited to, the standards set out in the table below.

Standard / Approach	Minimum Target	Aspiration
Net Zero Carbon – regulated emissions	45% improvement over Building Regulations Part L	Zero Carbon i.e. all emissions offset onsite or through carbon offsetting
Net Zero Carbon – whole life carbon	Design in accordance with LETI NZC Climate Emergency Design Guide. Consider both embodied carbon and operational energy use	Achieve LETI targets and KPI where practicable, including a zero carbon balance
BREEAM	Excellent certification	Outstanding certification
LEED	Gold certification being considered	Platinum certification
WELL	Gold certification being considered	Platinum certification
WiredScore	Adopt key principles to deliver a strong digital economy	Achieve formal certification
SmartScore	Adopt key principles to deliver intelligent buildings and homes, potentially supported by a smart/micro grid	Achieve formal certification
ActiveScore	Adopt key principles to promote active travel in a sustainable way	Achieve formal certification

The project team in consultation with an Energy Services Company (ESCO) have identified three potential strategy options for supplying fossil fuel free, low carbon (potentially zero carbon) heating and cooling to Northfleet Harbourside. These are set out in the table below.

At this outline stage the Applicant and project team’s preferred strategies are Options 1 or Option 2. Each option will be explored and appraised in detail at the next stage of design. Several factors will be taken into consideration including spatial constraints, visual amenity, technical feasibility, contribution to reducing carbon, and cost-benefit to future site users and occupiers.

Option	Strategy	Technologies
Option 1	Single centralised energy centre serving the whole site via District Heat Network	Hybrid. ASHP-led with contribution from GSHPs (if viable). PV could provide power-requirements to enable a zero carbon strategy.
Option 2	Each phase served by its own energy centre(s) with dedicated District Heat Network	Hybrid. ASHP-led with contribution from GSHPs (if viable). PV could provide power-requirements to enable a zero carbon strategy.
Option 3	Decentralised strategy where each building is served via a local heating/cooling plantroom dedicated to that building. No District Heat Network; building served via internal distribution pipework.	ASHPs based on the roof and/or GSHPs (if viable). PV could provide power-requirements to enable a zero carbon strategy.

Subsequently, the Masterplan demonstrates the following sustainability performance indicators:

- A new sustainable community that is designed to be resilient and adaptable to future climate change.
- A Net Zero Carbon community that adopts a whole life carbon approach to reducing its carbon impact.
- A built environment that maximises the opportunities for onsite renewable energy generation.

- A vibrant commercial offering that demonstrates environmental and social responsibility by attaining BREEAM ‘Excellent’ and WELL and LEED Gold certification as a minimum.
- A community that puts the health and wellbeing of site occupants, users, and visitors at its heart by aligning with the WELL, ActiveScore, BREEAM and LEED standards for healthy living.
- A new environment that supports nature and habitat creation whilst providing public spaces for recreation, leisure, and play.
- A robust and resilient digital economy and community through application of the principles of WiredScore, with the potential for formal certification.
- A community that lives and works ‘smart’ to drive resource and cost efficiency and reduce reliance on car borne travel (and potentially being certified under ActiveScore).

These indicators are proposed at an outline, site-wide level with the intention of being further developed as the scheme detail is designed. Through the implementation of the measures and approaches set out in this and other documents, such as the Design Code, it is anticipated that Northfleet Harbourside will achieve the sustainability aspirations of the Applicant, local Stakeholders, the Community and the Local Authority.

1 Introduction

1.1 Framework Sustainability & Energy Statement

This Framework Sustainability & Energy Statement has been prepared by Scotch Partners on behalf of Northfleet Central 1 Ltd in support of an outline planning application for the regeneration of a significant brownfield site in Northfleet.

This document provides a summary of the site-wide outline design proposals and approaches that have been considered as part of the framework strategy in order to support delivery of high quality, resource efficient homes and buildings throughout all phases of the masterplan. It demonstrates the aspirations of the Applicant and compliance, where viable and appropriate, with relevant policy on sustainable design and construction.

It should be noted that Design Codes specific to sustainable design and construction have been developed for the masterplan. These contractual Codes will be adopted and adhered to by each of the phases of development.

1.2 Development Description

The Site currently comprises Ebbsfleet Football Stadium, industrial land uses including active aggregates/concrete handling and processing sites operated by Aggregate Industries and Brett Aggregates, smaller industrial units, petrol station, a row of 4 (four) terrace houses, car showroom and town centre uses including a gym and coffee shop. The A226 (Stonebridge Road) runs through the site which is heavily used by HGVs accessing the industrial uses. Open spaces on-site are largely covered by concrete surfacing and areas of hardstanding. There is little to no amenity landscaping on site other than Ebbsfleet United FC's pitch.

An Outline planning application is being lodged with all matters reserved, except for the primary means of access, for a mixed-use redevelopment involving the demolition of existing buildings and structures including site preparation / remediation works, and the development of residential units (Use Class C3), Use Class E floorspace including floorspace for retail, food and beverage, office floorspace and flexible Class E floorspace, floorspace for a new multi-use stadium with associated business and leisure facilities, floorspace for a hotel (Use Class C1), floorspace for community uses (Use Class F2) and other sui generis uses, delivery of open space and the realignment of the A226 Galley Hill Road / Stonebridge Road with hard / soft landscaping, car and cycle parking, highways works, infrastructure works, ancillary and associated works.

The proposal contributes to Council's regeneration priorities and delivers a range of benefits to the local community.

The Stadium - At the heart of Northfleet Harbourside lies one of Northfleet's most treasured cultural links, its football club, that is to be re-housed in a new stadium. This multi-functional venue will be capable of hosting a greater supporter base through increased capacity and the ability to host additional events throughout the year. The Stadium will be capable of hosting major cultural, music and community events for between 10,000-18,000 visitors.

The Marketplace - The Marketplace will be a high-quality retail experience that works closely with the leisure activities of the stadium. The retailing will provide a destination for both visitors and the local community, with all year round activations and program. Locating Northfleet's retail attraction right at the heart of the proposal will promote multiple visits from its customers. Northfleet retail will embrace a granular street-scape, of human scale and of immense interest but with measure, and a sense of 'identifiable' forms and frontages.

The scheme will deliver up to 3,500 residential units distributed between 3 neighbourhoods:

Boulevard Neighbourhood - The Boulevard neighbourhood is located next to the stadium and is developed around a mixed-use active street. A 300 bed hotel and commercial office spaces are complimenting the diverse character of this area. Much of the ground floor of this neighbourhood provides a mix of local community services and food and beverage offerings.

Riverside Neighbourhood - The Riverside neighbourhood is situated adjacent to river Thames where river-front dining options and event spaces will provide a vibrant and attractive waterfront attraction;

Parkland Neighbourhood - The Parkland neighbourhood, located next to the Swanscombe peninsula, will provide a quiet yet diverse residential quarter with direct access to green spaces and local amenities.

The 15-minute City - The new shops, restaurants, coffee shops, and workspaces at Northfleet Harbourside will accommodate a commercial offer that satisfies residents daily needs on-site, allowing them to work locally, creating a 'place' and support the '15-min City' concept - in which most daily necessities can be accomplished by either walking or cycling from residents' homes. Extensive Pathways and Cycle routes (+3kms within this 19ha site) will contribute to creating a positive public realm and urban environment, helping the community to meet and come together. Extensive and accessible public open spaces will ensure that the upcoming development will be a sustainable place which responds to Nature & Heritage.

The Masterplan accommodation schedule below provides the proposed maximum quantum for each use class:

Use	Use Class	Maximum Quantum of Floorspace (GEA)					Total
		Riverside	Parkland	Marketplace	Boulevard	Stadium	
Retail	E(a)			15900		4100	20000 m2
Food and Beverage	E(b)	1910		1100	4840	1100	8950 m2
Local Services, e.g. hairdressers, bank	E(c)		200		900		1100 m2
Indoor sport, recreation and fitness	E(d)	300	300		600		1200 m2
Medical or health services	E(e)	480	520		500		1500 m2
Creche or nursery	E(f)	280	320		600		1200 m2
Offices Total				1000	17000		18000 m2
Local Community Use	F2	700	650	1800	770		3920 m2
Stadium and associated facilities (e.g. gym, conference facilities)	Sui Generis					13450	13450 m2
Hotel	C1					19800	19800 m2
Residential (units)	C3	1600	950			950	3500 Units

1.3 Policy Context

The Masterplan and the sustainability strategy have been developed giving due consideration to local, regional and national planning policy.

Gravesham Local Plan Core Strategy (2014)

The Core Strategy Spatial Vision for Gravesham seeks that by 2028, Gravesham will have reinvented and regenerated itself from being dominated by heavy riverside industry to offer a more diverse range of employment and housing that respects the unique built, historic and natural environment. The proposed development at Northfleet Harbourside presents an opportunity to build on this Spatial Vision for 2028. The elements which specifically relevant to the Northfleet Harbourside sustainability strategy are:

- **Policy CS01: Sustainable Development** – ‘When considering development proposals the Council will take a positive approach that reflects the presumption in favor of sustainable development contained in the National Planning Policy Framework (NPPF) and in this Core Strategy. It will work proactively with applicants jointly to find solutions which mean that proposals can be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area’.
- **Policy CS18: Climate Change and specific narrative on Carbon Reduction** – ‘The Core Strategy seeks to reduce greenhouse gas emissions through the appropriate location and design of future development in the Borough. The aim is to move towards zero carbon development and to reduce the overall carbon footprint of the Borough.
- Respond to the challenges of climate change, by minimising the risk of flooding, protecting flood defences, encouraging water conservation, improving energy efficiency, improving air quality and encouraging the use of low carbon and renewable energy.

- To help increase the use and supply of renewable and low carbon energy, the NPPF states that local planning authorities should:
 - Have a positive strategy to promote energy from renewable and low carbon sources;
 - Design their policies to maximise renewable and low carbon energy development while ensuring that adverse impacts are addressed satisfactorily;
 - Consider identifying suitable areas for renewable and low carbon energy sources;
 - Identify opportunities where development can draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.
- Zero carbon will be achieved through a combination of: fabric energy efficiency which will require that new homes are sufficiently well insulated and adequately air tight; carbon compliance (the overall on-site contribution to zero carbon) which includes on-site low and zero carbon heat and power.
- The Council also supports proposals for stand-alone decentralised, renewable or low carbon energy development. It is recognised that such development may employ a range of different technologies where the impact of proposals will depend on location and will need to be evaluated on a case by case basis.
- The Council recognises the positive impact that contemporary, innovative design solutions can have in appropriate locations, particularly where they embrace sustainability and enhance local distinctiveness.’

The National Planning Policy Framework (NPPF)

Published in March 2012 and revised in July 2018, February 2019 and July 2021, the NPPF sets out the Government’s approach to planning matters and is a material consideration in the determination of planning applications. High quality and inclusive design which is delivered through mixed and integrated developments with well planned public spaces is encouraged at all policy levels. The NPPF notes that good design is fundamental to the planning process and in achieving sustainable development and should contribute to creating better places in which to live and work.

1.4 Developing the Framework Sustainability & Energy Strategy

1.4.1 Team Collaboration & Consultation

The Applicant and the project team are keen to demonstrate and realise environmental and social responsibility by delivering a Net Zero Carbon masterplan with excellent ‘green’ credentials and an advanced level of sustainability performance. As such, a site-wide framework sustainability & energy strategy has been established to ensure the masterplan incorporates the appropriate measures and approaches to realise this aspiration.

Ongoing collaboration between the key team members and coordination of the forthcoming design proposals will be important in order to maintain and enhance the sustainability strategy as the project evolves. With an 8-year development phase for Northfleet Harbourside, there will likely be significant developmentst of technologies, building fabric and operational strategies to improve and enhance ‘sustainability initiatives’, as we move forward.

The framework sustainability & energy strategy gives due consideration to the ambitions of the Applicant and Gravesham District Council with regards to sustainable design and construction. Pre-application and public consultation events and workshops have taken place to introduce the key principles of the strategy, which was positively received. As such, the sustainability & energy strategy has informed and guided the outline proposals for the masterplan to ensure its alignment with planning policy requirements wherever possible.

1.4.2 Strategy Development

The methodology to developing the framework sustainability & energy strategy involves an integrated but simple, step-by-step approach:

- 1. Establish the baseline - the starting point including any key constraints to implementing sustainability and low/zero carbon measures.
- 2. Policy review – identify sustainability standards and targets set by the applicant and the relevant planning authorities.
- 3. Engage the team - communicate targets; review early stage design proposals; collaboration.
- 4. Identify key opportunities for achieving the desired level of sustainability performance and the key risks. This may include risks associated with Net Zero Carbon and the minimum standards for BREEAM Excellent, as well as WELL and LEED Gold standards.
- 5. Preliminary environmental assessments (including BREEAM) based on the issues identified in step 4.
- 6. Collate information and outputs from design proposals, workshops and assessment activities.
- 7. Develop outline strategy for review.
- 8. Finalise and implement strategy.

As part of the strategy development and implementation, there is a reiterative process of communication and collaboration with the project team to help inform development proposals, the cost plan and decision-making. This is particularly important when targeting an

advanced level of sustainability performance. Additionally, there are procedures in place to monitor and report progress against the sustainability and carbon targets throughout the process.

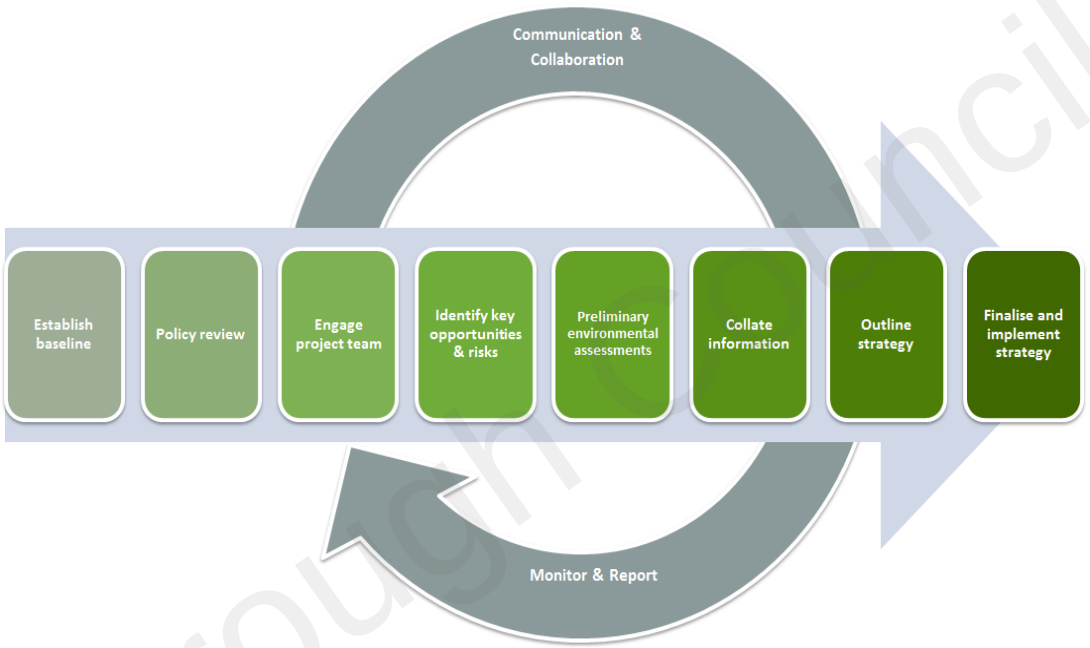


Figure 1.2 – Sustainability strategy methodology

1.4.3 Interactions

Within the framework strategy, the various environmental and social design measures proposed by the Development are considered both in terms of their individual value and their interaction with other measures to potentially deliver multiple benefits. As a result, the impact of these interactions may be cumulative and long-lasting.

This is particularly apparent where proposals that will provide an immediate, positive impact upon the site and its users may also support resilience to future climate change. Therefore, the relationships between sustainable design and climate change adaptation will be important considerations in the ongoing development of the masterplan.

The overall aim of this framework strategy is to promote and achieve high standards of sustainable design at Northfleet Harbourside. This will be a dynamic process whereby new and emerging technologies or techniques will need to be taken into account in terms of their interaction with the ongoing design, construction and management of the site and its buildings and facilities over time.

2 Sustainability Aspirations

2.1 Sustainability Goals and Targets

The sustainability aspirations for the masterplan are guided by the Applicant and Local Authority objectives. It is important to acknowledge that although both environmental and social issues contribute to the sustainability performance of a development, value in terms of upfront and ongoing costs is also a key consideration.

Working to these drivers the standards and targets that have been adopted by the site-wide framework sustainability strategy are as follows:

- Adopt and align with the UN Sustainable Development Goals (SDGs) and design for resilience to future climate change (and RIBA goals that mirror the UN SDGs).
- Aspire towards Net Zero Carbon adopting a whole life carbon approach to reducing the carbon impact of the development.
- Maximise the opportunities for onsite renewable energy generation.
- Retail, office, and hotel buildings to achieve BREEAM 'Excellent' certification as a minimum, LEED gold certification for offices as a minimum, and WELL gold certification for Living.
- Put the health and wellbeing of site occupants, users, and visitors at the heart of the masterplan proposals, potentially through formal certification under WELL and ACTIVE SCORE or similar accreditations.
- Achieve a site-wide net gain in biodiversity and urban greening.
- Apply sustainable drainage techniques to sensitively and positively attenuate surface water runoff thereby reducing localised flooding risk.
- Promote the Internet of Things (IoT) and a digital economy through resilient and robust data infrastructure. This includes adopting the principles of WiredScore and potentially seeking certification.
- Drive resource and cost efficiency by delivering smart buildings and homes.

2.2 BREEAM

In accordance with aspirations and to help guide the sustainable design and construction of the non-domestic building elements, the applicant is targeting a BREEAM rating of 'Excellent' for the non-domestic elements.

These elements have undergone an initial preliminary assessment under the New Construction 2018 version of BREEAM, primarily to ensure the credit issues which affect the Masterplan are captured at an early stage. A summary of the performance of each scheme is provide in the next chapter 'Environmental Assessment'.



<https://bregroup.com/products/breeam>

2.3 LEED

LEED (Leadership in Energy and Environmental Design) is the most widely used green building rating system in the world and provides a framework for healthy, highly efficient, and cost-saving green buildings. The project team are currently exploring the use of LEED for the non-domestic buildings with consideration for achieving Gold certification as a minimum.



<https://www.usgbc.org/leed>

2.4 WELL

The WELL Building Standard is a performance-based system for measuring, certifying, and monitoring features of the built environment that impact human health and wellbeing, through air, water, nourishment, light, fitness, comfort and mind. Elements of both WELL Building and WELL Community have been integrated into the Masterplan. The Applicant is keen to consider achieving Gold certification for appropriate uses as a minimum.



<https://www.wellcertified.com>

2.5 Active Score

Active travel is good for people and good for cities. Northfleet Harbourside will be a place that welcomes and encourages active occupnats, users and visitors. ActiveScore is the world's leading system for assessing and certifying active travel provision in buildings and the Applicant is exploring certification under this scheme.



<https://activetravelscore.com>

2.6 UN Sustainable Development Goals

In recognition of the masterplan aspirations and drivers, the UN Sustainable Development Goals (SDGs) have been used to guide the development of the Framework Sustainability & Energy Strategy and Design Code for Northfleet Harbourside.

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 SDGs, which are an urgent call for action by all countries - developed and developing - in a global partnership. They recognise that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.

The 17 SDGs are presented in figure 2.1 with a summary description of each provided in Appendix A. The Goals have been adapted to suit the nature of the masterplan and the way the Site and buildings will be used, operated, and maintained in the future.

Note that climate change adaptation has not been considered as a standalone issue; instead integrated into the key sustainability principles where appropriate.

 <https://sdgs.un.org/goals>



Figure 2.1 – The 17 UN Sustainable Development Goals

3 Sustainability Assessment

3.1 Background

Numerous assessments have been carried out to support the outline planning application for the masterplan. The assessments - including noise, air quality, socio-economic, ecology, amongst others - evaluate the environmental and social impact of the proposed masterplan and set out potential mitigation measures where required. Details of these assessments can be found within the Environmental Statement submitted with this application.

There are several benefits to applying a holistic sustainability assessment approach to a new development. Firstly, it can help to chart design progress and determine the final sustainability performance of the buildings; secondly it will ensure the project's key sustainability principles are put into practice; and thirdly, it will validate and benchmark the buildings against industry-recognised standards.

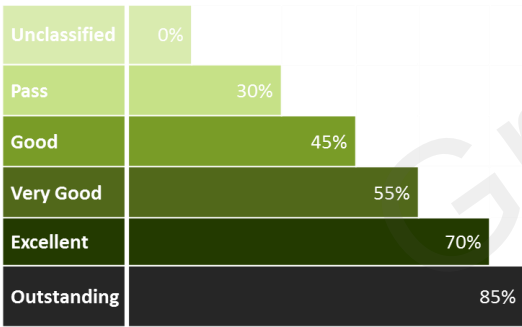
Northfleet Harbourside intends to apply BRE's Environmental Assessment Methodology (BREEAM).

3.2 BREEAM New Construction 2018

BREEAM seeks to minimise the adverse effects of new buildings on the environment at global and local scales, whilst promoting healthy indoor conditions for the occupants.

The assessment methodology addresses a range of sustainability issues under nine key categories. 'Innovation' credits are also available.

The environmental implications of a new building are assessed at the design stage and compared with good practice by independent assessors. An overall rating of the building's performance is given using the terms Pass, Good, Very Good, Excellent or Outstanding. This is determined from the total number of BREEAM credit criteria met and their respective environmental weighting.



The total of all these scores is the overall rating, which is awarded according to the scale adjacent.

Northfleet Harbourside will be seeking a minimum Excellent rating for its main non-domestic elements. It should be noted that BREEAM does not apply to new build residential.

Initial and indicative preliminary assessments have been carried out for the retail, hotel and office spaces by a BREEAM Accredited Professional. Given the outline status of the application, only the credits affecting the site-wide proposals have been considered in any detail at this stage. However, each subsequent phase or building will be required to undertake a dedicated, full pre-assessment and ensure the agreed targeted credits are incorporated into the detailed design proposals. The pre-assessment will be submitted as part of the Reserved Matters application to demonstrate the appropriateness of the credits targeted in order to attain the desired Excellent rating.

A summary of the indicative performance of each element is provided below. It is important to note that at this stage the pre-assessment scores are not fixed as credits will likely be replaced by others during the detailed design process. However, the overall minimum target of 'Excellent' will be maintained throughout.

3.2.1 The Retail Space

The indicative baseline score for the retail elements is currently at 71.55% which equates to an Excellent rating. A number of 'potential' credits have also been identified which could support an increase in credits targeted or any variance in the design as it develops.

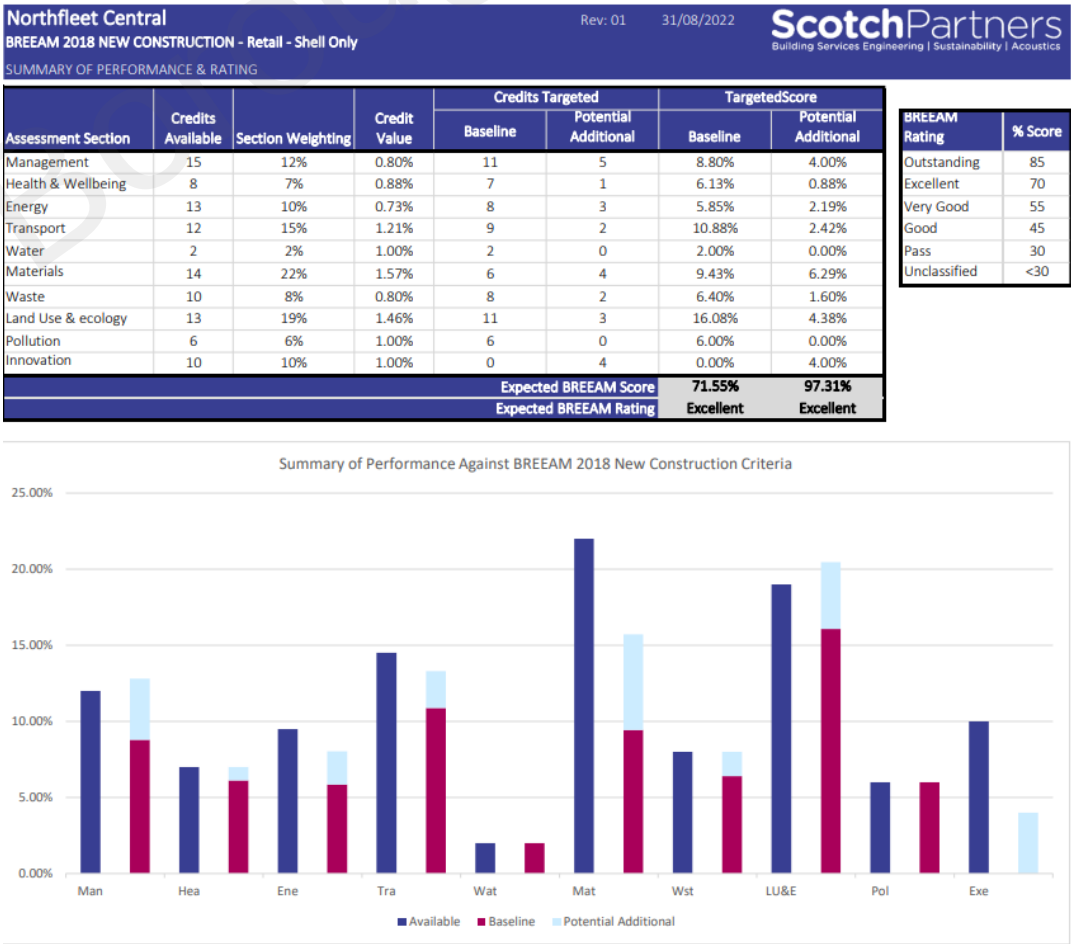


Figure 4.1 – Indicative, preliminary BREEAM performance for the Retail space

3.2.2 The Offices

The indicative baseline score for the office buildings is currently at 74.17% which equates to an Excellent rating. A number of ‘potential’ credits have also been identified which could support an increase in credits targeted or any variance in the design as it develops.

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BREEM 2018 NEW CONSTRUCTION - Offices - Shell & Core

SUMMARY OF PERFORMANCE & RATING

Rev: 01

31/08/2022

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Assessment Section	Credits Available	Section Weighting	Credit Value	Credits Targeted		TargetedScore		BREEAM Rating	% Score
				Baseline	Potential Additional	Baseline	Potential Additional		
Management	18	11%	0.61%	13	5	7.94%	3.06%	Outstanding	85
Health & Wellbeing	11	8%	0.73%	9	2	6.55%	1.45%	Excellent	70
Energy	21	14%	0.67%	16	3	10.67%	2.00%	Very Good	55
Transport	12	12%	0.96%	9	2	8.63%	1.92%	Good	45
Water	9	7%	0.78%	8	1	6.22%	0.78%	Pass	30
Materials	14	18%	1.25%	6	4	7.50%	5.00%	Unclassified	<30
Waste	11	7%	0.64%	9	2	5.73%	1.27%		
Land Use & ecology	13	15%	1.15%	11	3	12.69%	3.46%		
Pollution	12	9%	0.75%	11	1	8.25%	0.75%		
Innovation	10	10%	1.00%	0	4	0.00%	4.00%		
Expected BREEAM Score						74.17%	97.86%		
Expected BREEAM Rating						Excellent	Excellent		

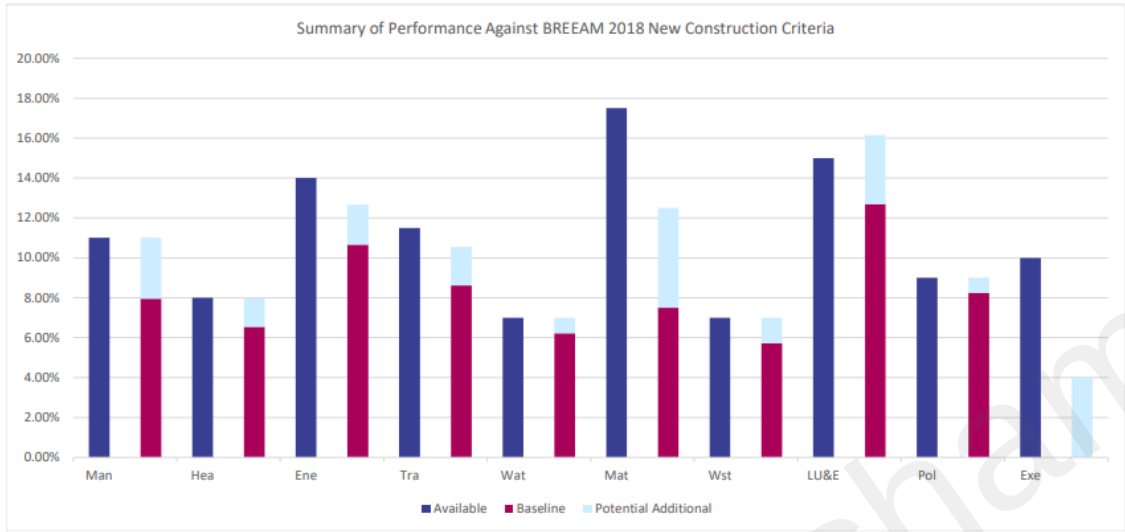


Figure 4.2 – Indicative, preliminary BREEAM performance for the Offices

3.2.3 The Hotel

The indicative baseline score for the hotel is currently at 74.70% which equates to an Excellent rating. A number of ‘potential’ credits have also been identified which could support an increase in credits targeted or any variance in the design as it develops.

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BREEAM 2018 NEW CONSTRUCTION - Hotel - Fully Fitted

SUMMARY OF PERFORMANCE & RATING

Rev: 0131/08/2022

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Assessment Section	Credits Available	Section Weighting	Credit Value	Credits Targeted		TargetedScore		BREEAM Rating	% Score
				Baseline	Potential Additional	Baseline	Potential Additional		
Management	21	11%	0.52%	15	5	7.86%	2.62%	Outstanding	85
Health & Wellbeing	17	14%	0.82%	13	4	10.71%	3.29%	Excellent	70
Energy	21	16%	0.76%	17	6	12.95%	4.57%	Very Good	55
Transport	12	10%	0.83%	9	2	7.50%	1.67%	Good	45
Water	8	7%	0.88%	7	1	6.13%	0.88%	Pass	30
Materials	14	15%	1.07%	6	4	6.43%	4.29%	Unclassified	<30
Waste	10	6%	0.60%	8	2	4.80%	1.20%		
Land Use & ecology	13	13%	1.00%	11	3	11.00%	3.00%		
Pollution	12	8%	0.67%	11	1	7.33%	0.67%		
Innovation	10	10%	1.00%	0	2	0.00%	2.00%		
Expected BREEAM Score						74.70%	98.88%		
Expected BREEAM Rating						Excellent	Excellent		

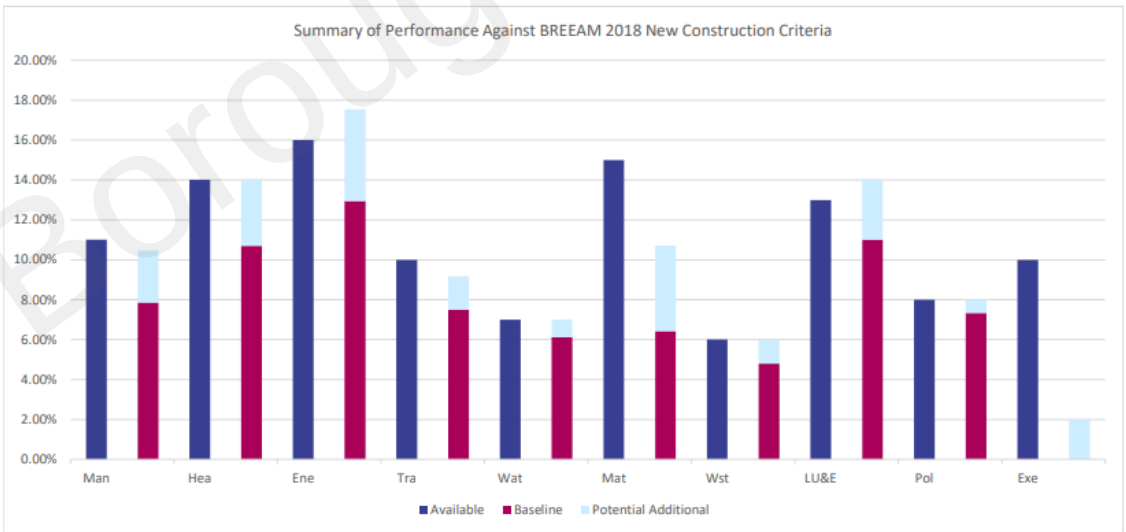


Figure 4.3 – Indicative, preliminary BREEAM performance for the Hotel

4 Land Use & Community

4.1 Sustainable Land Use

Ideally, a sustainable development utilises land that has been previously developed, thereby ensuring that 'green' spaces or areas of open public space are retained wherever possible. This is particularly important in an urban context where ideally 100% of a new development should utilise previously developed land.

The location and industrial nature of the masterplan site, plus the aim to maximise form factor to reduce each building footprint, means that the development is promoting the sustainable use of land. The Site has numerous transport connections which will improve further with the upgrade and enhancement of sustainable transport nodes proposed by the masterplan.

The application site currently comprises industrial buildings and other structures of varying style and age with limited amenity/green space and planting. The Applicant proposes to redevelop the site to provide a new, sustainable mixed-use development and community with the provision of safe, accessible amenity space and soft landscaping maximised as far as possible. By concentrating on mixed-use and by developing vertically, the masterplan will address housing, employment, and amenity needs whilst limiting land-take; subsequently limiting its ecological/carbon footprint.

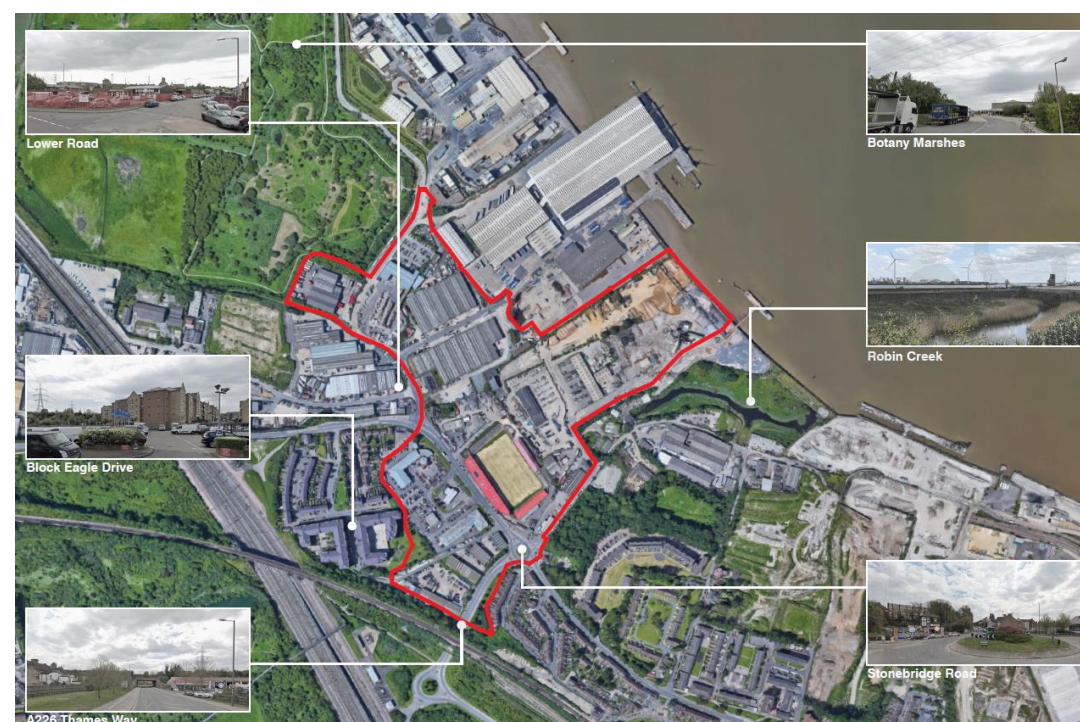


Figure 5.1 - Aerial image of the existing pre-development site

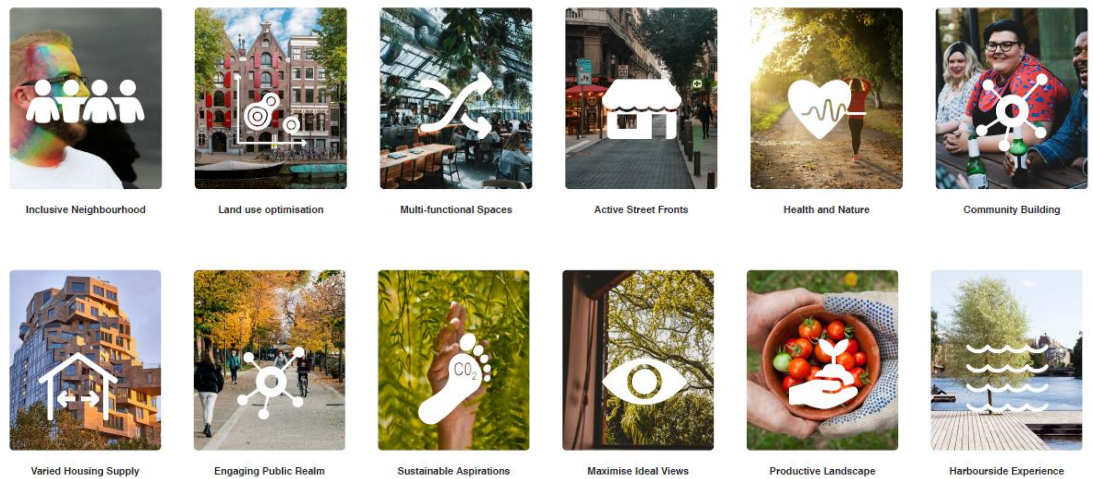


Figure 5.2 – Illustrative Masterplan showing proposed site layout

4.2 A Sustainable Community - Site Layout

AS illustrated in figure 4.2 the Northfleet Illustrative Masterplan has been designed as a series of interconnected neighbourhoods, with a major stadium and retail podium forming the central heart of the masterplan strategy, tying together the neighbourhood elements of the development.

Through careful architectural and engineering design, the intention is to redevelop and regenerate the site to provide a new resource efficient and accessible mixed use development. Detailed information is set out within the Design & Access Statement; however, an overview of the key Masterplan principles is provided below.



4.3 Local Community Benefits

It is recognised that the current site is in need of regeneration which presents many opportunities to enhance the local area bringing benefits to local people and the local economy. With sports/leisure, community, employment, essential services and residential uses, the masterplan strongly emphasises a mix of activities. This mix of uses ensures an optimal use of the site during day and evenings, improving the quality and vibrancy of Northfleet.

The Applicant actively encouraged feedback from local communities. To enable as many people as possible the opportunity to comment on the proposals, a wide range of feedback mechanisms were available and the masterplan has been shaped to give due consideration to the wants and needs of local people.

The Design & Access Statement and Socio-Economic chapter of the Environmental Statement provide detailed information about the community benefits offered by Northfleet Harbourside. However, in summary these include:

- The 15-minute city – everything you need in your day-to-day life will be within a 15-minute walk of your home
- New employment opportunities
- New identity and a sense of place
- Inclusive public realm
- Varied housing supply providing affordable housing
- Cultural inclusivity
- Spaces for recreation, leisure and play
- Spaces to come together as a community
- Improved transport links and the promotion of sustainable modes of mobility
- Safe and inclusive and attractive pedestrian access routes largely removing risk from vehicle/ pedestrian conflict
- Access to nature and enhanced natural environments
- Extensive cycling paths and routes that promote ‘calm’ public realm and encourage active travel opportunities.
- Opportunities for growing produce and onsite renewable energy generation, towards a self-sustaining community

4.4 Promoting a Digital Economy and Smart Community

It is critical that the Northfleet Harbourside provides the necessary infrastructure to ensure robust internet connection and high download speeds; everything that is essential to supporting a digital economy. The key principles of the WiredScore accreditation scheme will be evaluated and applied as applicable to the site and buildings, with due consideration for implementing the highest levels of digital infrastructure into the development from the earliest possible design stage.

WiredScore Home accreditation aims to ensure high speed, resilient connectivity for landlord facilities management and residents and will also be evaluated at the next stage of design. A WiredScore Home building should provide ample space for telecommunications equipment and distribution and this will need to be considered in terms of space and aesthetics. Residents may have a choice of quality broadband providers with ease of connection ensured.

A second opportunity for improving digital infrastructure is through creating smart buildings. A smart building converges various building-wide systems—such as HVAC, lighting, alarms, and security—into a single IT managed network infrastructure. It often uses foundational technology such as Power over Ethernet (PoE) to accomplish this convergence. This would enable easy control of lighting and heating, thus reducing energy consumption. This provides sustainability benefits in relation to the environment and the cost of living.



Energy efficiency could also be maximised across the Site through introduction of a micro or smart grid. This is a small network that powers localised electrical loads of a community through local electricity sources. The smart grid would be connected and synchronised with the national grid. This gives the site full control and flexibility around peak energy demand and aids in reducing energy and CO₂ emissions.

5 Energy & Carbon

5.1 The Energy Hierarchy

This section summarises the key approaches adopted by the framework energy strategy to reducing site-wide CO₂ emissions as far as practicable against each tier of the energy hierarchy.

The framework strategy has been developed in accordance with the principles of the energy hierarchy: “be Lean; be Clean; be Green” which prioritises a reduction in a development’s energy demand at source.

To align with ‘Be Lean’, the masterplan prioritises the inclusion of passive and low energy design solutions wherever possible to reduce energy demand, whilst ensuring the design standards for each building element are achieved. This will be further enforced through the Design Codes.

Whilst low carbon cooling is likely to be provided to commercial uses such as the offices, hotel, and retail, it is the Applicant’s aim to avoid the need for active cooling to the residential dwellings by exploring the incorporation of passive design measures to mitigate overheating risk. The overheating mitigation strategy will follow the cooling hierarchy and will be developed and detailed as part of the reserved matters applications.

‘Be Clean’ relates to supplying energy efficiently via connection to an offsite local/district heat network (DHN) where available. It should be noted that this step is often omitted due to the unavailability of a nearby network. They can also prohibit a site’s fossil fuel-free aspiration due to most DHN currently utilising gas-CHP.

No local DHNs are currently available; however the Applicant is exploring the option for developing a dedicated heat network to serve all uses on the Northfleet Harbourside site, including the new stadium.

‘Be Green’ is the final step and requires the use of renewable energy technologies to generate clean energy onsite. It is the Applicant’s intention to maximise the use of renewable energy technology on the site.

With an emphasis on the global climate crisis many local authorities, institutions and businesses have declared a ‘Climate Emergency’. There is a growing commitment to achieving Net Zero Carbon (NZC) buildings by 2030, meaning many new developments need to consider now how far they can go to design in features to enable the lowest carbon performance possible. The Applicant has committed to the masterplan being fossil fuel free and achieving Net Zero Carbon, targeting 2030 if feasible.

5.2 Approach to a Net Zero Carbon Development

5.2.1 LETI Net Zero Carbon

The LETI (London Energy Transformation Initiative) definition of Net Zero Carbon (NZC) builds upon the UKGBC NZC Framework and states that all new buildings must operate at net zero carbon by 2030 if we are to meet UK climate change targets. This means designing all new buildings to be NZC from 2025 at the latest, but we should be designing this way now, particularly for strategic scale sites like Northfleet Harbourside.

The LETI NZC definition relates to whole life carbon whereby the emissions of a building – both in terms of operational energy use and embodied carbon – are considered holistically over its lifespan, as illustrated below.

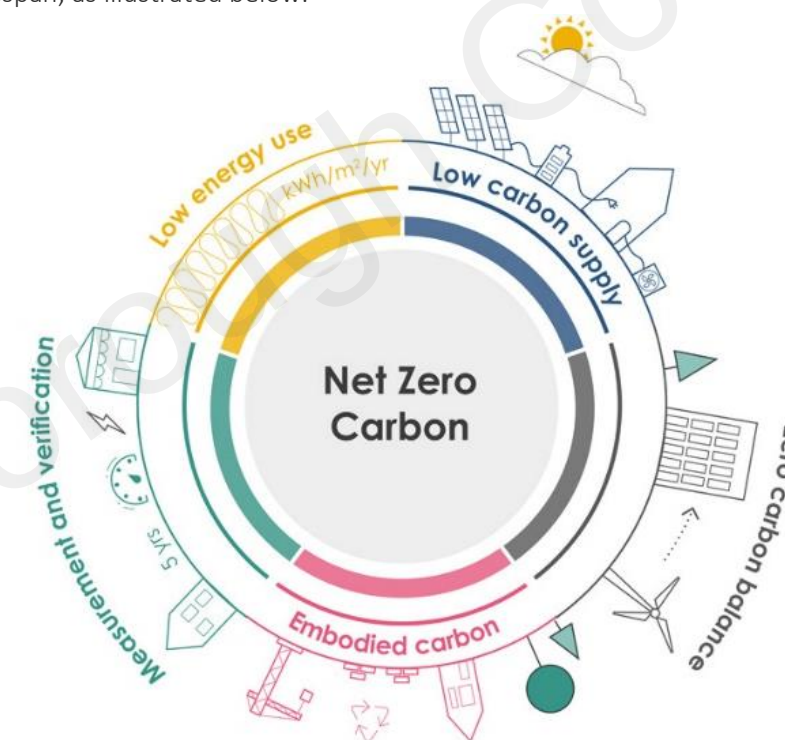


Figure 5.1 – The proposed approach to delivering a NZC Northfleet Harbourside

LETI’s definition relates to whole life carbon which is formed of two key components:

Operational Carbon



A new building with net zero operational carbon does not burn fossil fuels, is 100% powered by renewable energy (or achieves a carbon balance), and achieves a level of energy performance in-use in line with national climate change targets.

Embodied Carbon



Best Practice targets for embodied carbon are met, and the building is made from re-used materials and can be disassembled at its end of life in accordance with the circular economy principles.

Through extensive research and input from organisations across the UK construction sector, LETI have developed a ‘Climate Emergency Design Guide’ which sets out a suite of performance specification, targets and KPIs to assist design teams in the design and construction of NZC buildings.

The Applicant is intending to adopt this guidance as part of the Design Code. Summaries of the performance specifications and targets for residential buildings and commercial (office) buildings are provided in figures 5.3 and 5.4 on the following pages.

5.2.2 Whole Life Carbon

Whole Life Carbon (WLC) emissions are the sum total of all asset related Greenhouse Gas (GHG) emissions and removals, both operational and embodied, over the life cycle of an asset including its disposal. In reference to *Figure 5.2 Life cycle stages defined by BS EN 15978:2011, taken from LETI Whole Life Carbon Guidance*, the WLC of a development includes the following modules:

- A1-A5 upfront embodied carbon
- B1-B7 embodied carbon in use
- C1-C4 carbon emissions from products at their end of life
- D potential benefit from future energy recovery, reuse, and recycling. This module is reported separately as it is outside the project system boundaries.

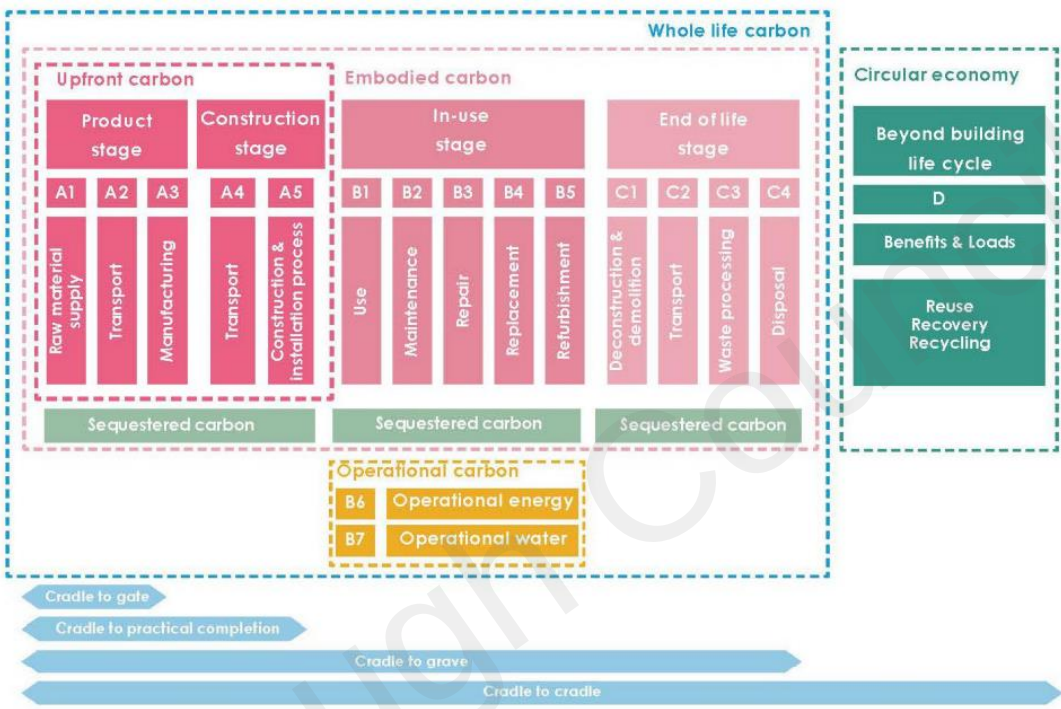


Figure 5.2 Life cycle stages defined by BS EN 15978:2011, taken from LETI Whole Life Carbon Guidance

To reduce the WLC of Northfleet Harbourside, the following key strategies will be considered:

1. Define the energy and embodied carbon targets at the start of the design for each Phase and track throughout. Formal disclosure should be made at post-completion and then annually.
2. Use WLC analysis during design to optimise embodied carbon, reduce operational energy and integrate Circular Economy principles. For example, testing energy reductions, increased envelope specification or calculating carbon payback periods for MEP equipment or renewables.
3. Address upfront embodied carbon emissions (A1-A5) by using minimal material.
4. Consider the carbon cost/ benefit between upfront carbon, operational carbon and life cycle carbon due to replacement cycles.
5. At each replacement cycle, prioritise low carbon materials and Circular Economy principles to reduce WLC emissions.
6. Operational energy loads must be minimised and meet local energy targets; for example LETI EUI targets. A future decarbonised grid depends on reducing overall energy requirements.
7. Utilise Circular Economy principles at the beginning and end of the building and component life cycle. This includes retrofit, re-use of materials, recycled materials and design for future adaptability.
8. Document end of life scenarios and quantify the potential future carbon benefits.

Medium and large scale housing

Operational energy

Implement the following indicative design measures:

Fabric U-values (W/m².K)

Walls	0.13 - 0.15
Floor	0.08 - 0.10
Roof	0.10 - 0.12
Exposed ceilings/floors	0.13 - 0.18
Windows	1.0 (triple glazing)
Doors	1.00

Efficiency measures

Air tightness	<1 (m ³ /h.m ² @50Pa)
Thermal bridging	0.04 (y-value)
G-value of glass	0.6 - 0.5
MVHR	90% (efficiency) ≤2m (duct length from unit to external wall)

Maximise renewables so that 70% of the roof is covered

Form factor of <0.8 - 1.5

Window areas guide (% of wall area)

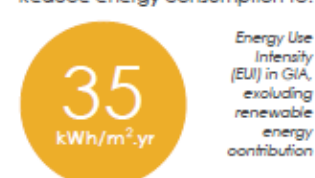
North	10-20%
East	10-15%
South	20-25%
West	10-15%

Balance daylight and overheating

Include external shading

Include operable windows and cross ventilation

Reduce energy consumption to:



Reduce space heating demand to:



Heating and hot water

Implement the following measures:

- Fuel**
Ensure heating and hot water generation is fossil fuel free
- Heat**
The average carbon content of heat supplied (gCO₂/kWh.yr) should be reported in-use
- Heating**
Maximum 10 W/m² peak heat loss (including ventilation)
- Hot water**
Maximum dead leg of 1 litre for hot water pipework
'Green' Euro Water Label should be used for hot water outlets (e.g.: certified 6 L/min shower head – not using flow restrictors).

Demand response

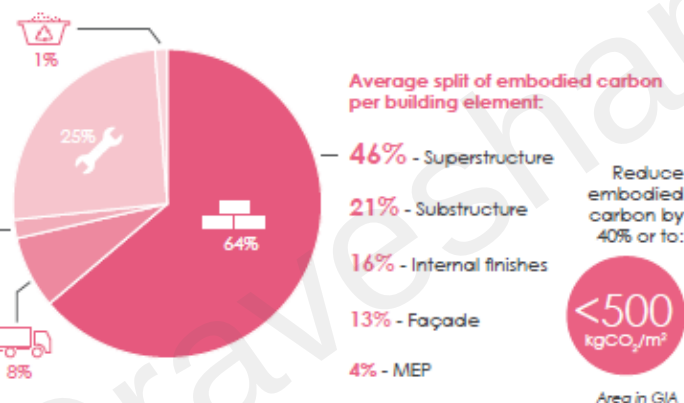
Implement the following measures to smooth energy demand and consumption:

- Peak reduction**
Reduce heating and hot water peak energy demand
- Active demand response measures**
Install heating set point control and thermal storage
- Electricity generation and storage**
Consider battery storage
- Electric vehicle (EV) charging**
Electric vehicle turn down
- Behaviour change**
Incentives to reduce power consumption and peak grid constraints.

Embodied carbon

Focus on reducing embodied carbon for the largest uses:

- Products/materials (A1-A3)
- Transport (A4)
- Construction (A5)
- Maintenance and replacements (B1-B5)
- End of life disposal (C1-C4)



Data disclosure

Meter and disclose energy consumption as follows:

Metering

1. Submeter renewables for energy generation
2. Submeter electric vehicle charging
3. Submeter heating fuel (e.g. heat pump consumption)
4. Continuously monitor with a smart meter
5. Consider monitoring internal temperatures
6. For multiple properties include a data logger alongside the smart meter to make data sharing possible.

Disclosure

1. Collect annual building energy consumption and generation
2. Aggregate average operational reporting e.g. by post code for anonymity or upstream meters from part or whole of apartment block
3. Collect water consumption meter readings
4. Upload five years of data to GLA and/or CarbonBuzz online platform
5. Consider uploading to Low Energy Building Database.

Figure 5.3 – LETI Design Guide for NZC Residential Buildings

Commercial offices

Operational energy

Implement the following indicative design measures:

Fabric U-values (W/m².K)

Walls	0.12 - 0.15
Floor	0.10 - 0.12
Roof	0.10 - 0.12
Windows	1.0 (triple glazing) - 1.2 (double glazing)
Doors	1.2

Fabric efficiency measures

Air tightness	<1 (m ³ /h. m ² @50Pa)
Thermal bridging	0.04 (y-value)
G-value of glass	0.4 - 0.3

Power efficiency measures

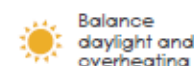
Lighting power density	4.5 (W/m ² peak NIA)
Lighting out of hours	0.5 (W/m ² peak NIA)
Tenant power density	8 (W/m ² peak NIA)
ICT loads	0.5 (W/m ² peak NIA)
Small power out of hours	2 (W/m ² peak NIA)

System efficiency measures

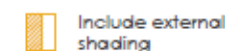
MVHR	90% (efficiency)
Heat pump SCOP	≥ 2.8
Chiller SEER	≥ 5.5
Central AHU SFP	1.5 - 1.2 W/l.s
A/C set points	20-26°C

Window areas guide (% of wall area)

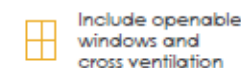
North	25-40%
East	25-40%
South	25-40%
West	25-40%



Balance daylight and overheating



Include external shading



Include operable windows and cross ventilation



Maximise renewables to generate the annual energy requirement for at least two floors of the development on-site



Form factor of 1 - 2

Reduce energy consumption to:



Reduce space heating demand to:



Heating and hot water

Implement the following measures:



Fuel

Ensure heating and hot water generation is fossil fuel free



Heat

The average carbon content of heat supplied (gCO₂/kWh.yr) should be reported in-use



Heating

Maximum 10 W/m² peak heat loss (including ventilation)

Connect to community wide ambient loop heat-sharing network to allow excess heat from cooling to be made available to other buildings



Hot water

Maximum dead leg of 1 litre for hot water pipework

'Green' Euro Water Label should be used for hot water outlets (e.g.: certified 6 L/min shower head – not using flow restrictors).

Demand response

Implement the following measures to smooth energy demand and consumption:



Peak reduction

Reduce heating and hot water peak energy demand



Active demand response measures

Install heating and cooling set point control

Reduce lighting, ventilation and small power energy consumption



Electricity generation and storage

Consider battery storage



Electric vehicle (EV) charging

Electric vehicle turn down
Reverse charging EV technology



Behaviour change

Incentives to reduce power consumption and peak grid constraints
Encourage responsible occupancy.

Embodied carbon

Focus on reducing embodied carbon for the largest uses:

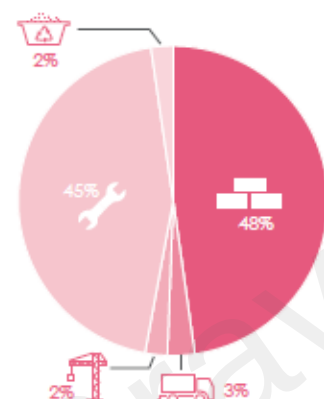
Products/materials (A1-A3)

Transport (A4)

Construction (A5)

Maintenance and replacements (B1-B5)

End of life disposal (C1-C4)



Average split of embodied carbon per building element:

48% - Superstructure

17% - Substructure

16% - Façade

15% - MEP

4% - Internal finishes

Reduce embodied carbon by 40% or to:



Area in GIA

Data disclosure

Meter and disclose energy consumption as follows:



Metering

(Metering strategy following BPP Better Metering Toolkit guidance)

1. Record meter data at half hourly intervals
2. Separate landlord and tenant energy use meters and clearly label meters with serial number and end use
3. Submeter renewable energy generation
4. Use a central repository for data that has a minimum of 18 months data storage
5. Provide thorough set of meter schematics and information on maintenance and use of meters
6. Ensure metering commissioning includes validation of manual compared to half hourly readings.

123 Disclosure

1. Carry out an annual Display Energy Certificate (DEC) and include as part of annual reporting
2. Report energy consumption by fuel type and respective benchmarks from the DEC technical table
3. For multi-let commercial offices produce annual landlord energy (base building) rating and tenant ratings as well as or instead of a whole building DEC
4. Upload five years of data to a publicly accessible database such as GLA and/or CarbonBuzz.

Figure 5.4 – LETI Design Guide for NZC Office Buildings

5.3 Renewable Energy

In order to achieve the aspiration to be fossil fuel free and to support achieving a Zero Carbon Balance in line with the NZC aspiration, the project team have explored a number of low carbon and renewable energy technologies that would assist in supplying power and electricity-led heat to all uses within the Masterplan.

5.3.1 High Level Strategy for PV

Given the extent of roof space, the Site has the potential to generate a meaningful contribution of renewable energy from PV. Figure 5.5 indicates the potential locations for roof-mounted PV within the masterplan (denoted by a star), assuming the panels are mounted on A-frames to enable orientation to be optimised. Consideration needs to be given to overshadowing by neighbouring buildings and competition from other roof uses such as lift overruns, MEP plant, amenity space, etc.

As a rule of thumb it could be assumed that c25% of the total roof area could be dedicated to PV. Based on the total roof area across site of c56,670sqm (figure excludes stadium parapet) and applying the c25% availability assumption, the potential total area for PV at Northfleet Harbourside could be c14,000sqm. Based on current, standard PV performance this could generate a potential peak output c3.75MW. Note: the percentage area could be lower if roof space is shared with Air Source Heat Pump (ASHPs).

The PV arrays could serve a single building, a group of buildings, or fed into a site-wide solution to support operation of a smartgrid (refer to section 5.5). The PV pump strategy will form part of the final site-wide energy strategy and will be developed and coordinated as part of the detailed design, with details submitted with the reserved matters applications.

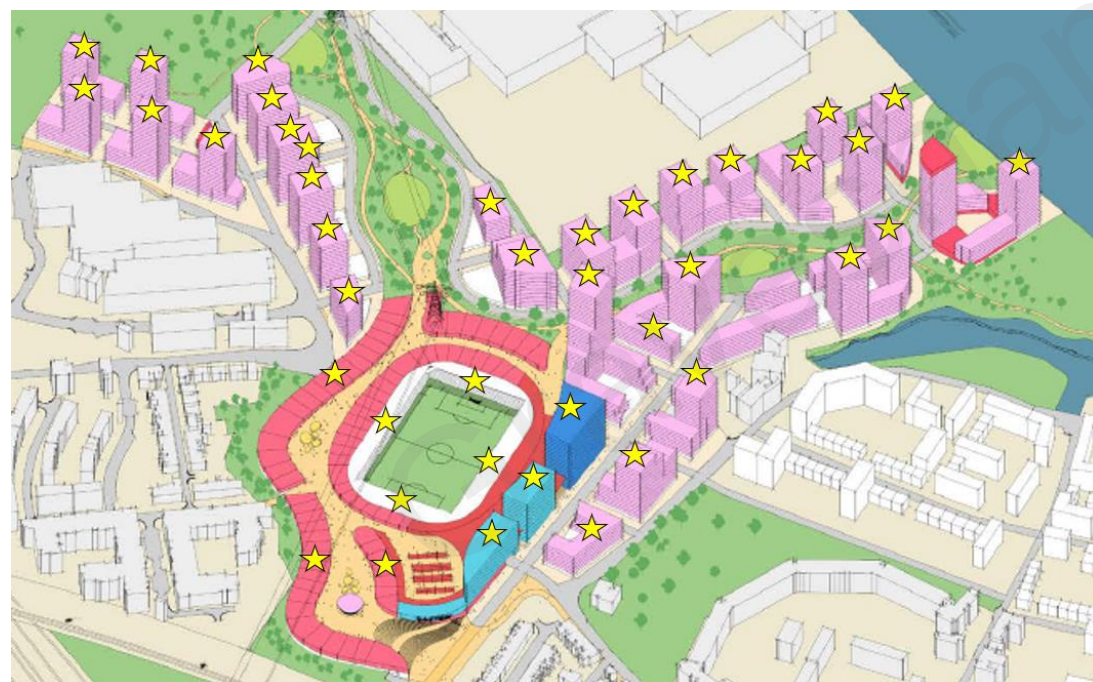


Figure 5.5 - Potential locations for PV within the masterplan

The solar resource in the Northfleet area is amongst the highest in the UK, as illustrated in figure 5.6 below. This suggests that PV is a suitable technology for Northfleet Harbourside and will provide a good contribution to reducing the site's carbon emissions.

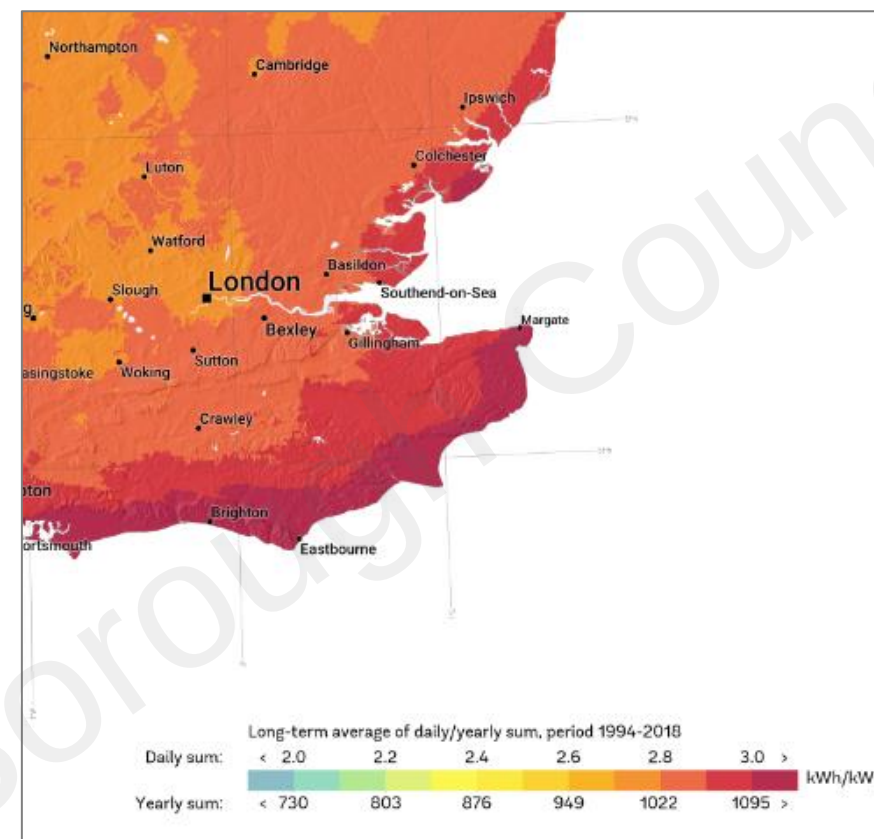


Figure 5.6 – Solar Resource map - <https://solargis.com/maps-and-gis-data/overview>

5.3.2 High Level Strategy for Heat Pumps

Heat pumps can play a major role in the delivery of an electric-led heating/cooling strategy. There are a number of heat pump technologies depending on the fuel source e.g. air, water, heat from the ground/groundwater. As part of the high level options appraisal the technologies listed in the key table below and in figure 5.7 have been considered.

It is possible for a heat pump strategy to be a hybrid of various technologies and fuel sources. Heat pumps could serve a building, a group of buildings, or a site-wide energy centre that distributes heat across the site to all uses via district heat network.

The heat pump strategy will form part of the final site-wide energy strategy and will be developed and coordinated as part of the detailed design, with details submitted with the reserved matters applications for each phase.

Key	Technology
	Ground Source Heat Pump (horizontal) Potential location for buried trenches. Note: Structure required to house plant compound. Investigative analysis of ground conditions and potential yields will be required to determine if this a viable solution for the Site.
	Ground Source Heat Pumps (vertical) Indicative locations. Potentially could be located as part of a building's piling i.e. geothermal piles. Investigative analysis of ground conditions and potential yields will be required to determine if this a viable solution for the Site.
	Air Source Heat Pump (roof-based) Potential location for plant enclosure. Ideally located on the tallest buildings to reduce visual impact (i.e. overlooking by neighbouring buildings) and noise impact. Could serve a single building or group of buildings.
Not shown	Air Source Heat Pumps (ground-based) Potential location for a centralised ASHP energy centre or centres to be reviewed. Due to visual impact and noise, the compound should be located away from sensitive buildings e.g. residential.
	Discounted - Water Source Heat Pump <i>Potential location for plant compound to be close to energy source i.e. the Thames. Due to ownership boundaries and other constraints this solution is unlikely to be viable for Northfleet Harbourside.</i>

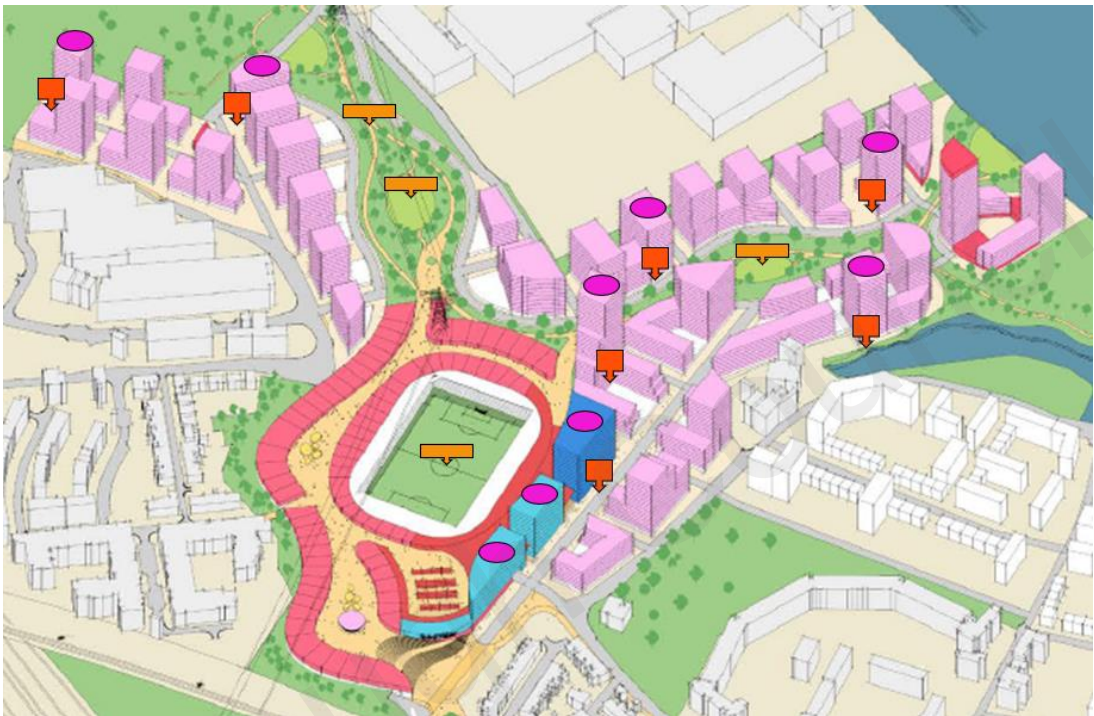


Figure 5.7 - Potential locations for heat pumps within the masterplan

5.3.3 Discounted Technologies

Wind and biomass were appraised as potential solutions for the scheme but discounted due to their unsuitability to the Site, its location, and the proposed massing. They could also prohibit some other sustainability aspirations from being delivered, such as zero onsite combustion (air quality implications) and maximised public open space.

Solar thermal has not been discounted and may be considered as part of the final energy strategy, should it provide a suitable alternative or supporting solution to heat pumps for some uses.

5.4 Energy Strategy Options for Northfleet Harbourside

The project team in consultation with an Energy Services Company (ESCo) have identified three potential strategy options for supplying fossil fuel free, low carbon (potentially zero carbon) heating and cooling to Northfleet Harbourside. These are set out in table 5.1 below.

At this outline stage the Applicant and project team’s preferred strategies are Options 1 or Option 2.

Each option will be explored and appraised in detail at the next stage of design. Several factors will be taken into consideration including spatial constraints, visual amenity, technical feasibility, contribution to reducing carbon, and cost-benefit to future site users and occupiers.

Table 5.1 – High level energy strategy options for Northfleet Harbourside

Option	Strategy	Technologies
Option 1	Single centralised energy centre serving whole site via District Heat Network	Hybrid. ASHP-led with contribution from GSHPs (if viable). PV could provide power-requirements to enable a zero carbon strategy.
Option 2	Each phase served by its own energy centre(s) with dedicated District Heat Network	Hybrid. ASHP-led with contribution from GSHPs (if viable). PV could provide power-requirements to enable a zero carbon strategy.
Option 3	Decentralised strategy where each building is served via a local heating/cooling plantroom dedicated to that building. No District Heat Network; building served via internal distribution pipework.	ASHPs based on the roof and/or GSHPs (if viable). PV could provide power-requirements to enable a zero carbon strategy.

5.5 Potential for a Smartgrid

Energy efficiency could also be maximised on site through introduction of a microgrid or smartgrid. This is a small local energy grid with control capability, which means it can disconnect from the traditional grid and operate autonomously. The microgrid powers localised electrical loads of a community through local electricity sources. An effective Microgrid might connect to:

- Utility provider electricity supply
- Photovoltaics
- Battery storage
- Electric vehicle and cycle/ scooter charging
- Generators

A microgrid gives the site full control and flexibility around peak energy demand and aids in the achievement of the additional energy hierarchy step of ‘Be Seen’.

6 Health & Wellbeing

6.1 Key Considerations

The physical health & mental wellbeing of people is a complex connected and inter-dependent system, affected by genes, social and economic circumstances, the quality of relationships and the value and purpose of work. Wellness is greatly affected by our physical environment, both indoors and outdoors, and by our connection to nature. Promoting societal health and wellbeing will enable communities and individuals to live healthy, happy lives.

For the masterplan this means ensuring users, visitors and local people have access to healthy workspaces, good access to amenities, sustainable transport options, and open green space for recreation and relaxation.

Many factors have been considered in the development of the masterplan in order to promote physical and mental health and wellbeing:

- Access to natural amenity e.g. good air quality, daylight and sunlight
- Access to nature (internal and external): greening and biophilia, natural materials, images of nature
- Comfort conditions: urban heat island, humidity, noise, odours
- Inclusive and accessible spaces
- Security and safety
- Sense of place and belonging
- Spaces that enable physical fitness and/or mindfulness
- Access to knowledge: data, news, local information, etc

6.2 Health Impact Assessment

A Health Impact Assessment (HIA) has been prepared to identify any potential effects on the health and well-being of the new and existing population and occupiers, arising from the masterplan, taking account of the key determinants of health. Where an impact is identified, actions and measures are recommended to mitigate an adverse impact or enhance or secure a positive impact.

The results of the HIA conclude that the proposed development achieves the objective of creating a healthy, successful place for people to live and work in, and that no negative impacts to health have been identified following the implementation of suggested mitigation.

6.3 WELL Building Standard & Community

Several of the proposed masterplan measures align with the WELL Community assessment standard and it is the intention of the Applicant to further explore the applicability of formal assessment at site level, and then the WELL Building Standard at building level.

As a minimum key principles of WELL Community will be applied to the development of the site, and key principles of WELL Building will be applied to each building use. These will include measures that promote each of the core concepts, as shown in figure 6.1.



Figure 6.1 The 10 Core Concepts for healthier places and buildings

7 Water Efficiency

It is the intention of the Applicant to incorporate site-wide water economy measures to enable potable water demand to be reduced across the Site. The water conservation strategy will include both internal and external water uses.

7.1 Water Demand

Various water economy measures can be implemented in order to reduce the demand for mains water. Water efficient sanitaryware is the most cost effective means of achieving water reduction targets and would be considered as a priority at the detailed design stage to help achieve compliance with consumption targets.

Reducing demand for water not only reduces the burden on mains supply, it subsequently reduces the volume of waste water requiring disposal. In particular, where foul water is discharged to sewers, it can reduce the burden on the local drainage network and at the treatment facility, thereby providing a double benefit in terms of resource use, including energy, and environmental impact.

7.2 Water Recycling

To further support the water conservation strategy alternative means of supplying water to that of mains potable water will be explored. These potential alternatives include:

- Groundwater abstraction
- Blackwater recycling (i.e. from kitchen/catering sinks)
- Greywater recycling (i.e. from wash hand basins, showers/baths)
- Rainwater harvesting (i.e. from surface water runoff)

It may not be technically or economically feasible to employ all of these systems and for these reasons blackwater recycling has been discounted at this stage.

Given that Kent has a low annual precipitation average relative to the rest of the UK it is considered that a rainwater recycling system alone would not provide a consistent means of offsetting mains water, i.e. WCs would need to rely on 100% mains water for most of the year. Other issues such as discolouration from runoff collected from green roofs also pose issues to the perception of water quality.

Greywater recycling systems collect wastewater from baths, showers and hand basins. This can be used in a number of ways including WC flushing, irrigation and cleaning/washing down of external areas. The systems work by filtering and disinfecting the collected water, then storing it for use as and when required. Some systems also collect from washing

machines/washer-dryers which can bring additional benefits in terms of the quantity of waste water feeding the greywater system. These benefits may be outweighed however by technical complexities relating to drainage pipework and the contamination level of the water, thereby requiring additional treatment.

Greywater recycling is therefore considered the primary solution for this Development; although a hybrid system utilising rainwater harvesting could be a viable option. In particular, surface water runoff from the stadium's extensive overhangs could be collected for rainwater recycling, potentially to irrigate the pitch.

The potential greywater/rainwater hybrid recycling strategy for Northfleet Harbourside could serve WC flushing to dwellings, commercial uses and the stadium and provide irrigation for soft landscaping and other vegetation during warm, dry weather when its needed most.

9 The Circular Economy

Currently, the construction industry largely follows a single use “take-make-dispose” linear model. In order to reduce the negative impact the industry is having on the environment, and participate in the wider move to long-term sustainable buildings, it is vital that the construction industry moves across to a more circular model, in which the value in materials and buildings are both realised and kept in the model for as long as possible.



Figure 10.1 Principles of a Circular Economy

9.1 Circular Economy Principles for the Existing Site - Demolition & Refurbishment

In line with the Waste Hierarchy, first the condition of the existing site must be considered for any opportunities for a refurbishment in order to prevent waste prior to a new building being developed. This approach was considered at the outset of the masterplan but deemed unfeasible due to the industrial nature of the site.

A pre-demolition audit will be undertaken which will include a review to identify potential materials with enough value for reuse. This may include items or materials with basic reuse value or architectural value.

The outcome of the audits would be a Bill of Quantities that would categorise and quantify the potential materials that are available for reuse. The Bill of Quantities will be shared with the design team to enable them to identify opportunities for onsite recovery, in line with the waste hierarchy.

This audit is likely to be undertaken by the demolition contractor to maximise the recovery of materials from demolition for subsequent high-grade applications.

Non-hazardous demolition waste will be diverted from landfill through reuse, recycling, and recovery. Actions to avoid waste being disposed of in landfill include:

- Reusing the material on site (in situ or for new applications)
- Reusing the material on other sites
- Community reuse and recycling
- Salvaging or reclaiming the material for reuse
- Returning material to the supplier via a ‘take-back’ schemes
- Direct recycling of materials via a specialist material reprocessor or recycler
- Recovery of the material from site by an approved waste management contractor and recycled or sent for energy recovery
- Utilising waste in exempt or permitted applications (not landfill).

9.2 Circular Economy Approach for the Masterplan

Minimise Material Waste

The detailed design will take into consideration the durability of proposed construction materials to limit the need for repair and to avoid premature replacement as far as practicable.

Material Efficiency

In line with the BREEAM credit Mat 06- Material Efficiency, at the end of each RIBA stage the project team will examine opportunities to implement appropriate measures to ensure that the amount of materials used in the construction of the proposed development are optimised, and therefore reduce the amount of construction waste arising from site.

Minimise Construction Waste

AS a minimum, all non-residential buildings will not exceed the target of $\leq 7.5 \text{ m}^3$ or ≤ 6.5 tonnes per 100 m^2 Gross internal floor area. AS a minimum, residential buildings have targets for non-hazardous construction waste not to exceed to 26.52 m^3 or 16.90 tonnes per £100K of project value.

Design for End of Life and Reuse

Both end-of-life carbon and the re-use of building materials must be considered as part of the full life cycle of the building and its components. The optimal outcome would be to construct the building from re-used materials and enable disassembly at the end of life in accordance

with the circular economy principles. A best practice strategy will be developed for each phase or building to be considered by the design team and contractor.

Design for Adaptability and Disassembly

A Functional Adaptability study will be undertaken for the key commercial buildings to identify opportunities for accommodating future changes of use to the buildings over their lifespan, and how they could be incorporated into the design proposals. The study has been prepared to comply with BREEAM credit issue Wst 06.

Sustainable Procurement of Materials

A sustainable procurement plan will be developed which will set out a clear framework for the responsible sourcing of construction products to guide procurement throughout the project and by all involved in the specification and procurement of construction products.

The main contractor(s) will be encouraged to prioritise the use of suppliers with a current accredited environmental management system (EMS) in place over those suppliers that do not.

Timber is to be responsibly sourced in accordance with the UK Government's Timber Procurement Policy. i.e. FSC or PEFC only. Where possible and available, timber which is locally reclaimed, including during construction, will be used.

There will be consideration for the specification of products with an Environmental Product Declaration (EPD) where possible. EPDs provide information about products from cradle to grave (or cradle) such that designers, specifiers, buyers, code officials and the general public can better understand a product's specific, as well as overall, environmental impact. EPDs make the environmental benefits of energy efficiency and other important aspects of a given product clearer. This will be reviewed during the next stage of design.

9.3 Circular Economy Approach for Municipal Waste During Operation

Dedicated, sufficiently sized waste storage for general refuse and recyclables will be provided for all the building elements, located in appropriate, accessible locations.

These are matters of detailed design, and as the proposals are developed opportunities for promoting good waste management would be explored further, together with flexibility to incorporate emerging best practice.

10 Adapting to Climate Change & Greening The City

10.1 Introduction

Our climate is changing and this will have notable environmental, social and economic implications. Observed trends are projected to continue and can be summarised as: warmer, wetter winters; hotter, drier summers; rising sea levels and; increased extreme weather events such as storms and heat waves.

Climate change poses the following key climate risks for buildings in the UK:

- Damage due to flooding and coastal erosion.
- Overheating increasing impact from the urban heat island effect.
- Subsidence.

Other risks directly relevant to the built environment included:

- Water supply shortage.
- Increased water demand for energy generation.
- Higher energy demand for cooling.
- Flood risk to energy infrastructure.
- Heat damage/disruption to energy infrastructure.

In response, it is recognised that the built environment needs to be able to adapt to the impacts of climate change to minimise the associated risks.

10.2 Possible Risks for Northfleet

The risks to buildings in urban areas mainly relate to rising temperatures and changing rainfall patterns, which are exacerbated by extreme weather events that are hard to predict. The ‘Design for Future Climate, 2013’ publication suggests weather events that are currently regarded as extreme are useful illustrations of what is projected to be normal in future. It gives the example of the exceptionally hot summer of 2003 which is likely to become the norm by the second half of this century. We are already seeing record peak temperatures being recorded on a frequent basis, with 2022 being the hottest since records began.

A basic assessment of the key impacts and associated risks for Northfleet Harbourside has been carried out and is summarised in table 10.1 opposite.

Table 10.1 – Climate Impacts and Risks

Climate impact		Climate risk	
Rising temperatures and extreme hot weather events	Overheating - internal and external (i.e. urban heat island)		Health implications for people Business continuity Maintenance cost issues for building managers/owners Increased CO ₂ from increased cooling demand (known as ‘maladaptation’)
Hot weather events and prolonged or intense periods of precipitation	Structural stability - Subsidence or heave (‘shrink-swell’) and fissures in building fabric		Safety implications for people Business continuity Maintenance and insurance cost issues for building managers/owners
Increased winter rainfall and prolonged or intense periods of precipitation	Water resource, quality and flooding		Water shortages Health & safety implications for people Business continuity Maintenance and insurance cost issues for building managers/owners

Designing for climate resilience is critical and the Applicant and project team consider it a duty of care to ensure as far as possible Northfleet Harbourside remains safe, operational, and fit for purpose throughout its lifespan, regardless of the climate.

Measures to ensure Northfleet Harbourside is resilient and adaptable to the impacts of climate change will be developed and modelled as part of the detailed design and submitted with the reserved matters applications.

Conclusion

A Framework Sustainability & Energy Strategy has been developed for the Masterplan of Northfleet Harbourside in accordance with the sustainability objectives and aspirations of the Applicant and Gravesham Borough Council. The strategy sets out the high level approaches to achieving a Net Zero Carbon community and underpin the Masterplan's response to climate change and resource management.

Key opportunities for implementing sustainability measures and solutions appropriate to the Masterplan have been identified and these align with the UN Sustainable Development Goals.

Subsequently, the Masterplan demonstrates the following sustainability performance indicators:

- A new sustainable community that is designed to be resilient and adaptable to future climate change.
- A Net Zero Carbon community that adopts a whole life carbon approach to reducing its carbon impact.
- A built environment that maximises the opportunities for onsite renewable energy generation.
- A vibrant commercial offering that demonstrates environmental and social responsibility by attaining BREEAM 'Excellent' certification as a minimum, and WELL Gold considered for living and LEED Gold considered for commercial buildings..
- A community that puts the health and wellbeing of site occupants, users, and visitors at its heart by aligning with the WELL, ActiveScore, BREEAM and LEED standards for healthy living.
- A new environment that supports nature and habitat creation whilst providing public spaces for recreation, leisure, and play.
- A robust and resilient digital economy and community through application of the principles of WiredScore, with the potential for formal certification.
- A community that lives and works 'smart' to drive resource and cost efficiency.

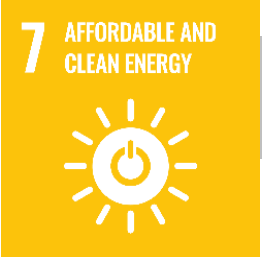
These indicators are proposed at an outline, site-wide level with the intention of being further developed as the scheme detail is designed. Through the implementation of the measures and approaches set out in this and other documents, such as the Design Code, it is anticipated that Northfleet Harbourside will achieve the sustainability aspirations of the Applicant and the Local Authority.

Appendix A – UN Sustainable Development Goals

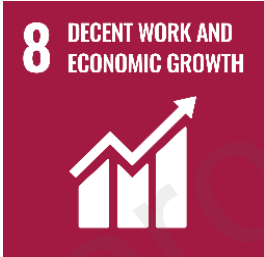
SDG	Summary
	End poverty in all its forms everywhere. Targets include ensuring that all men and women have equal rights to economic resource and access to basic services. This goal also seeks to build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.
	End hunger, achieve food security and improved nutrition and promote sustainable agriculture. Targets include ensuring sustainable food production systems and resilient agricultural practices that increase productivity and production, that help maintain ecosystems, strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.
	Ensure healthy lives and promote well-being at all ages. Targets include reducing by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being, halving the number of global deaths and injuries from road traffic accidents, and to substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.
	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. Targets include building and upgrading education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all.
	Achieve gender equality and empower all women and girls.



Ensure availability and sustainable management of water and sanitation for all. Targets include achieving access to adequate and equitable sanitation and hygiene, universal access to safe and affordable drinking water for all, expand water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies.



Ensure access to affordable, reliable, sustainable and modern energy for all. Targets include doubling the global rate of improvement in energy efficiency, enhancing international cooperation to facilitate access to clean energy research and technology, promoting investment in energy infrastructure and clean energy technology, expanding infrastructure and substantially increasing the share of renewable energy in the global energy mix.



Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all. Targets include improving global resource efficiency in consumption and production; endeavour to decouple economic growth from environmental degradation; promote development-oriented policies that support productive activities and job creation; provide access to banking, insurance and financial services for all.



Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation. Targets include developing quality, reliable, sustainable and resilient infrastructure; supporting economic development and human well-being; encouraging innovation, research and development; and upgrading and retrofitting infrastructure to make them sustainable.



Reduce inequality within and among countries. Targets include ensuring equal opportunities; empowering and promoting social, economic and political inclusion of all; reducing inequalities including discriminatory laws, policies and practices.



Make cities and human settlements inclusive, safe, resilient and sustainable. Targets include ensuring access for all to adequate, safe and affordable housing and basic services; increasing the number of cities and human settlements implementing policies towards resource efficiency, climate mitigation and adaptation, and resilience to disasters; provide access to safe, inclusive and accessible green spaces; and support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning.



Ensure sustainable consumption and production patterns. Targets include substantially reducing waste generation through prevention, reduction, recycling and reuse; promote sustainable procurement practices; achieve sustainable management and efficient use of natural resources.



Take urgent action to combat climate change and its impacts. Targets include strengthening resilience and adaptive capacity to climate-related hazards and natural disasters, integrating climate change measures into policies, strategies and planning, improving education on climate change mitigation and adaptation.



Conserve and sustainably use the oceans, seas and marine resources for sustainable development. Targets include preventing and significantly reducing marine pollution, in particular from land-based activities, sustainably manage and protect marine and coastal ecosystems, take action for restoration in order to achieve healthy and productive oceans, and minimize the impacts of ocean acidification.



Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss. Targets include halting deforestation, increasing afforestation and reforestation, restoring degraded land and soil, integrating ecosystem and biodiversity values into planning and development processes.



Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels. Targets include ending abuse, exploitation, violence, corruption and bribery.



Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development.

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