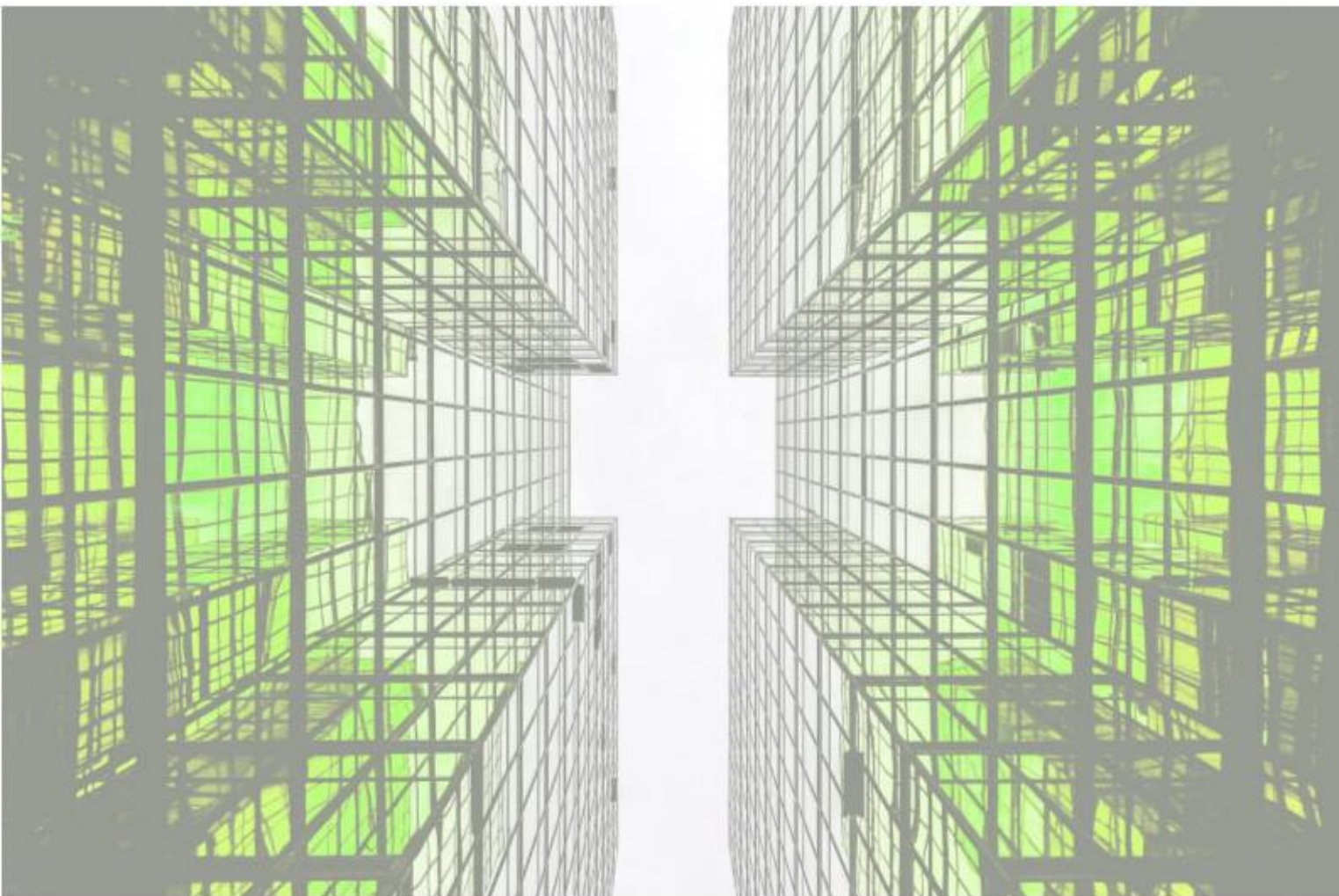


Sustainability Statement

incorporating an indicative Energy Assessment



Long Copse Lane, Emsworth

Prepared for Land and Partners
August 2021



envision

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1 INTRODUCTION

- 1.1 Envision has been appointed by Land and Partners (the applicant) to produce a Sustainability Statement, incorporating an indicative Energy Assessment to support an outline planning application for a new residential scheme (C3 use to include affordable housing) and associated landscaping, access and supporting infrastructure on land north of Long Copse Lane, Emsworth.

Scope

- 1.2 The primary purpose of this statement is to explain how planning policy drivers, which influence the environmental sustainability of the development can be addressed by a development of this nature. As the application is being taken forward in outline, the report establishes the principles that would be followed, and which would be given further consideration at the reserved matters stage. The statement provides an indicative energy assessment of the development in Section 4. This sets out how the scheme will meet, and where appropriate, exceed the requirements of emerging Havant Borough Local Plan Policy E12 and Part L of the Building Regulations, Amended 2016.
- 1.3 This statement is structured as follows:
- Section 2 provides a description of the main sustainability policies relevant to the application;
 - Section 3 examines the general sustainable design features proposed in the development against the policies outlined in Section 2;
 - Section 4 provides an indicative Energy Assessment, detailing how the scheme will exceed the requirements of policy E12 and Building Regulations Part L 2016; and
 - Section 5 provides a concluding summary.
 - A BREEAM Communities Review is provided in Appendix 1, demonstrating compliance with emerging Policy E12(g).
 - SAP 10 and 12 calculations are provided in Appendix 2.

About the Applicant

- 1.4 Land and Partners believe that the planning and delivery of new homes should be a positive and inclusive process and understands the benefits of respecting the environment, engaging with the community and insisting on high quality design, tailored to the local context.
- 1.5 They have formulated a set of key principles that we apply to every new housing project. Adopting this positive approach and working with the grain of the community, they receive more support for their projects, and this reduces objections and uncertainty, for the benefit of all those involved in the development process.



- PEOPLE
Gathering evidence and engaging with local people
- PLACE
Assessing the site and surroundings
- BEAUTY
Creating imaginative designs and spaces
- NATURE
Delivering gains to the environment

Location and Existing Situation

- 1.6 The site is located to the north of Emsworth, approximately 400m to the south of Emsworth Common Road, approximately 330m to the west of Monk's Hill and approximately 1.5km to the north of the A27 dual carriageway. Long Copse Lane is located immediately to the south of the site. The site is currently comprised of fields for livestock and horses. Woodlands and fields bound the site to the north, east and west with residential dwellings to the south of Long Copse Lane. Hollybank House and grounds are located to the west of the site. The general location is shown in figure 1.1.



Fig 1.1. Site Location

Proposal

- 1.7 The applicant is seeking an outline planning application for a new residential scheme (C3 use to include affordable housing) and associated landscaping, access and supporting infrastructure on land north of Long Copse Lane, Emsworth. All matters are reserved. A general illustrative site layout of the proposed development is given in figure 1.2.



Fig 1.2. Illustrative Site Masterplan

2 SUSTAINABILITY POLICY & DRIVERS

- 2.1 The mechanism for delivering sustainability and the principles of low-carbon economy is now well enshrined within a wide range of UK statutes, strategies and policies and has most recently been set out within the Government's 'A Green Future: Our 25 Year Plan to Improve the Environment'.
- 2.2 This is also reflected in the UK planning system, which is implemented through national guidance along with local planning policies. A review of all the relevant policy documents was undertaken in order to gain an understanding of the guiding principles for sustainability.

National Planning Policy Framework

- 2.3 The revised National Planning Policy Framework (NPPF) was released on 20th July 2021. This replaces the previous National Planning Policy Framework published in March 2012, revised in July 2018 and updated in February 2019. It sets out the framework for all planning policy in England and how these policies are expected to be applied. At a very high level, the objective of sustainable development can be summarised as meeting the needs of the present without compromising the ability of future generations to meet their own needs. At a similarly high level, members of the United Nations – including the United Kingdom – have agreed to pursue the 17 Global Goals for Sustainable Development in the period to 2030. These address social progress, economic well-being and environmental protection.
- 2.4 The NPPF sets out a presumption in favour of sustainable development, and the need to support economic growth through the planning system. Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives):
 - an economic objective – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;
 - a social objective – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering well-designed, beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and
 - an environmental objective – to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.
- 2.5 Planning plays a key role in helping shape places to radical reductions in greenhouse gas emissions, minimising vulnerability and providing resilience to the impacts of climate change, and supporting the delivery of renewable and low carbon energy and associated infrastructure. This is central to the economic, social and environmental dimensions of sustainable development. The

NPPF does not include detailed measures on sustainable design codes and standards to apply, although expects that when setting any local requirement for a building's sustainability, local planning authorities should do so in a way consistent with the national technical standards.

Havant Borough Council Emerging Local Plan

- 2.6 The most relevant policies which need to be considered when appraising the sustainability of the scheme are those presented in Local Policy.
- 2.7 Havant Borough Council is working to their adopted Core Strategy (2011) and Site Allocations Document (July 2014), however is in the process of adopting their new Local Plan, which was submitted for Examination in Public on 12th February 2021, with a further minor update made in June 2021. The submission version of the Local Plan is a highly material consideration and has therefore formed the basis of this statement.
- 2.8 The site is being promoted against Policy H8 of the emerging Local Plan, which allocates a 16.9 Ha site to the north of Copse Lane in Emsworth for up to 260 dwellings. The application site falls wholly within the H8 allocation area and is the main land parcel. Around 210 dwellings are expected to be provided within the application site, as shown on the illustrative masterplan for the H8 allocation.

H8: Land north of Long Copse Lane

- 2.9 Residential development of about 260 dwellings will be permitted where:
 - a. The development of the site is masterplanned and delivered in a comprehensive manner;
 - b. Sufficient information is submitted to address the site-specific planning considerations. This is to be agreed at the pre-application stage and is expected to include the following:
 - i. Environmental Statement if required;
 - ii. Heritage Statement;
 - iii. Flood Risk Assessment;
 - iv. Drainage Strategy;
 - v. Ecological Assessment;
 - vi. Arboricultural Assessment;
 - vii. Transport Assessment and Travel Plan;
 - viii. Air Quality Assessment;
 - ix. Noise Impact Assessment;
 - x. Contaminated Land Investigation Report (to include gas monitoring);
 - xi. Lighting Assessment;
 - xii. Utilities Assessment.

- 2.10 In addition to the technical requirements to support the planning application, Policy H8 goes on to state:
- c. An appropriate means of access is established, which incorporates road widening along Hollybank Lane and Long Copse Lane, to the satisfaction of the Highway Authority;
 - d. The proposal does not undermine the future development potential of surrounding sites;
 - e. Appropriate mitigation measures, including a sufficient woodland buffer, are put in place for Bechstein's bats in line with Policy E15;
 - f. The development enhances the relevant Local Ecological Network opportunity areas and safeguards the connections between the protected landscapes of the South Downs National Park and the Chichester Harbour AONB;
 - g. Opportunities have been explored for the prior extraction of minerals to the satisfaction of Hampshire County Council;
 - h. Off-site water mains reinforcements are installed to Portsmouth Water's design and approval;
 - i. The proposal considers and positively responds to the special qualities of the South Downs National Park, including consideration of the Dark Night Sky Reserve;
 - j. The developer provides a drainage solution on site which reduces surface water run-off and contributes towards identified flood alleviation schemes in the area, in line with Policies E19 and E20; and
 - k. The design and layout:
 - i. Responds to the semi-urban/rural character of the surrounding residential development to the south;
 - ii. Preserves and, where possible, enhances the character and setting of Hollybank House;
 - iii. Retains and integrates the protected and existing trees and hedgerows found on and surrounding the site and leaves a substantial landscape buffer between the development and the ancient woodland of Southleigh Forest to the west and north;
 - iv. Provides on-site public open space and community food growing provision in line with Policy E9;
 - v. Provides play space for children and young people to address the deficit highlighted in Policy E11;
 - vi. Provides landscaping between the built development and the undeveloped land to the east to soften the visual impact;
 - vii. Provides easy and convenient multi-user links across the site and connecting to existing and planned routes, including those linking north to the Southleigh Forest and the South Downs National Park (Havant BOAT 66a and Havant Bridleway 66b), and those connecting with Emsworth to the south (Havant Footpath 67).

E12 | Efficient use of resources and low carbon design

- 2.11 More specifically for energy and sustainability, emerging Policy E12 requires development proposals which involve an increase in non-residential floorspace or a net gain in overnight accommodation to:
- a. Reuse existing buildings' construction materials wherever possible;
 - b. Appropriately integrate solar gain, natural ventilation or ventilation with heat recovery, fabric performance and Passivhaus principles into the layout and design;
 - c. Minimise greenhouse gas emissions and improve energy efficiency of buildings; and
 - d. Use district heat or combined heat and power (CHP or CCHP) (existing or proposed or on-site), where appropriate;

Energy Efficiency in Residential development

As well as addressing points a) to d) above, proposals for residential development are expected to achieve the following standards:

- f. A reduction in CO₂ emissions of at least 19% of the Dwelling Emission Rate (DER) compared to the Target Emission Rate of Part L of the Building Regulations is achieved; and
 - g. The development has demonstrated its long-term sustainability and cumulative impacts using one or both of the following tools as appropriate:
 - i. Assessment under the Home Quality Mark (HQM) ONE, or equivalent, for any development of one dwelling or more (gross)
 - ii. Assessment under the BREEAM Communities scheme, or equivalent, for any development of 100 dwellings or more (gross)
- 2.12 Home Quality Mark may present an opportunity for future integration, however at this stage of the outline application, the scheme demonstrates how the relevant requirements of BREEAM Communities has been taken into account. Further details on this are available in Section 3, and Appendix I.
- 2.13 Paragraph 5.125 of the emerging Local Plan goes on to state that if schemes can provide above the 19% improvement, then this will be a material consideration in the determination of that scheme. If the required 19% reduction is financially unviable or technically unfeasible, then this will need to be demonstrated with appropriate evidence in support of a planning application. In this instance, the applicant will be expected to achieve the most significant CO₂ reduction viable in the circumstances.

Water Efficiency

- 2.14 Policy E12 goes in to state that as well as addressing points a) to d) above, proposals which result in a net gain of overnight accommodation must include measures to achieve a maximum water use of 110 litres of water per person, per day, including external water use.

Sustainability Appraisal of the Site through the Local Plan formulation

- 2.15 As part of the preparation of the emerging local plan, Havant Borough Council prepared a Sustainability Appraisal (SA) of the Pre-Submission Havant Borough Local Plan 2036 in January 2019. This considers the strategic implications of adopting the Local Plan against sustainability appraisal criteria. The council also undertook a site options appraisal using sustainability appraisal techniques. The proposed development site (EM7) was considered within this review and would latterly be presented as a development allocation under Policy H8 for a residential scheme.
- 2.16 In general, positive or neutral effects were identified through the site's sustainability appraisal for development at Long Copse Lane, with negative effects for biodiversity (Obj 7), landscape (Obj 8) and ease of access (Obj 7). For these, the Sustainability Appraisal concluded that the is in a sensitive location in terms of landscape and biodiversity. However, through further discussions with the South Downs National Park, the Council's Ecologist and the Council's Landscape Team, the council considered that potential adverse impacts could be mitigated through a comprehensive masterplan approach to development. As part of this, the design and layout of development must be informed by the site's constraints and context, as well as the landscape character of the wider area.
- 2.17 An extract of the Sustainability Appraisal for the site is given in figure 2.1, highlighted.

Site/Objective	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Objective 6	Objective 7	Objective 8	Objective 9	Objective 10	Objective 11	Objective 12	Objective 13	Objective 14	Include in Pre-Submission HBLP 2036?
RESIDENTIAL DEVELOPMENT															
EM1 Emsworth Victoria Cottage Hospital	+	0	+	++	0	0	+	0	0	0	++	+/-	+	++	Yes
EM2 Gas Site, Palmer's Road	+	++	+	++	-	0	+	0	0	0	++	+/-	++	++	Yes
EM3 Fowley Cottage	+	++	+	+	0	0	0	0	0	0	+	+/-	++	+	Yes
EM4 Land at Selangor Avenue	+	++	+	0	0	0	-	0	0	0	0	+/-	+	0	Yes
EM5a Land at Westwood Close	+	++	0	-	-	0	-	0	0	0	0	+/-	+	0	No
EM6 Land west of Coldharbour Farm	+	++	+	+	0	0	0	0	0	0	+	+/-	++	+	Yes
EM7 Land north of Long Copse Lane	+	++	0	0	0	0	-	-	0	0	0	+/-	0	-	Yes
EM8 Land rear of 15-27 Hordean Road	+	++	+	0	0	0	-	-	-	0	0	+/-	++	0	As part of Southleigh
EM9 Land east of 54 Long Copse Lane	+	+	-	0	0	0	-	-	0	0	0	+/-	-	-	No
EM10 Land west of Westbourne	+	++	0	0	0	0	-	-	0	0	-	+/-	0	-	No
EM22	No longer applicable – The has been discounted in the Strategic Housing Land														

Fig 2.1 Energy & Carbon Hierarchy in design development

Table 2.1. Havant BC Local Plan Sustainability Appraisal (SA) Themes and Objectives

Objective Number	SA Objective	Sustainability Theme
1	Develop a dynamic, diverse and knowledge-based economy that excels in innovation with higher value, lower impact activities	Economic factors and quality of life
2	Provide affordable, environmentally sound and good quality housing for all	Housing, population and quality of life
3	Safeguard and improve community health, safety and wellbeing	Health, population and quality of life
4	Promote and support climate change mitigation and adaptation through reducing Havant's greenhouse gas emissions from all sources and plan for anticipated levels of climate change	Climate change
5	Reduce the risk of flooding from all sources and the resulting detriment to public wellbeing, the economy and the environment. Take a sequential approach to development and avoid putting more people and property at risk of being affected by flooding, where possible. Manage flood risk where necessary	Climate change, air, water and soil
6	Protect, enhance and manage buildings, features, areas and landscapes of archaeological, historical and cultural heritage importance and their setting	Historic environment and landscape
7	Protect, enhance and manage the character and appearance of the landscape and townscape, maintaining and strengthening local distinctiveness and sense of place	Historic environment and landscape
8	Protect, enhance and manage biodiversity and geodiversity – supporting the enhancement and connectivity of ecological green networks	Biodiversity and geodiversity
9	Protect and conserve natural resources	Material assets, air, water and soil
10	Reduce waste generation and disposal, and promote the waste hierarchy of reduce, reuse, recycle/compost, energy recovery and disposal	Material assets
11	Improve the efficiency of transport networks by increasing the proportion of travel by sustainable modes, by promoting policies which reduce the need to travel and provide opportunities for walking and cycling	Climate change, accessibility and transport
12	Improve air, water (ground and surface) and soil qualities through reducing pollution both diffuse and point source	Air, water and soil
13	Reduce poverty and social exclusion and close the gap between the most deprived areas in the Borough and the rest of the Borough	Quality of life, housing
14	Ensure easy and equitable access to services, facilities and opportunities	Accessibility and transport, quality of life, economic factors

Fig 2.2 SA Scoring Matrix

Grade	Appraisal
Strong positive effect	++
Positive effect	+
Neutral/no effect	0
Negative effect	-
Strong negative effect	--
Uncertain effect	+/-

Table 4 - SA assessment grades

- 2.18 This Sustainability Statement reflects on the objectives of the council's own Sustainability Appraisal of the site and demonstrate how the scheme can continue to support these as the scheme progresses to future reserved matters.

3 SUSTAINABILITY STATEMENT

- 3.1 This section provides an account of the sustainability benefits of the proposed development, and how relevant policy will be addressed in the development proposals.
- 3.2 In defining the sustainability framework for Long Copse Lane, the following themes have been identified which are materially relevant, and which draw from objectives of the council's own sustainability appraisal:
- Climate Mitigation
 - Climate Change Adaptation
 - Conserving and Enhancing Biodiversity
 - Sustainable Transport
 - Waste and Resources
 - Environmental Protection
 - BREEAM Communities

Climate Mitigation

- 3.3 In the UK, the residential sector accounted for 18.5% of the UK's carbon emissions in 2019, and in total was estimated to be 65.2 million tonnes of CO₂e¹. Climate change mitigation involves reducing the flow of heat-trapping greenhouse gases into the atmosphere, either by reducing sources of these gases (for example, the burning of fossil fuels for electricity, heat or transport) or enhancing the "sinks" that accumulate and store these gases.
- 3.4 New development has an important role to play in climate change mitigation, requiring development to emit significantly reduced carbon emissions by comparison to existing residential stock to meet national and international climate targets.
- 3.5 Policy E12 of the emerging Local Plan includes provisions for energy efficiency and low carbon development. Proposals for residential development are expected to achieve a reduction in CO₂ emissions of at least 19% of the Dwelling Emission Rate (DER) compared to the Target Emission Rate of Part L of the Building Regulations. Para (5.124) of the Local Plan confirms the Council will expect building fabric efficiency measures to be prioritised over technological solutions. In addition, Paragraph 5.125 goes on to state that if schemes can provide above the 19% improvement, then this will be a material consideration in the determination of that scheme.

Energy Conservation Principles

- 3.6 The conservation of energy is an important design consideration for Long Copse Lane, and which will be developed further at the reserved matters stage. The design will have regard to an energy

¹ Department for Business, Energy and Industrial Strategy, Provisional UK greenhouse gas emissions national statistics. June 2020

and carbon hierarchy, summarised in figure 3.1, which illustrates the issues which should be considered at different stages of design development.

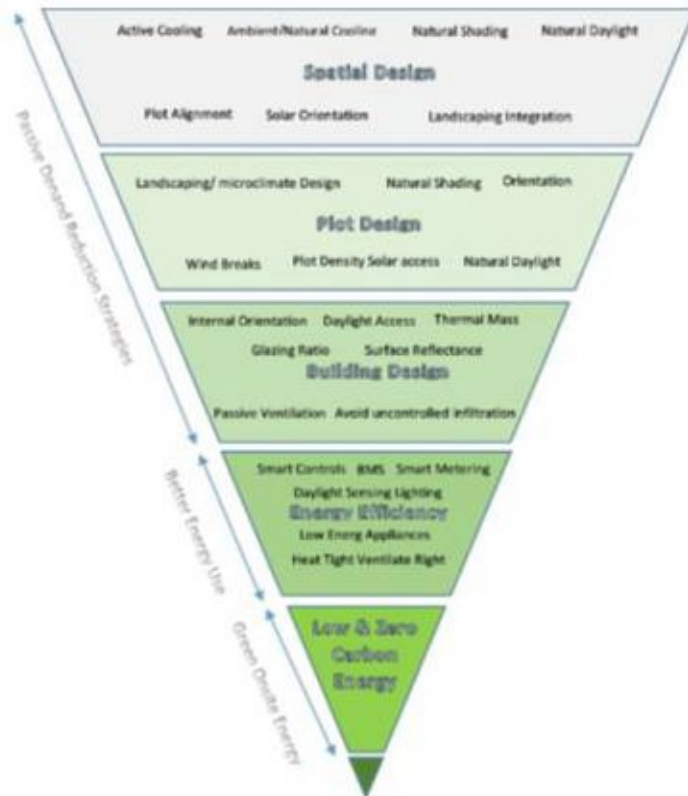


Fig 3.1 Energy & Carbon Hierarchy in design development

- 3.7 In accordance with the above hierarchy, the first stage of design should be to take into consideration basic spatial design elements, including enabling access to solar energy, provision of wind breaks and the integration of the proposed scheme with the natural landscape setting. The second stage considers these issues further in relation to siting of building plots, as well as the scale and massing of the proposed built environment.
- 3.8 Whilst presented in outline, the illustrative site layout demonstrates how good spatial design principles can be readily accommodated. The layout will access to beneficial solar energy, for example. Initial strategies in relation to energy and carbon performance are discussed further in section 4, where an indicative energy assessment is presented which explains how carbon reduction may be achieved.

- 3.9 The specifics of sustainability performance including, but not limited to form, style, materials, energy use and carbon has not been fixed as this is too early in design. It is expected these issues will be resolved through the reserved matters process paying respect to the energy and carbon hierarchy presented above.

Low Carbon and Renewable Energy and District Wide Solutions

- 3.10 Section 4 includes an analysis of the developments predicted energy use and how this can be minimised by following robust design principles. The section discusses the feasibility of applying renewable energy, which is a commitment of the applicant, and why, in this particular case a site wide energy network is deemed impractical due to the low density of the site making the scheme less practical.

Electric Vehicle Infrastructure

- 3.11 There has been a significant increase in the uptake of electric vehicle and hybrid cars in the UK. In 2020, there have been over 370,000 new hybrid / battery electric vehicles registered.

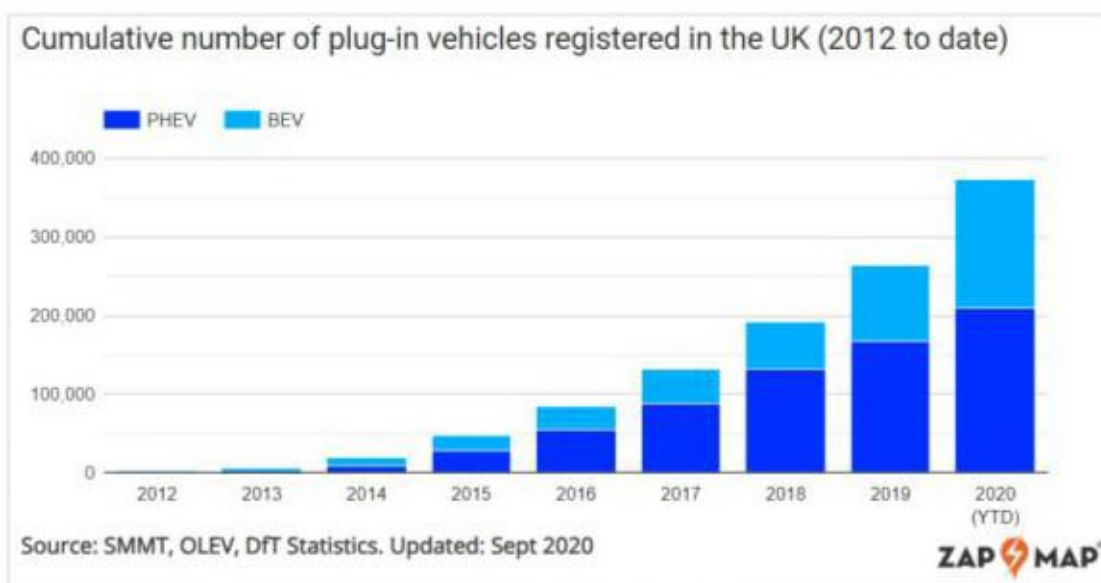


Fig 3.2 - Increase in EV vehicles registered in the UK – 2012 to 2020 (Zap Map)

- 3.12 In 2019, the department of transport issued a consultation in line with the government's key consultation principles on electric vehicle charging in residential and non-residential buildings which proposes ambitious regulatory changes to increase charge points across the UK to ensure new buildings are ready for the future. The government proposes that new residential buildings with an associated car parking space must have a ChargePoint.
- 3.13 There are various publicly accessible charging points located within the area, the nearest being a 50-kW fast charger in the municipal car park in Emsworth, some 2 miles from the site. Emerging Policy IN3 relates to Transport and Parking. It requires that Electric Vehicle charging infrastructure is provided for each new residential unit with private off-street parking. The development will also

be enabled to provide EV charging infrastructure, to provide a minimum of 7.5 kW charging for use by residents. In general plots are expected to include private parking on drives, which will enable the inclusion of electric vehicle charging connectivity for residents to charge EV vehicles.

Climate Change Adaptation

- 3.14 Climate change adaptation involves taking steps to adapt to the already inevitable consequences of climate change. In the UK climate change is expected to lead to warmer, wetter winters and hotter, dryer summers. This will lead to greater chances of developments overheating, and increased concerns for water scarcity.

Flood Risk and Sustainable Drainage

- 3.15 A flood risk assessment and surface water drainage strategy has been submitted with the application, which considers how surface water can be managed sustainably. According to the Environment Agency, the site is located within Flood Zone 1 and as such, it is suitable for residential development. The Government Flood Maps identify the site to be at very low risk from flooding from rivers or the sea, surface water or from reservoirs. The Strategic Flood Risk Assessment (SFRA) confirms that the site is sequentially preferable as it is in Flood Zone 1 only. However, it is acknowledged that Emsworth (as a whole) has known drainage capacity issues due to underlying geology. To overcome this, the site allocation requires the developer to provide a drainage solution onsite which reduces surface water run-off and contributes towards identified flood alleviation schemes in the area, in line with Policies E19 and E20.
- 3.16 The proposed surface water drainage strategy for the site incorporates a combination of SUDs measures, including attenuation basins, swales, permeable paving and geo – cellular storage. In combination these will ensure that the development can be drained without increasing flood risk on site or elsewhere for up to the 1 in 100-year rainfall event, incorporating a 40% allowance for climate change in accordance with best practice.
- 3.17 The widening of Long Copse Lane to facilitate the site offers the opportunity to include appropriate surfacing and drainage, helping to reduce the impact of flooding elsewhere in Emsworth. The new highway drainage improvements that have been discussed and agreed with the Highway and Drainage teams at Hampshire County Council provide a new highway drainage system to drain the highway and resolve the existing local flooding issue, and also to receive the attenuated runoff from the proposed development. This is expected to deliver a direct benefit to the wider community around Long Copse Lane and to the Emsworth town by alleviating some of the pressure of the existing surface water drainage down through the housing estates.

Water efficiency

- 3.18 With relation to on-site water conservation, emerging Policy E12 requires all new dwellings are required to achieve the higher water efficiency standard in the appendix to Building Regulations Approved Document Part G. This is an optional requirement from Regulation 36 paragraph 2, B requiring a maximum calculated potable demand of 110 litres / person / day, which includes an allowance of 5 litres / person / day for external water use. The policy is therefore aligned with now withdrawn Code for Sustainable Homes Level 4.

- 3.19 The measures employed in this scheme for water conservation are envisaged to be the following;
- Rainwater harvesting is not proposed to meet this target; however, it is envisaged that gardens will be provided with water butts.
 - Potable water consumption will be reduced through the specification of efficient water fittings where feasible;
 - Water consuming white goods would be water efficient.

Mitigate Urban Heat – the use of green Infrastructure and building design principles

- 3.20 Urban heat islands can occur, mainly in summer months, and perpetuated during anticyclone events in which wind strength is low. The effect is exasperated in urban areas, where there is generally increased thermal mass from building and pavement materials, greater human activity, alongside less vegetation and open water which act as a thermo regulator and serve to cool the air. Higher summer temperature can lead to buildings overheating.
- 3.21 Whilst the Borough doesn't accurately map urban heat risks, it is relevant to note that the development site is located at the edge of the existing settlement of Emsworth and is generally surrounded by greenspace to the north, east and west. The existing site is greenfield, and therefore development will involve the loss of green surfaces to buildings and hard standing. This will be mitigated as far as possible through the provision of an extensive landscape scheme.
- 3.22 Supporting text to emerging policy E12 (Para 5.126) states that in terms of overheating, more specifically, the Chartered Institution of Building Services Engineers (CIBSE) design methodology for the assessment of overheating risk in homes (as amended) provides best practice examples to reduce the impact of overheating. At this outline stage the risks from overheating have been considered against the Good Homes Alliance Overheating Checklist. An extract of this is given below, which evaluates that the homes would be at low risk from overheating.

EARLY STAGE OVERHEATING RISK TOOL

Version 1.0, July 2019

This tool provides guidance on how to assess overheating risk in residential schemes at the early stages of design. It is specifically a pre-detail design assessment intended to help identify factors that could contribute to or mitigate the likelihood of overheating. The questions can be answered for an overall scheme or for individual units. Score zero wherever the question does not apply. Additional information is provided in the accompanying guidance, with examples of scoring and advice on next steps.

Find out more information and download accompanying guidance at goodhomes.org.uk/overheating-in-new-homes



KEY FACTORS INCREASING THE LIKELIHOOD OF OVERHEATING				KEY FACTORS REDUCING THE LIKELIHOOD OF OVERHEATING			
Geographical and local context							
#1 Where is the scheme in the UK? See guidance for map		South east Northern England, Scotland & NI Rest of England and Wales	4 0 2	#8 Do the site surroundings feature significant blue/green infrastructure? Proximity to green spaces and large water bodies has beneficial effects on local temperatures; as guidance, this would require at least 50% of surroundings within a 100m radius to be blue/green, or a rural context		1	1
#2 Is the site likely to see an Urban Heat Island effect? See guidance for details		Central London (see guidance) City London, Manchester, Bham Other cities, towns & dense sub-urban areas	3 2 1				
Site characteristics							
#3 Does the site have barriers to windows opening? - Noise/Acoustic risks - Poor air quality/smells e.g. near factory or car park or very busy road - Security risks/crime - Adjacent to heat rejection plant		Day - reasons to keep all windows closed Day - barriers some of the time, or for some windows e.g. on quiet side Night - reasons to keep all windows closed Night - bedroom windows OK to open, but other windows are likely to stay closed	0 4 0 4	#9 Are immediate surrounding surfaces in majority pale in colour, or blue/green? Lighter surfaces reflect more heat and absorb less so their temperatures remain lower; consider horizontal and vertical surfaces within 10m of the scheme		1	0
				#10 Does the site have existing tall trees or buildings that will shade solar-exposed glazed areas? Shading onto east, south and west facing areas can reduce solar gains, but may also reduce daylight levels		1	1
Scheme characteristics and dwelling design							
#4 Are the dwellings flats? Flats often combine a number of factors contributing to overheating risk e.g. dwelling size, heat gains from surrounding areas; other dense and enclosed dwellings may be similarly affected - see guidance for examples			3	#11 Do dwellings have high exposed thermal mass AND a means for secure and quiet night ventilation? Thermal mass can help slow down temperature rises, but it can also cause properties to be slower to cool, so needs to be used with care - see guidance		1	0
#5 Does the scheme have community heating? i.e. with hot pipework operating during summer, especially in internal areas, leading to heat gains and higher temperatures			3	#12 Do floor-to-ceiling heights allow ceiling fans, now or in the future? Higher ceilings increase stratification and air movement, and offer the potential for ceiling fans		2 1	1
Solar heat gains and ventilation							
#6 What is the estimated average glazing ratio for the dwellings? (as a proportion of the facade on solar-exposed areas i.e. orientations facing east, south, west, and anything in between). Higher proportions of glazing allow higher heat gains into the space		>60% >50% >35%	12 7 4	#13 Is there useful external shading? Shading should apply to solar exposed (E/S/W) glazing. It may include shading devices, balconies above, facade articulation etc. See guidance on "full" and "part". Scoring depends on glazing proportions as per #6		Full Part 0 2 1	0
#7 Are the dwellings single aspect? Single aspect dwellings have all openings on the same facade. This reduces the potential for ventilation		Single aspect Dual aspect	3 0	#14 Do windows & openings support effective ventilation? Larger, effective and secure openings will help dissipate heat - see guidance		Openings compared to Part F purge rates = Part F +50% +100%	2 3 3
TOTAL SCORE		7	=	Sum of contributing factors:		12	
				minus			
				Sum of mitigating factors:		5	
<div> <div>High</div> <div>12</div> <div>Medium</div> <div>8</div> <div>Low</div> </div>							
<div> <div>score >12: Incorporate design changes to reduce risk factors and increase mitigation factors AND Carry out a detailed assessment (e.g. dynamic modelling against CIBSE TM59)</div> <div>score between 8 and 12: Seek design changes to reduce risk factors and/or increase mitigation factors AND Carry out a detailed assessment (e.g. dynamic modelling against CIBSE TM59)</div> <div>score <8: Ensure the mitigating measures are retained, and that risk factors do not increase (e.g. in planning conditions)</div> </div>							

Figure 3.4 – Good Homes Alliance Overheating Checklist

Conserving and Enhancing Biodiversity

- 3.23 Objective 8 of the Council's Sustainability Appraisal is to 'Protect, enhance and manage biodiversity and geodiversity – supporting the enhancement and connectivity of ecological green networks. Through the council's own SA process, it was concluded that the site has moderate-to-high ecological potential, being adjacent to the Southleigh Wood SINC and the site, itself, comprises improved grassland, neutral grassland and mixed woodland (with oak trees), as well as having potential for protected species. Site allocation Policy H8 requires the retention and integration of the existing, especially protected, trees and hedgerows found on and surrounding the site and the provision of a sizeable landscape buffer between the built development, Southleigh Forest and the undeveloped land to the east. Through the SA work of the council, it was concluded that development has the potential to result in a positive impact if designed and managed well.
- 3.24 In accordance with Policy H8, an Ecological Impact Assessment has been undertaken to investigate and inform the masterplan layout and planning application. Surveys have been undertaken over several periods to assess the habitats for wildlife. The site is mostly pony paddocks and buildings in intensive use and have little ecological value.
- 3.25 The trees along Long Copse Lane will be protected and most of the hedgerow will remain, other than short stretches that will accommodate the new access points. Replacement planting will take place for any vegetation lost.
- 3.26 Early engagement with the County ecologist has been undertaken and measures agreed to ensure that existing habitats are retained, and where appropriate enhanced for protected species such as Bechstein's bats, which will be protected in corridors suitable for foraging and connecting naturally across the site and to the ancient woodland to the north.
- 3.27 The relationship to the Ancient Woodland to the north of the site has been carefully considered and a significant setback from any built development has been included to deal with any impacts. Further details are available on the landscape masterplan.
- 3.28 The application is also submitted with a nitrogen neutrality statement. This is required for development sites historically used for agricultural purposes, whereby nitrogen can be released from the environment to cause ecological harm in the coastal waters. measures need to be taken to address the issue on site with the aim for the development to achieve nutrient neutrality.

An assessment has been completed by the Applicant to demonstrate how the scheme can mitigate and offset nitrogen, with the goal to achieve zero net release of nitrogen to the environment. The scheme includes reed bed planting and offsite contributions to reduce the impacts.

Sustainable Transport

- 3.29 The site is located within walking distance of the district centre of Emsworth, where there are a number of everyday local services and facilities to accommodate the day to day needs of future residents that can be easily accessed from the site on foot or by public transport. This includes a convenience store, doctors' surgery, primary school and public house. Recognising the

importance of pedestrian and cycle routes, the allocation policy stipulates that development should provide easy and convenient multi-user links across the site and connecting to existing and planned routes, including those linking north to the Southleigh Forest and the South Downs National Park (Havant BOAT 66a and Havant Bridleway 66b), and those connecting with Emsworth to the south (Havant Footpath 67). New links have been created, with an access and movement strategy established to ensure that pedestrians and cyclists are prioritised.

- 3.30 With regard to public transport, there is a regular bus services operating from a stop within approximately 750m to the South of the site which provide regular services to Rowlands Castle and Emsworth including onward connections to the rail network for trips further afield. Additional customers using this service will increase the viability and sustainability of these services. In addition, Emsworth station is located 1.9km south of the site which provides regular connections to Southampton Central, Brighton and London.

In terms of sustainable transport initiatives, the following is proposed:

- Cycle parking will be provided on site in accordance with local standards, including short stay parking spaces located in accessible locations on site.
- A street hierarchy will be followed for main streets, secondary streets, shared surfaces and courtyards to promote sustainable transport and safety.
- EV charging will be provided for each dwelling
- A Travel Plan to promote sustainable lifestyles amongst new residents through reducing the need to travel by private car will be secured through a Section 106 Agreement or suitably worded condition.

Waste and Resources

- 3.31 Waste, both through construction and building operation, can have a detrimental effect on a building's overall sustainability and environmental performance.
- 3.32 With regards to construction waste, prior to commencement of works on site, the client will require the principal contractor, sub-contractors, design team and suppliers to minimise the amount of waste produced during construction and adopt principles to reduce waste, ideally through a Resource Management Plan (RMP). It is expected that principles of sustainable waste management will be taken forward as part of a Construction Environmental Management Plan, which would be expected by condition.
- 3.33 Operational waste from the dwellings will be managed by the local authority. Each dwelling will be provided with an appropriate level of waste storage and there will be adequate external storage sized to council requirements.
- 3.34 During the further design stages, consideration will also be given to materials. This will include criteria to ensure as low an environmental impact as possible;

1. Materials Specification

Where possible building materials will be selected to minimise environmental impact. Where possible, local materials will be sought. Examples of measures that will be

considered include, the use of recycled materials in substrates and in concrete aggregates, specifying locally sourced timber where feasible, and ensuring no construction or insulation materials are to be used which will release toxins into the internal and external environment, including those that deplete stratospheric ozone.

2. Procuring Materials Responsibility

Through future supply chain involvement, consideration will be given to the responsible sourcing of main construction materials. For example, suppliers will preferentially hold an Environmental Management System (EMS), and where possible accredited to ISO 14001. In addition, all timber in the scheme will be FSC and procured in accordance with the UK Government's 'Timber Procurement Policy'.

Environmental Protection

- 3.35 Any new development can potentially lead to detrimental environmental effects and these potential effects have been considered during the planning stages of this proposal. The development is not of the scale that would require an Environmental Impact Assessment (EIA), however the measures as outlined in this section, and subsequently implemented, will ensure that any potential impacts can be appropriately controlled.

Avoidance of Light Pollution

- 3.36 The site is approximately 0.5km away from the South Downs National Park and is beyond the transition zone for Dark Sky Reserve. The site is identified in the Landscape Capacity Study (May 2015) as part of land parcels 21.3 and 21.4. As outlined in the study, these parcels have a low and medium/low capacity to accept change respectively. Policy H8 requires the planning application for Long Copse Lane to be brought forward with a lighting assessment, to ensure that the South Downs National Dark Skies Reserve is preserved through the design of the scheme.
- 3.37 The lighting Assessment has been undertaken to demonstrate how light spillage can be restricted to protect the landscape and ecology. The lighting for all areas will meet the recommendations of the ILP guidance on Obtrusive Light and the Bat Conservation Trust.

Avoidance of Noise Pollution

- 3.38 The noise assessment undertaken for the development by Accon UK. This considers the potential impact on the proposed development from sources of noise. The initial site noise risk assessment identifies that the site is generally at negligible risk of adverse noise effect. A small area within approximately 15 m of Long Copse Lane is likely to be at low risk of adverse noise effect, however in general noise levels from road traffic movements are not considered to be significant at this site.

Managing Air Quality

- 3.39 An air quality assessment has been completed by Accon UK to consider the impacts of the proposed development on local air quality. The site is not located within an Air Quality Management Area and there are no exceedances predicted for NO₂, PM₁₀ or PM_{2.5} at any of the proposed development receptors for the projected completion year of 2023. Therefore, it is not deemed necessary to include any mitigation measures for the proposed development.

BREEAM Communities

- 3.40 Emerging Policy E12(g) requires development to demonstrate its long-term sustainability and cumulative impacts using one or both of the following tools as appropriate:
- i. Assessment under the Home Quality Mark (HQM) ONE, or equivalent, for any development of one dwelling or more (gross)
 - ii. Assessment under the BREEAM Communities scheme, or equivalent, for any development of 100 dwellings or more (gross)
- 3.41 Home Quality Mark is a potentially relevant standard to apply at the further design stages, however given the scale of the scheme and this early stage, BREEAM communities offers the closest alignment.
- 3.42 BREEAM Communities is an independent, third party assessment and certification standard based on the established BREEAM methodology. It is a framework for considering the issues and opportunities that affect sustainability at the earliest stage of the design process for a development. The scheme addresses key environmental, social and economic sustainability objectives that have an impact on large-scale development projects.
- 3.43 There are three steps involved in the assessment of sustainability at the masterplanning level as illustrated below:

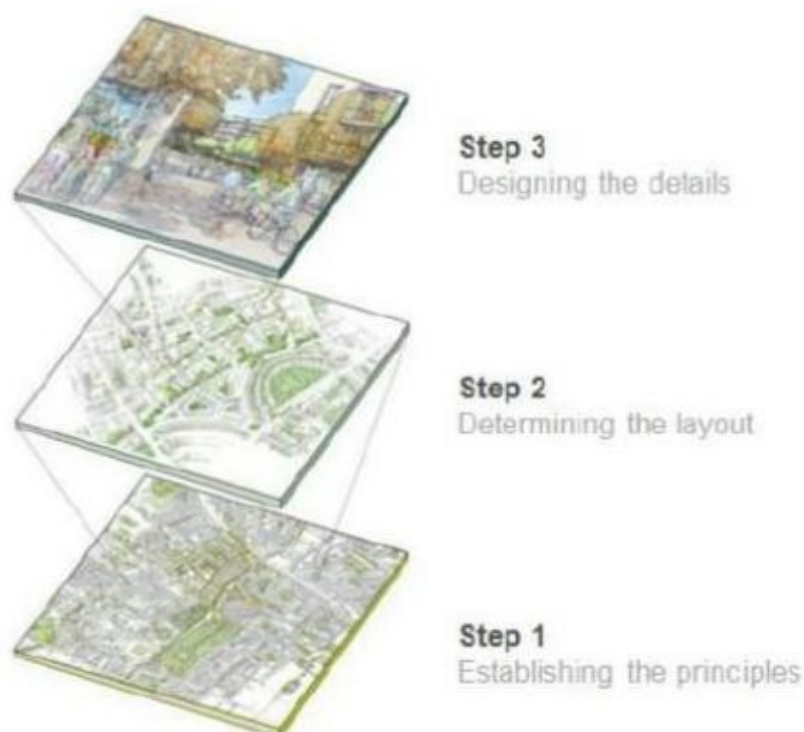


Figure 3.5 – BREEAM Communities Steps

- 3.44 Following site selection there is a process whereby the developer must show the suitability and need for specific types of development on the site as part of a planning application. Strategic plans for the wider area, usually contained within the local authority's planning policy documents, should indicate the housing, employment or services that are required. The new development will need to respond to these local requirements in order to receive planning permission. In this scheme the process described above is assessed under Step 1: Establishing the principle of development. During this step, the BREEAM Communities framework emphasises the opportunities to improve sustainability at the site-wide level, such as community-scale energy generation, transport and amenity requirements. All issues within this step contain a mandatory element reflecting what should be considered standard practice for developments which aspire to high sustainability standards.
- 3.45 The next step, Step 2: 'Determining the layout' of the development includes detailed requirements regarding how people will move around and through the site and where buildings and amenities will be situated.
- 3.46 The final step, Step 3: 'Designing the details' involves more detailed design of the development including: the design and specification of landscaping, sustainable drainage solutions, transport facilities and the more detailed design of the built environment (but excluding detailed building design).

- 3.47 At this stage of the project's outline planning, steps 1 and 2 are broadly relevant. A review has been undertaken and summarised in Appendix 1 which indicates that the scheme aligns well with the BREEAM Communities framework.

4 INDICATIVE ENERGY ASSESSMENT

- 4.1 This section specifically considers the likely energy use by the proposed development. The Sustainability Statement considered the general good design approach to managing energy and carbon. However, although it is early in the design process it is necessary to consider how the scheme could comply with national and local energy policy and building regulation requirements.
- 4.2 This assessment sets out an indicative strategy for the development in order to demonstrate compliance with emerging Policy E12, which requires a reduction in CO₂ emissions of at least 19% of the Dwelling Emission Rate (DER) compared to the Target Emission Rate of Part L of the Building Regulations is achieved.
- 4.3 This section will provide a set of design considerations for reserved matters applications for the development to follow, which would need to be tested through future viability and feasibility testing, alongside prevailing best practices at the time of construction.

Methodology

- 4.4 As this is an outline application, with design details unknown, this energy assessment sets out to demonstrate compliance with the above policy requirements as follows:

1. Step 1 – Establish the Target Emission Rate

This is the carbon emissions baseline against which proposed measures will show a reduction. It will be based on typical and benchmark Target Emission Rates for chosen dwelling types for regulated carbon emissions as required by building regulations

2. Step 2 – Reducing Energy Requirements (Building Regulations Compliance)

This will set out a range of energy-saving design measures in order to demonstrate a route to compliance with Part L of Building Regulations.

3. Step 3 – Providing Renewable Energy (Consideration is given to how the integration of renewable could be achieved to exceed policy, where practical).

This step will assess applicable renewable energy technologies and provide design recommendations to demonstrate savings beyond Part L of the Building Regulations.

Update to Part L and Future Use of SAP 10 Emission Factors

- 4.5 The Ministry of Housing, Communities and Local Government (MHCLG) published the Future Homes Standard consultation on 1 October 2019. This sought views on MHCLG's plans for a Future Homes Standard for new homes from 2025, and proposed options for an interim increase to the energy efficiency requirements for new homes ahead of that.
- 4.6 This 'interim' uplift to Part L & F of Building Regulations will be introduced in December 2021, with enactment from June 2022. A key part of this interim uplift will be the use of updated emission factors for electricity (SAP 10/10.1), which reflect the reduced carbon intensity of the national grid. The SAP 10 emission factor for electricity is widely used and is set at 233 grams of CO₂/kWh.

- 4.7 It is therefore reasonable to assume that the interim Part L will be a statutory document by such time that reserved matters applications are being brought forward. Included in Appendix I are a set of Step 1-Step 2-Step 3 carbon calculations undertaken using SAP 10 emission factors to demonstrate what savings could be expected in future reserved matters applications, by an applicant following the route prescribed below.
- 4.8 For the results presented in the main body of this section, the applicant has used the current SAP 2012 grid emission factor of 519 grams of CO₂/kWh.

Development Mix

- 4.9 The development is being taken forward in outline for about 210 dwellings, an indicative schedule has been prepared by the scheme architects to base calculations on. This is summarised in Table 4.1 and has been used as the basis of calculations.

Table 4.1 Development Mix

	Indicative Unit Area (m ²)	Quantity	Total Unit Area (m ²)
1-Bed Unit	50	37	1850
2-Bed Unit	61	78	4758
3-Bed Unit	92	77	7058
4+Bed Unit	136	18	2440
Total		210	16,106

Step 1 – Establish the Target Emission Rate

- 4.10 The total emissions savings calculated in this report are expressed against a Building Regulation Target Emission Rate. This is the Baseline against which the measures implemented must show an improvement.
- 4.11 The Target Emission Rates for the development have been established using typical and benchmark examples, calculated using DCLG approved methodology and software.
- 4.12 The calculated carbon emissions and total energy demand for the Target Emission Rate are illustrated below. The calculated figure demonstrates a Part L1A Building Regulations 2013 compliant model.

Table 4.2 Step 1 Baseline Emissions

Unit	Total Area (m ²)	SAP 12 TER	Total Target Regulated Emissions (tn.CO ₂ .yr)
1-Bed Flat	1,850.00	18.47	34.16
2-Bed Flat	4,758.00	15.94	75.83
3-Bed House	7,058.33	16.46	116.21
4 & 5 Bed House	2,439.82	22.07	53.84
		Total	280.04

Unit	Total Area (m ²)	SAP 12 TER	Total Target Regulated Emissions (tn.CO ₂ .yr)
1-Bed Unit	1,850.00	18.47	34.16
2-Bed Unit	4,758.00	15.94	75.83
3-Bed Unit	7,058.33	15.60	110.13
4-Bed Unit	2,439.82	16.12	39.32
		Total	259.45

- 4.13 The indicative target figure for the entire development is **259.45 tonnes.CO₂.annum**. This the figure that must be improved upon by the indicative design proposals in this section.

Step 2 – Reducing Energy Requirements

- 4.14 Robust low carbon seeks a ‘fabric first’ approach to reducing the carbon footprint of the built environment. This is achieved through buildings using less energy by improving u-values, airtightness and lighting efficiency amongst others. This is the first step to consider in reducing a building’s carbon emissions before the efficient delivery of power, heat or renewables are considered by a design-team.

Fabric Efficiency

- 4.15 U-Values are used to measure how effective elements of a building’s fabric are as insulators. That is, how effective they are at preventing heat from transmitting between the inside and the outside of a building. The lower the U-value of an element of a building’s fabric, the more slowly heat is able to transmit through it, and so the better it performs as an insulator. Very broadly, the better (i.e. lower) the U-value of a buildings fabric, the less energy is required to maintain comfortable conditions inside the building., The following U-Values are proposed for the development:

Table 4.3- Proposed U-Values for Residential Units

Elements	New Thermal Elements: U-Values – W/m ² K	Comment
External Wall	0.14	Assumed as cavity wall.
Ground / Exposed Floor	0.11	n/a
External Roof	0.11	n/a
External Windows / Glazed Doors	1.1	Assumed as double-glazed, with a g-value of 0.55 and frame factor of 0.85
External Doors	1.3	n/a
Party Wall between dwellings	0	Assumed to be fully filled cavity with effective edge sealing and in line with insulation in abutting elements.

Air Permeability

- 4.16 The designed Air Permeability Rate (APR) has been assumed at 3 m³/h.m² @ 50Pa for the entire development. This will require good construction detailing to be adopted by the design team and main contractor.

Lighting

- 4.17 The SAP calculation software used for assessing the residential units does not allow for the specification of lighting elements. However, for the purposes of the strategy the light fittings will be specified as LED, low energy with local manual switching and if appropriate, occupancy sensing.

Ventilation

- 4.18 A balanced whole-house mechanical ventilation system with heat recovery (MVHR) is proposed for each dwelling typology on site. MVHR will allow adequate levels of fresh air to be delivered into each habitable room without the need to open windows, which will assist in mitigating any noise or air quality concerns.

Space & Water Heating

- 4.19 In accordance with the methodology of the 'Energy Hierarchy', the benefit of any proposed renewable heating is not calculated at this stage. Instead, where a renewable heating system is specified, at this stage the heating is provided by a benchmark 91% efficient gas-fired boiler, in line with the notional dwelling (TER calculation).

Step 2 – Predicted Results

- 4.20 The following tables and graphs represent the Step 2 improvements for the development over the target baseline emissions.

Table 4.4 - Step 2 Results

Unit	Total Area (m ²)	SAP 12 DER	Total Target Regulated Emissions (tn.CO ₂ .yr)
1-Bed Unit	1,850.00	16.83	31.14
2-Bed Unit	4,758.00	14.26	67.84
3-Bed Unit	7,058.33	15.60	110.09
4-Bed Unit	2,439.82	15.83	38.62
Total			247.69
Savings against Step 1			11.76
% Savings			4.53%

- 4.21 As detailed above following the indicative energy saving measures laid out in Step 2, the development could be expected to achieve a **4.53%** reduction in CO₂ emissions.

Step 3 – Providing Renewable Energy

- 4.22 The use of low carbon/renewable technology has been explored for the site to ensure energy security and contribute to the regions low carbon economy. During the design-development period for this scheme, multiple low carbon/renewable systems were examined for both their feasibility and ability to lower carbon emissions insofar as possible. The renewable systems deemed to be the most viable for the development are individual Air-Source Heat Pumps (ASHPs) serving each dwelling on site.

Renewable Energy / Low Carbon Technology 1 – Air-Source Heat Pumps for Space & Water Heating to Residential Units

- 4.23 The first low-carbon/renewable energy proposed for the development is an air-source heat pump (ASHP) serving all dwellings on-site. ASHPs with the following specifications have been assumed:
- The ASHP will have a minimum SCOP of 3 for heating²;
 - DHW storage losses will be limited to of 1.8 kWh/24 hours.
 - HVAC system controls installed will be operating efficiently and to include automatic monitoring and targeting with alarms for out-of-range values as well as local time and temperature control.

Alternative Renewable Energy Options

- 4.24 Owing to the significant quantum of available roof space, reserved matters applications should consider the installation of PV to maximise on-site CO₂ savings and a method to off-site on-site utility costs through the generation of on-site electricity.

² Mitsubishi Ecodan QUHZ Monobloc Air Source Heat Pump or similar assumed

4.25 Fossil fuel consuming (e.g., gas-fired) heating systems should not form part of any future reserved matters application. If a future applicant determines individual Air-Source Heat Pumps (ASHPs) are not an appropriate solution, alternative solutions to consider include:

1. Ground source heat pumps;
2. Direct Electric heating and hot water to each dwelling with PV.³

Step 3 – Predicted Results

4.26 The following tables and graphs represent the indicative Step 3 improvements for the development over the target baseline emissions.

Table 4.5 - Step 3 Results

Unit	Total Area (m ²)	SAP 12 DER	Total Target Regulated Emissions (tn.CO ₂ .yr)
1-Bed Unit	1,850.00	19.12	35.38
2-Bed Unit	4,758.00	14.63	69.62
3-Bed Unit	7,058.33	10.72	75.65
4-Bed Unit	2,439.82	10.87	26.51
		Total	207.16
		Savings against Step 1	52.29
		% Savings	20.15%
		Savings against Step 2	40.53
		% Savings	16.36%

4.27 As detailed above following the application of renewable technologies laid out in Step 3, using SAP 12 emission factors the development could be expected to achieve a further **16.36%** reduction in CO₂ emissions over the Step 2 emissions through the use of renewables. The developments overall expected CO₂ reductions are **20.15%**.

4.28 As detailed in Appendix I, by using SAP 10 emission factors an applicant following this strategy through future reserved matters applications could achieve an overall CO₂ reduction of **63.78%** beyond Part L, with a **50.97%** reduction through the use of renewables, a significant betterment.

³ This solution would require careful design consideration to mitigate potential high fuel costs to occupants, which will form a key criterion in the emerging Part L. Through using SAP 10 emission factors, a strategy utilising direct electric heating and hot water would require an indicative 350 kWp PV array across the development to achieve compliance with emerging Policy E12.

Results Summary (Step 1 to 3)

- 4.29 At this stage of the project design timeline, the solutions proposed are considered to be technically and financially viable and will deliver the policy requirements in advance of those mandated by building regulations, thus in full support of emerging Policy E12.
- 4.30 The measures laid out in this section provide a set of design considerations for reserved matters applications for the development to follow, which would need to be tested through future viability and feasibility testing. This would allow the development to achieve the following reductions in line with emerging Policy E12:
1. **Against Current Part L** - an overall **20.15%** reduction in CO₂ emissions below a Part L baseline using SAP 12 emission factors, with a 16.36% reduction through the use of renewable energy;
 2. **Against Future Part L** – any reserved matters application brought forward using SAP 10 emission factors in their calculations would achieve an overall **65.09%** reduction in CO₂ emissions below a Part L baseline, with a 54.26% reduction through the use of renewable energy (as detailed in Appendix I).
- 4.31 This outline energy assessment sets the parameters of future reserved matters but remains at a strategic level. The calculations in this document are an indication of system size and carbon emissions based on guidance documents, approved software and practical experience. Findings of the analysis are summarised graphically below.

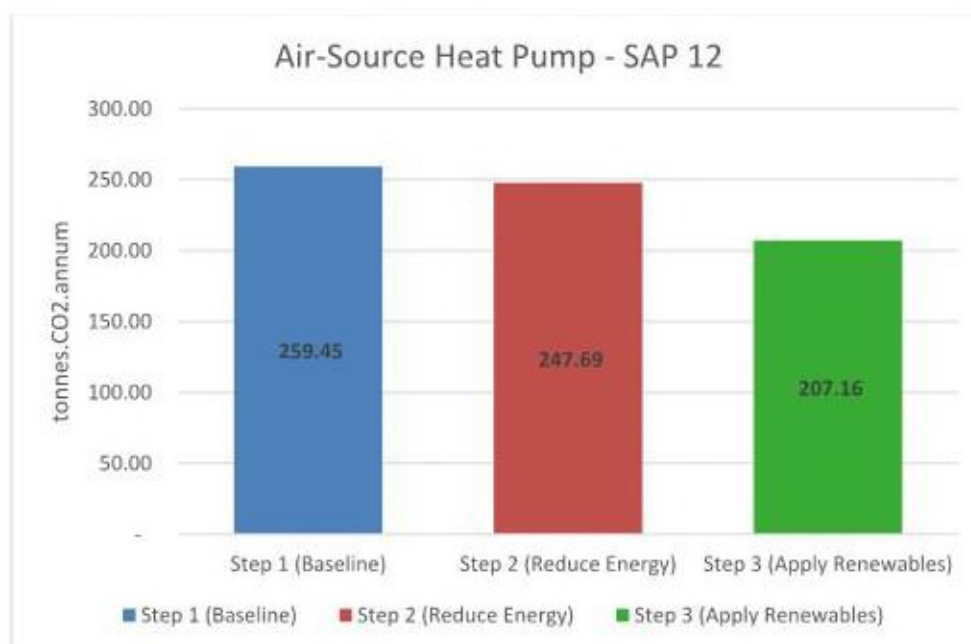


Fig 4.1 - Step 3 Results (SAP 12)

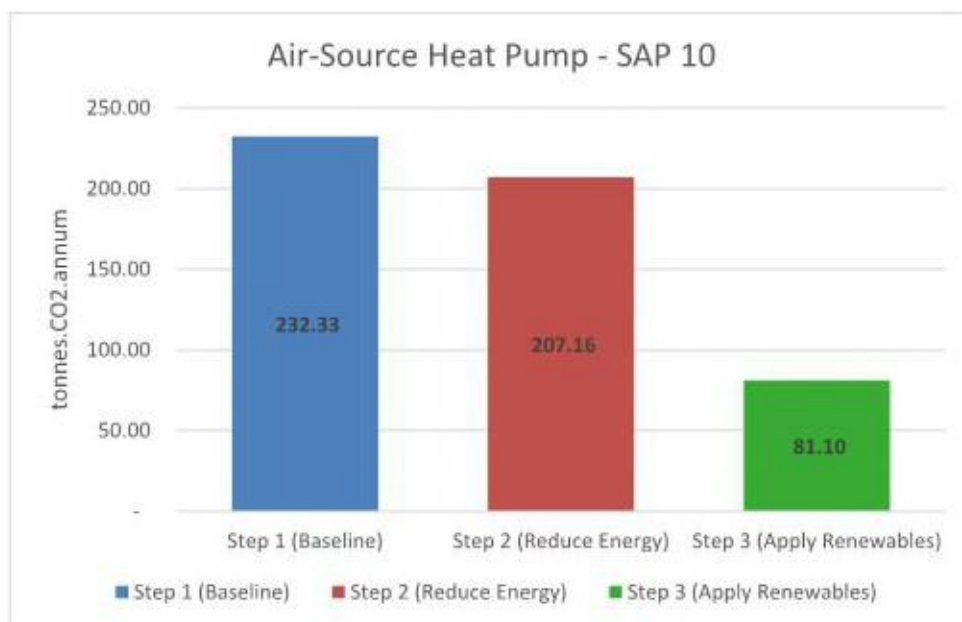


Fig 4.1 - Step 3 Results (SAP 10)

- 4.32 To ensure that the predicted savings in energy and carbon are delivered through the design development it would be possible to assign appropriate condition seeking a *19% reduction in carbon emissions beyond Part L* to ensure that energy assessments are developed at the reserved matter stage to deliver the targets.

5 CONCLUSION

- 5.1 Envision has been appointed by Land and Partners (the applicant) to produce a Sustainability Statement, incorporating an Energy Assessment to support an outline planning application for a new residential scheme (C3 use to include affordable housing) and associated landscaping, access and supporting infrastructure on land north of Long Copse Lane, Emsworth.
- 5.2 The following conclusions can be drawn from the sustainability statement:
- **Climate Mitigation** - The scheme will be capable of exceeding building regulations standards by adopting a hierarchical approach to energy and carbon. A hierarchy is set out in the statement which will be followed at reserved matters stage. An illustrative energy assessment has been completed which indicates how the scheme may exceed building regulations standards incorporate renewable energy to save approximately 20.15% CO₂ emissions by comparison to the current Building Regulations. When compared against forthcoming regs, the equivalent scheme would save 65.09%.
 - **Climate Change Adaptation** - The scheme is located within a low flood risk zone. A sustainable drainage scheme concept has been devised which will enable the development to meet with greenfield runoff rates. In addition, contributions are being offered to support flood alleviation schemes offsite. The scheme will also be incorporate water efficiency measures to reduce consumption to 110 litres / bedspace / day.
 - **Sustainable Transport** - The scheme incorporates a range of transport measures to reduce impacts from private vehicles. This includes provision of electric vehicle charging, space for the secure storage of cycles and greater pedestrian and cycle permeability.
 - **Waste and Resources** – To manage the impacts of waste arisings in construction, a Resource Management Plan will be produced to consider options for sustainable material management. It is anticipated that this will form a part of a wider Construction Environmental Management Plan. In operation the scheme will incorporate sufficient waste storage to enable the collection by the local authority.
 - **Environmental Protection** - The development is not of the scale where a formal Environmental Impact Assessment is required, however the scheme will ensure the appropriate control of any potential environmental effects. Noise and air quality have been considered and mitigation put forward to reduce the potential effects in construction. Furthermore, the scheme will be designed to limit light pollution to preserve the South Downs National Dark Skies Reserve.

APPENDIX I – BREEAM COMMUNITIES REVIEW

Step 1 - Planning Principles		Response
Consultation Plan	<p>Members of the local community and appropriate stakeholders have been identified for consultation.</p> <p>A consultation plan is in place and the local authority has been consulted about the plan</p>	Land & Partners have consistently engaged with the local community and any key interested parties throughout the planning process. Notably, carrying out two public consultation events on 21st March and 23rd May 2018 as well as a Development Consultation Forum (DCF) on 17th April 2018 where a number of topics were raised.
Economic Impact	An economic study is completed and clearly identifies the needs and opportunities within the local area and surrounding economy.	An economic study is not relevant for the scheme, which proposes sole residential uses. Through allocating the site, the council evaluated the need / quantum of development attainable on site. This included an initial consideration for a small village store; however, this was determined by the council to be unviable.
Demographic Needs	The scope of the proposed development, including housing mix, community facilities and employment opportunities, has been informed by a review of the current demographic profiles and future trends of the local area	The masterplan content responds to the development brief established by Local Plan policy H8. There will be a range of housing types and tenures, including starter homes, family homes and housing designed for the elderly. The indicative mix proposed in the masterplan across the allocated site (30% on site affordable). The exact mix will be determined at the detailed approval stage once outline permission is granted.
Energy Strategy	An energy strategy has been written for the proposed development by an energy specialist.	This sustainability statement incorporates an energy assessment and strategy (section 4) prepared by a Low Carbon Consultant and domestic energy specialist. This illustrates a strategy for the development to follow, which aims to omit gas from the scheme development and target efficient, all electric systems with renewable energy.
Existing Buildings and Infrastructure	An assessment of any existing buildings and infrastructure is carried out to determine what	The scheme is located on greenfield land, which does not offer the potential to reuse buildings and infrastructure. A utilities assessment has been

	can be refurbished, re-used, recycled or maintained and those of significant value	undertaken by WSP which considers the need for new infrastructure and how this may be provided to site.
Water Strategy	The developer engages with water suppliers, the local authority and the appropriate regulatory body to develop overall water consumption targets for the development.	Water supply issues have been factored into the early scheme design. Emerging Policy H8 recognises that Off-site water mains reinforcements must be installed to Portsmouth Water's design and approval. Water reduction targets are sought in accordance with policy E12.
Ecology Strategy	A suitably qualified ecologist has been appointed and has undertaken an Ecological Impact Assessment (EclA) to identify valued ecological features (including those off-site that may be affected by the development) potential impacts from the development.	<p>A comprehensive range of surveys has been undertaken by DW Ecology to determine what species use the site at present and what can be done to mitigate any potential impact of development. This has included on site features and important designated off-site features.</p> <p>The ecological strategy aims to ensure that the development will create a net gain for biodiversity overall. This is made possible by the retention of the environmental assets of the site, along with enhancement of their setting in terms of habitat value. The existing grazed equestrian paddocks have limited habitat value, and this is where built development is proposed. The more valuable habitats such as trees and hedgerows are preserved, and corridors are retained to connect these. The corridors are designed primarily around the bat routes as previously described, but a mosaic of additional habitats will be encouraged. Sustainable drainage ponds will benefit biodiversity and areas can be planted with wildflower meadows and additional woodland to create a network of habitats.</p>
Land Use	A preliminary investigation (desk study and site reconnaissance) has been carried out, in line with best practice guidance, by a contaminated land specialist to identify any potential land contamination issues with the site.	A preliminary contaminated land risk assessment has been undertaken for the site by WSP. This has assessed the potential for contamination. Given the history of the site there is currently generally a Low to Moderate risk to receptors based on the historical use of the site and a Very Low to Low risk from offsite sources. The risk to construction workers is considered to be Moderate due to there being a risk of workers coming in to contact with potential asbestos or contaminated soils. The risks to workers should be

		managed through health and safety protocols under Construction (Design and Management) Regulations 2015.
Transport Assessment	Transport assessment or transport statement is developed following scoping discussions with the local authority and local, national and regional authorities (where applicable) responsible for roads and other transport networks.	<p>A Transport Assessment has been undertaken by I Transport for the site, which has included discussions with local highways.</p> <p>In line with good practice, the transport and highways implications of the proposed development have been subject to extensive pre-application discussions with the local highway authority, Hampshire County Council (HCC). A scoping note was issued to HCC on 1 March 2018 which agreed the scope of the transport assessment. In addition, a further detailed pre-application discussion has taken place with Havant Borough Council (HBC), who are the local planning authority. This included a Developer Consultation Forum (DCF) on 7 April 2018 where detailed feedback and comments were received from HBC members and the local residents. These comments have been taken on board in producing the Transport Assessment.</p>
Step 2 - Master Planning Layout Principles		
Design review	<p>Consultation led by an independent facilitator, is used to demonstrate how the development addresses key issues in urban design including:</p> <ul style="list-style-type: none"> the character and identity of the place how security is considered and addressed through design the design of the public realm how the design addresses movement and legibility the layout of the development the diversity and compatibility of uses in the development 	<p>The applicant has consistently engaged with the local community and any key interested parties throughout the planning process. Notably, carrying out two public consultation events on 21st March and 23rd May 2018 as well as a Development Consultation Forum (DCF) on 17th April 2018 where a number of topics were raised, including masterplan design.</p> <p>There has not been a formal independent facilitator leading consultation at this stage, however all feedback relevant feedback has been incorporated into the illustrative masterplan. It is considered that at the next stage of reserved matters, such independent consultation could be facilitated to address these aspects.</p>

	<ul style="list-style-type: none"> • how the place is designed to be flexible and adaptable over time • the design of the landscape • the density, scale and appearance of the development. 	
Housing provision	<p>The housing types and tenures for the development are determined based on the needs in the local area and the developer and local authority agree on specific levels of housing provision for different types and tenures, including space standards.</p>	<p>The scheme is presented in outline with all matters reserved. As part of pre-application engagement officers were comfortable with the scheme providing around 210 of the allocation so the technical work set out in the application submission tests this number. As such, the mix presented with the planning application is not fixed but allows the application to set out the assumptions underpinning the masterplan, which will be subject to market testing by the housebuilder.</p> <p>The breakdown of housing by unit size and tenure identifies a mix of market and affordable tenures that closely matches that identified in the PUSH SHMA. In addition, 37% of the overall mix is provided as 2-bedroom stock, in line with Policy H4 of the emerging Local Plan.</p> <p>It is proposed to provide 63 units as affordable housing (30%) in line with Policy H2 of the emerging Local Plan. 21 units will be provided as shared ownership in line with Policy H2 of the emerging Local Plan. The tenure split at 66.6: 33.3 is broadly in line with the requirements of Policy H2 of the emerging Local Plan. Whilst it may be appropriate to fix the mix and tenure of the affordable housing element, there should remain some flexibility in the market mix in order to respond to the detailed reserved market proposals.</p> <p>In terms of space and functionality of garden spaces, the generous plot sizes provided ensure that external amenity space is of a sufficient size to accommodate a storage shed (including a cycle store where no garage provision is possible), space to facilitate the drying of clothes (rotary or washing line), table and chairs suitable for the size of the dwelling, an area for children to play in and circulation space.</p>

		Garden depths are all greater than 10m to ensure a reasonable degree of amenity and privacy between dwellings.
Delivery of services, facilities and amenities	The list of local needs and requirements from SE 02 – Demographic needs and priorities is used to confirm which services, facilities and amenities should be provided on the site and to what timescales	<p>The allocation policy identifies the site to support up to 260 residential units. Through previous iterations of the policy, the requirement of a local convenience store at the gateway point to the site has now been removed from the allocation policy. This is due to the information submitted to the Council at the public (regulation 18) consultation in early 2018 which determined that such a provision would not be viable.</p> <p>The scheme will however provide open space and child play space. The development proposal comprises a development to open space ratio of 58:42. The masterplan provides 0.99ha of amenity open space and further 3.2ha of other green infrastructure and non-accessible wildlife area.</p>
Public realm	<p>Consultation has taken place with the local authority and potential users of the development to understand the activities, uses and local identities that the public realm can promote. Where appropriate, the consultation also considers how existing residents currently use this space.</p> <ul style="list-style-type: none"> The public realm is designed to allow multiple uses for different users, including children, the elderly and disabled people with consideration given to safety, comfort, disturbance and security. The design of the public realm takes account of connectivity throughout the development and into the surrounding 	<p>The Design and Access Statement sets out the masterplan principles for access. The site is currently in use for agricultural purposes and the proposed development enable access for the first time onto the site, via new footpaths and cycleways.</p> <p>The layout will seek to reflect the structure of the surrounding area with perimeter blocks formed by detached, semi-detached and/or terraced properties and defensible private gardens.</p> <p>The approach has been to integrate the new housing into the landscape through the development of a Green Infrastructure Strategy which takes the existing landscape context as a starting point to design a multi-functional setting that will result in a range of landscape and environmental benefits.</p> <p>The indicative development layout aims to create a hierarchy of different street types of varying characters. This hierarchy, from the spine road &</p>

	<p>area, encouraging new movement and activity.</p> <ul style="list-style-type: none"> • An assessment is undertaken to determine the suitability of using shared street space or home zones within the development. • Where the assessment has identified appropriate streets for shared spaces, design plans indicate where these spaces should be developed within the site. Appropriate levels of signage and surface treatments/landscaping should be used to clearly define these areas • Where shared street spaces are not appropriate, the design plans indicate how space for social interaction has been considered in the design of streets and open areas throughout the development and its surroundings. 	<p>avenues to the secondary streets & mews to the rural edges & green lanes, is intended to provide an extensive, well integrated network that creates a permeable, easily navigable development.</p>
Microclimate	<p>A microclimatic simulation or study shows the effect of urban morphology on the external microclimate of the development and surrounding area. The development should be designed to minimise adverse conditions, including negative microclimatic factors</p>	<p>No consideration has been given to microclimatic effects, which due to the low density of the scheme and extensive green and blue infrastructure, is not thought to be of concern of the development site.</p>
Utilities	<p>The development should aim to minimise the number of access points for services, taking into account:</p> <ul style="list-style-type: none"> • the scale and density of the development 	<p>A Utilities assessment has been completed by WSP which considers the need for new services to the site. As the site is greenfield, there is a need for new site infrastructure, which includes roads and access points.</p> <p>As the site is being taken in outline, all matters will be defined through the</p>

	<ul style="list-style-type: none"> • links to the existing infrastructure • ease of access for maintenance • Access to the service(s) should be provided away from any circulation routes on site. 	<p>reserved stages. Notwithstanding this a comprehensive approach has been developed in conjunction with HCC and HBC and agreed to the satisfaction of HCC under its Section 278 Preliminary Design Checking process which takes account of several factors such as the extent of adopted highway, ecology, arboriculture and engineering. The agreed site access strategy can be delivered comprehensively or in two parts depending on whether the eastern and western parts of the site allocation come forward together or in a phased manner. A position statement between the applicant and Highways Authority has been signed and forms part of the submission suite of documents. In this case, where the application relates to the eastern phase (the majority but not all of the allocation) the agreed access strategy works will be delivered in phases, albeit that the only remaining works to be completed by the minority western phase will be a footpath inside the frontage to the western phase, undenied verge on the western end of Long Copse Lane and Hollybank Lane around the bend.</p>
Adapting to climate change	<ul style="list-style-type: none"> • design to enable airflow throughout the development • maximise open water and fountains • external finishes that are designed to avoid heat absorption • site layout/orientation to maximise microclimatic cooling • interconnection of green spaces/corridors. • flood resilient buildings and materials • managing flood pathways • water storage within green space • surface erosion controls • reinforcement or re-grading of slopes 	<p>The climate adaptation principles are addressed in section 3 of this Sustainability Statement.</p>

<p>Local parking</p>	<ul style="list-style-type: none"> • An appropriate level of parking for the development that promotes sustainable transport choices has been agreed with the local authority. • Parking is integrated into the development without allowing it to dominate the space or interfere with cyclist, pedestrian and vehicle movement. • Residential parking is overlooked by houses and is located an appropriate distance from the vehicle owner's dwelling, as established during consultation. 	<p>Car and Cycle parking standards for new residential development are provided within HBC's Parking Standards SPD (adopted July 2016). In addition, an additional 20% of unallocated parking for visitors should be accommodated. A future Reserved Matters application would deal with the provision of car parking, which will be provided in accordance with HBC's Residential Parking Standards or any other relevant guidance at the time the application is submitted.</p> <p>Sufficient space is shown on the illustrative masterplan for car parking, with a mix of parking solutions expected to be provided throughout the site, with the emphasis on avoiding parking within the front curtilage so as to keep the integrity of the front gardens in providing a high-quality setting for the houses.</p> <p>The parking spaces will be sensitively distributed throughout the site to avoid large areas of uninterrupted on-street or courtyard parking, or long rows of integral garages which would create uninviting/intimidating dead frontages to the street. Communal parking courts at the rear of properties will not be permitted.</p> <p>Visitor parking will generally be provided in defined on-street bays which will allow ample space for high quality public realm.</p>
<p>Flood management risk</p>	<p>Spatial allowance for:</p> <ul style="list-style-type: none"> • wet ponds • infiltration basins • detention basins • swales 	<p>As part of the flood risk assessment a surface water strategy has been produced for the site. The proposal is for attenuation of surface water on the site in a range of SuDS ponds and discharge of one catchment to the watercourse bounding the northern edge of the site, and another catchment to a new surface water culvert and outfall basin to the south of the site. The SuDS ponds will be of a capacity which ensures peak run offs are no greater than those currently discharged.</p>

Water pollution	<ul style="list-style-type: none"> run-off from all hard surfaces shall receive an appropriate level of treatment in accordance with best practice SuDS guidance to minimise the risk of pollution. 	Water Pollution is addressed within the flood risk assessment. Any pollution hazard associated with runoff from on site catchments will be treated by attenuation basins, permeable paving and swales.in line with the CIRIA C753 SuDS Manual.
Enhancement of ecological value	<ul style="list-style-type: none"> Retain linear ecological features where possible. Achieve net gain in ecological value through the creation of appropriate new habitats or through the increase in scale of existing habitats on the site in accordance 	<p>The majority of trees and hedgerows within the site and along its boundaries will be retained.</p> <p>Whilst there are features of habitat value on the site such as the tree cover, much of the site is heavily grazed offering limited biodiversity interest. The comprehensive suite of ecological surveys and reports details the habitat enhancement and mitigation measures designed into the masterplan. A net gain is found to be likely through the measures recommended.</p>
Landscape	<ul style="list-style-type: none"> Create ecological connectivity through landscaping. At least 60% of tree, scrub and herbaceous planting consists of appropriate native species (or other ecologically appropriate species were recommended by the suitably qualified ecologist 	<p>The masterplan incorporates a significant level of planting within corridors that serve both a landscape/design purpose and an ecological one. A bat corridor separates the development area from the grounds of Hollybank House and this will protect and enhance the wooded environs surrounding the house. The density and scale of development is reduced to the north west of the site. The masterplan has included strong landscaped buffers of new planting with native species to the surrounding countryside and to Long Copse Lane.</p> <p>The masterplan provides 0.99ha of amenity open space and further 3.2ha of other green infrastructure and non-accessible wildlife area.</p>
Safe and appealing streets	Context appraisal is carried out to determine the appropriate layout of streetscape in relation to the existing or planned buildings and/or open space	The indicative development layout aims to create a hierarchy of different street types of varying characters. This hierarchy is based on the anticipated frequency of access by different vehicle types, with the higher order streets accommodating larger vehicles and the lower order streets, smaller vehicles. All streets aim to provide a pleasant walking and cycling environment.

	<ul style="list-style-type: none"> • in residential areas, all streets and open spaces should be overlooked • all access points and routes through the site should be well lit, direct and overlooked • pedestrian crossings are designed to ensure safety for all users • a clear distinction is made between public, semi-public and private external spaces. • Design measures are incorporated into the masterplan to ensure safety with regard to large vehicles, pedestrian and cyclist movement. 	<p>This hierarchy, from the spine road & avenues to the secondary streets & mews to the rural edges & green lanes, is intended to provide an extensive, well integrated network that creates a permeable, easily navigable development. In addition to the network of three street types, the interconnected network of green space will incorporate cycle and pedestrian paths to help integrate the development into the existing neighbourhood.</p> <p>At the detailed design stage, careful consideration must be given to pedestrian and vehicular movement in and around the site in order to create streets that are safe and pleasant spaces to inhabit.</p>
Cycling network	<ul style="list-style-type: none"> • Cycle routes within the development connect to or are a continuation of existing routes from the surrounding area. • Cycle routes are segregated from vehicles and pedestrians as appropriate. • Cycle routes are direct and safe (well lit, safe road crossings etc.). 	<p>All streets will aim to provide a pleasant walking and cycling environment, which will connect to surrounding roads. Local roads including Long Copse Lane, Hollybank Lane, Southleigh Road and New Brighton Road are suitable for use by cyclists within the carriageway. The National Cycle Network Route 2 provides an east/west connection approximately 1.5km south of the site between Havant, Warblington and Portsmouth to the west and Chichester to the east.</p> <p>An extensive network of paths will run through the site and green infrastructure network. The proposal will provide safe and illuminated footway and cycleway connections, particularly footway lining up with Redland's route and other routes south.</p> <p>Improved pedestrian and cycle crossing facilities will be provided on Long Copse Lane, Wraysbury Park Drive and Redlands Lane as a result of the proposals.</p>

		Havant 67 footpath will be upgraded to a cycle route as part of the proposals to enhance the attractive route towards Emsworth.
Access to public transport	The distance from each building entrance to a compliant transport node must be via a safe and convenient pedestrian route and less than < 900 m	There is a regular bus service operating from a stop within approximately 750m to the South of the site which provide regular services to Rowlands Castle and Emsworth including onward connections to the rail network for trips further afield. Additional customers using this service will increase the viability and sustainability of these services.

APPENDIX II – SAP 10 & 12 CALCULATIONS

SAP 10 CALCULATIONS										SAP 12 CALCULATIONS										SAP 15 CALCULATIONS												
Table 1. CARBON [CO2] FACTORS										Table 2. CARBON [CO2] FACTORS										Table 3. CARBON [CO2] FACTORS												
Fuel type		Fuel Carbon Factor		SAP 10		SAP 12		SAP 15		Fuel type		Fuel Carbon Factor		SAP 10		SAP 12		SAP 15		Fuel type		Fuel Carbon Factor		SAP 10		SAP 12		SAP 15				
Natural Gas		0.716		0.710		0.716		0.710		Natural Gas		0.716		0.710		0.716		0.710		Natural Gas		0.716		0.710		0.716		0.710				
Grid Electricity		0.519		0.233		0.519		0.233		Grid Electricity		0.519		0.233		0.519		0.233		Grid Electricity		0.519		0.233		0.519		0.233				
STEP 1 - BASELINE (ITER) CALCULATIONS																																
Unit	Area (m²)	SAP 10 ITER	SAP 12 ITER	Space Heating	Fuel Type	Domestic Hot Water	Fuel Type	Lighting	Auxiliary	Cooling	Renewable Energy	Space Heating	Domestic Hot Water	Lighting	Auxiliary	Cooling	Renewable Energy	Total	Space Heating	Domestic Hot Water	Lighting	Auxiliary	Cooling	Renewable Energy	Total	Space Heating	Domestic Hot Water	Lighting	Auxiliary	Cooling	Renewable Energy	Total
1-Bed Unit	50	26.26	18.47	1429.99	Natural Gas	2103.64	Natural Gas	250.78	75	n/a	0	308.033	446.1782	130.1548	38.925	n/a	0	923.2719	299.4573	433.7844	58.43174	17.475	n/a	0	829.149	299.4573	433.7844	58.43174	17.475	n/a	0	829.149
2-Bed Unit	71.73	33.88	13.54	1805.46	Natural Gas	2402.62	Natural Gas	351.49	75	n/a	0	402.3954	518.9231	38.925	n/a	0	1149.554	391.7466	504.9502	81.89712	17.475	n/a	1	995.699	391.7466	504.9502	81.89712	17.475	n/a	1	995.699	
3-Bed Unit	127.01	34.21	13.50	4548.63	Natural Gas	2734.75	Natural Gas	550.63	75	n/a	n/a	1846.594	590.706	285.777	38.925	n/a	0	2761.912	1795.212	574.2975	128.2908	17.475	n/a	2	2515.282	1795.212	574.2975	128.2908	17.475	n/a	2	2515.282
4-Bed Unit	209.8	34.78	16.12	10653.74	Natural Gas	2793.52	Natural Gas	585.38	75	n/a	n/a	2302.268	592.1683	301.8122	38.925	n/a	0	3236.113	2237.285	575.7192	136.3930	17.475	n/a	3	2966.873	2237.285	575.7192	136.3930	17.475	n/a	3	2966.873
STEP 2 - RE-LEAN DER CALCULATIONS																																
Unit	Area (m²)	SAP 10 DER	SAP 12 DER	Space Heating	Fuel Type	Domestic Hot Water	Fuel Type	Lighting	Auxiliary	Cooling	Renewable Energy	Space Heating	Domestic Hot Water	Lighting	Auxiliary	Cooling	Renewable Energy	Total	Space Heating	Domestic Hot Water	Lighting	Auxiliary	Cooling	Renewable Energy	Total	Space Heating	Domestic Hot Water	Lighting	Auxiliary	Cooling	Renewable Energy	Total
1-Bed Unit	50	13.73	16.83	730.17	Natural Gas	1999.99	Natural Gas	247.49	237.73	n/a	0	157.7167	431.9978	128.4473	173.3819	n/a	0	841.5437	153.1357	419.9979	57.66517	55.39109	n/a	0	686.3889	153.1357	419.9979	57.66517	55.39109	n/a	0	686.3889
2-Bed Unit	71.73	11.42	14.26	827.83	Natural Gas	2358.48	Natural Gas	346.8	297.71	n/a	0	178.8113	509.4317	179.9892	154.5115	n/a	0	1022.744	173.8443	495.2908	80.8044	65.36643	n/a	1	819.2959	173.8443	495.2908	80.8044	65.36643	n/a	1	819.2959
3-Bed Unit	127.01	13.34	15.60	7280.51	Natural Gas	2645.31	Natural Gas	548.9	639.67	n/a	n/a	1572.594	571.3915	284.8791	331.9887	n/a	0	2760.854	1528.911	555.5129	127.8037	149.0431	n/a	2	2363.367	1528.911	555.5129	127.8037	149.0431	n/a	2	2363.367
4-Bed Unit	209.8	12.62	15.83	8937.35	Natural Gas	2654.26	Natural Gas	585.38	715.04	n/a	n/a	1930.468	573.3202	303.8122	371.1058	n/a	0	3178.706	1876.944	557.3946	166.6043	n/a	3	2737.236	1876.944	557.3946	166.6043	n/a	3	2737.236		
STEP 3 - BE-GREEN DER CALCULATIONS [ASHP]																																
Unit	Area (m²)	SAP 10 DER	SAP 12 DER	Space Heating	Fuel Type	Domestic Hot Water	Fuel Type	Lighting	Auxiliary	Cooling	Renewable Energy	Space Heating	Domestic Hot Water	Lighting	Auxiliary	Cooling	Renewable Energy	Total	Space Heating	Domestic Hot Water	Lighting	Auxiliary	Cooling	Renewable Energy	Total	Space Heating	Domestic Hot Water	Lighting	Auxiliary	Cooling	Renewable Energy	Total
1-Bed Unit	50	8.59	12.12	835.83	Electricity	596.36	Electricity	247.49	162.73	n/a	0	433.7958	308.5108	128.4473	84.45687	n/a	0	956.2108	194.7484	138.9519	57.66517	37.91609	n/a	0	429.2815	194.7484	138.9519	57.66517	37.91609	n/a	0	429.2815
2-Bed Unit	71.73	6.57	14.65	750.34	Electricity	702.3	Electricity	346.8	222.71	n/a	0	389.4262	364.4937	179.9892	135.5805	n/a	0	1049.496	174.8922	165.6319	80.8044	51.89143	n/a	1	471.161	174.8922	165.6319	80.8044	51.89143	n/a	1	471.161
3-Bed Unit	127.01	6.81	10.72	1726.75	Electricity	815.34	Electricity	548.9	564.67	n/a	0	896.1833	423.1615	284.8791	293.6627	n/a	0	1897.288	402.3328	189.9742	127.8037	31.5681	n/a	0	851.7688	402.3328	189.9742	127.8037	31.5681	n/a	0	851.7688
4-Bed Unit	209.8	4.88	10.87	2159.01	Electricity	819.46	Electricity	585.38	640.04	n/a	0	1120.526	425.2997	303.8122	332.1808	n/a	0	2181.819	501.0493	190.9342	136.3935	149.1293	n/a	0	979.5064	501.0493	190.9342	136.3935	149.1293	n/a	0	979.5064
STEP 3 - BE-GREEN DER CALCULATIONS [DE + PV]																																
Unit	Area (m²)	SAP 10 DER	SAP 12 DER	Space Heating	Fuel Type	Domestic Hot Water	Fuel Type	Lighting	Auxiliary	Cooling	Renewable Energy	Space Heating	Domestic Hot Water	Lighting	Auxiliary	Cooling	Renewable Energy	Total	Space Heating	Domestic Hot Water	Lighting	Auxiliary	Cooling	Renewable Energy	Total	Space Heating	Domestic Hot Water	Lighting	Auxiliary	Cooling	Renewable Energy	Total
1-Bed Unit	50	9.20	20.49	738.46	Electricity	1693.27	Electricity	247.49	162.73	n/a	-604.53	381.2607	742.351	128.4473	84.45687	n/a	-313.751	1024.724	172.0612	333.2529	57.66517	37.91609	n/a	-140.855	460.0399	172.0612	333.2529	57.66517	37.91609	n/a	-140.855	460.0399
2-Bed Unit	71.73	8.24	18.16	836.53	Electricity	1786.68	Electricity	346.8	222.71	n/a	-604.53	434.1591	901.3369	179.9892	135.5805	n/a	-313.751	1317.321	194.9115	406.6484	80.8044	51.89143	n/a	-140.855	591.3983	194.9115	406.6484	80.8044	51.89143	n/a	-140.855	591.3983
3-Bed Unit	127.01	12.10	26.94	8548.63	Electricity	2734.75	Electricity	550.63	75	n/a	-2720.4	4436.799	3419.315	285.777	38.925	n/a	-2411.89	4768.889	1993.831	617.1968	128.2968	17.475	n/a	-633.853	2140.946	1993.831	617.1968	128.2968	17.475	n/a	-633.853	2140.946
4-Bed Unit	209.8	12.80	28.52	10653.74	Electricity	2793.52	Electricity	585.38	75	n/a	-3072.67	5529.293	3429.849	381.8122	38.925	n/a	-3568.77	5726.111	2482.321	638.7242	136.3935	17.475	n/a	-704.282	2520.626	2482.321	638.7242	136.3935	17.475	n/a	-704.282	2520.626