MAX FORDHAM

Carpenters Estate

Draft Neighbourhood Plan Sustainability Matrix overlay report 2

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1.0 INTRODUCTION

This report looks at how the Carpenter's Estate Draft Neighbourhood Plan maps against the Max Fordham in house sustainability tool, the Sustainability Matrix. The report benchmarks the Estate's Neighbourhood Plan against the local planning sustainability requirements and Best Practice in London.

The Carpenter's Estate sits on the boundary of the Queen Elizabeth Olympic Park in the London Borough of Newham. The community led neighbourhood plan makes proposals for a masterplan which includes refurbishment of a number of buildings plus new build infill.

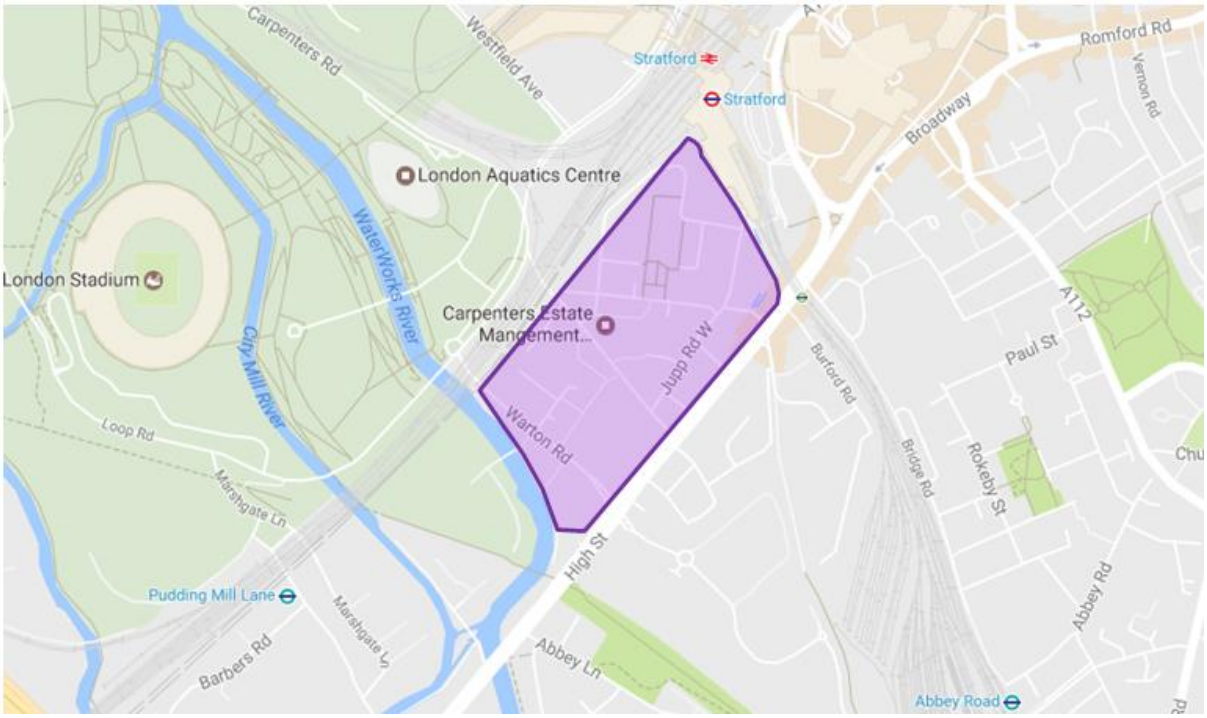

Figure 1 Site Location

This report identifies areas of sustainability that have not been addressed.

Recommendations are also made for improving how sustainability considerations are addressed in the neighbourhood plan and also further work that might be required to provide greater certainty on refurbishment standards to allow costing to be carried out in the future.

2.0 PLANNING POLICY CONTEXT

The Relevant planning documents to the site are the following:

Regional policy: The London Plan, Spatial Development Strategy for Greater London 2011

Local policy: London Legacy Development Corporation
The Carpenter's Estate sits within the London Legacy Development Corporation (LLDC) planning authority boundary. London Legacy Development Corporation local plan was adopted in July 2015 and is currently under review.

LLDC Supplementary Planning Guidance
Carbon Offset SPD, August 2016

Details of the policy requirements are given in the Appendix.

3.0 THE SUSTAINABILITY MATRIX

3.1 What is the Max Fordham sustainability matrix?

The Max Fordham residential sustainability matrix is a framework to explain the options against different sustainability themes on any given project. Criteria stretch from the familiar to wider themes such as procurement, indoor health, equity, education and community. The criteria and their range are explained on the Cover sheets (first two pages).

We have used our residential matrix for the Carpenters Estate analysis. The standards used in the matrix relate predominantly to new build criteria. The matrix uses an increasing level of aspiration for each criterion (considered in isolation) defined as follows:

Minimum Standard
As required by any legislation; Lowest acceptable design standard

Best Practice
What a project should seek to achieve to as a minimum; what the industry would consider 'good design'

Innovative
New approaches or techniques; rarely implemented solutions

Pioneering
Most sustainable achievable within that criteria for that building type; Top 1% buildings.

The Sustainability Matrix's strength lies in its ability to capture the breadth of sustainability issues considered, whilst giving a succinct picture of the particular goals and focus of a project.

The matrix is broken down into two sheets; the first half covering operational emissions and sector specific design targets, the second half covering design elements that are common across all sectors. The content within each box is a mixture of targets design strategies and design approaches. It should be noted that the content has not been specifically tailored to the Carpenter's Estate and therefore is intended only as a guiding reference.

3.2 Planning Policy and Draft Neighbourhood Plan matrix overlay

Policy overlay
The sustainability requirements of the Regional and Local plans as set out in section 2.0 have been mapped across the matrix as shown in Figure 2.

Requirements referenced in the Neighbourhood plan are highlighted in blue

Planning requirements are highlighted in Orange (Mayoral) and Yellow (LLDC)

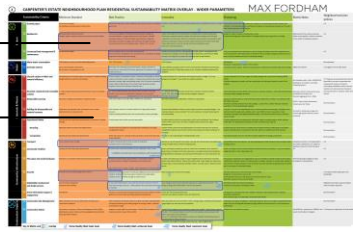

Figure 2 Key to colours used in the sustainability matrix

In many cases the planning policy requirements do not the match the wording in the matrix word for word. In this case we have used our judgement to decide where the highlight should stop; this indicates where we feel the policy meets the aims of the target level and best aligns in our opinion.

Home Quality Mark (HQM) overlay
HQM is a new voluntary standard introduced by the BRE for residential developments as a way to ensure a level of sustainability that is monitored by a third party. Certificates can be achieved from level 1 to 5. It is significantly more comprehensive than the Code for Sustainable Homes. The matrix makes reference to the HQM requirements. This is represented as:

Requirements that corresponds to 1 credit in the relevant HQM issue

Requirements that corresponds to 2 credits in the relevant HQM issue

Sustainability Matrix neighbourhood plan overlay
The Carpenter's Estate Draft Neighbourhood Plan (Draft 4, February 2017) has been reviewed against the Sustainability Matrix. As shown in Figure 2 specific references made in the Neighbourhood Plan have been highlighted in blue. The final column gives the policy reference and more clarification where necessary.

The matrix is given in Section 5.0.

4.0 GAP ANALYSIS AND CONCLUSIONS BASED ON THE MATRIX OVERLAY

The Neighbourhood plan is very comprehensive in addressing the wider sustainability impacts relating to community, landscape and biodiversity and water. In no places are the requirements less than those of the Regional and Local planning requirements. Where the neighbourhood plan directly addresses the requirements of the Local planning authority, the requirements are either met or exceeded. In some cases the neighbourhood plan does not make reference to the local planning criteria.

4.1 Conflicting criteria

New build energy standards
The new build energy requirements of the Neighbourhood Plan are to achieve an Energy Performance Certificate (EPC) B or C. There is not a clear correlation between the EPC methodology and the London plan methodology.

The EPC rating is based on cost (i.e. fuel consumption totals multiplied by typical fuel prices). For new builds The London Plan requires demonstration of a reduction of CO2 over a notional building (as with Part L requirements), calculated as an aggregate across the site.

In our experience projects built to today's planning requirements seem to achieve a B or a C. However the rating is subject to considerations such as: the type of fuel, and whether renewables are wired directly to the dwelling (not usual for apartment blocks) or centrally to the Landlords supply. In the latter case the CO_2 benefits of a renewable are not factored into the calculation. We would argue that the more important aspect of energy efficiency performance to a tenant was the efficiency of the fabric and the electrical systems. Therefore EPCs are a problematic methodology for setting standards in this context.

See section 5.1 for recommendations in this area.

Refurbished energy standard
There are very few energy efficiency refurbishment requirements in planning policy. However the Climate change Action 2008 provides powers to ensure from April 2018, it will be unlawful to rent out a residential or business property that does not reach a minimum energy efficiency standard (this is likely to be an EPC rating 'E').

In the Neighbourhood plan it is not clear if refurbishment requirements are the same as those of new builds (which states EPC B or C).

There is less clarity on specification of refurbishment performance standards in planning. EPCs are the national method and used in home energy performance assessments and are widely referred to as the main measure of an existing building's energy performance. They are subject to the difficulties discussed above. A recognised robust standard is the EnerPHit – the Passivhaus retrofit standard which looks at the whole house energy efficiency at the pioneering end of refurbishment.

It is recommended that a combined standard could be set: a minimum EPC standard with an elemental approach on U-values to ensure a fabric first approach. An elemental approach would be simple to understand and to specify. This is in line with Part L1b of the building regulations. For example set upgrade values for glazing standards, wall insulation (U-value of 0.3 W/m^2K is a good refurbishment value) air tightness improvement (5 $m^3/h.m^2$ at 50Pa may be a good target).

Any recommendations along these lines should be coupled with performance testing to ensure upgrades are done sufficiently. Additionally designers should consider future climate and overheating, possibly requiring external shading. Insulation strategies must consider effects on other aspects of the design such as moisture control and fire safety.

An alternative approach would be to specify refurbishment to EnerPHit levels (the Passivhaus standard for refurbishment).

Lifetime homes and Part M
The neighbourhood plan references Lifetime homes, and the LLDC's Policy BN.5 references the new Part M requirements.

4.2 Neighbourhood plan: areas not fully covered

There are noticeable absences in the requirements which are listed in the table below. Consider whether these are covered sufficiently by the planning documents or whether the Neighbourhood plan should set specific requirements:

Sustainability area	**Matrix criteria**
Energy standards - clarity between new build and refurbished standard requirements.	1
Ongoing engagement by the design team and or contractor after project completion. Through post occupancy evaluation, home information support	10, 33
Acoustic standards	14
Climate change adaptation and designing to future climate standards	9
Daylighting requirements	11
Recycling, composting requirements	27
Play requirements could be more comprehensive. We would expect the Community to be in a very good position to advise on what specifically would be good in this area rather than relying on generic standards	30

Areas of sustainability not covered by the matrix
The matrix has been written from the point of view of new build neighbourhood project. There are some areas of sustainability relating to wider community, economic and equity impacts that are not referenced in the

matrix but are covered in the Neighbourhood plan. These are important elements of the sustainability story of the Neighbourhood plan and so are referenced separately below.

'All new homes will achieve high standards of sustainable development, including low and zero carbon energy, best practice in sustainable urban drainage (SuDS), the re-use and recycling of resources, and the production and consumption of renewable energy. The provision of low and zero carbon energy infrastructure in new developments will be linked to existing buildings.

'Encourage community owned energy projects'

5.0 RECOMMENDATIONS

5.1 Recommendations for improving the Neighbourhood Plan

- Consider stating a preference for use of the Home Quality Mark for new builds. Ratings range from 1 star to 5 stars. A 2 star rating would provide a good base level whilst minimising the cost impact. It should be noted that Local Authorities are no longer allowed to set requirements along these lines as part of their planning documents.
- Consider changing Lifetime Homes requirements to Category 2 Part M requirements to align with LLDC Policy BN.5: Requiring inclusive design
- It is recommended that the Neighbourhood plan changes new build energy performance standard to one of the following options:
  - CO_2 targets that align with London Plan requirements and additional fabric standards (such as targeting Best Practice Fabric Standards as set out in the Matrix)
  - Introducing an energy efficiency target for the whole dwelling based on the Standard Assessment Procedure methodology (SAP)[1] – this would incorporate fabric and systems efficiencies but would not consider low carbon delivery
  - Consider changing the wording of the EPC target for new builds. 'EPC B or C' will be interpreted as a requirement for an EPC C. In order to raise aspiration it may be better to state 'an EPC B is expected, and an EPC C is required as a minimum.'
- For refurbished energy standards consider a combined standard: a minimum EPC standard with an elemental approach on U-values to ensure a fabric first approach

Additional work required to enable a refurbishment scheme to be costed.
Many elements set out in the neighbourhood plan as it stands should be able to have a cost applied to them. However there are some additional points suggested below that should be noted for putting together a cost plan.

Refurbishment of existing buildings
The largest cost uncertainty is likely to resort around the extent to which the existing buildings can and should be refurbished. This will require technical appraisals of the existing buildings including a structural surveyor carrying out a condition survey. As the approach may need to be bespoke to the building, age and condition, an architectural and engineering team will likely be required to conduct a feasibility study around the refurbishment options to provide sufficient detail for costing.

Energy strategy
The site sits very near to The Olympic Park District Energy Scheme (OPDES) as shown below. The LLDC will be looking for a connection to be made on the Carpenter's Estate as part of any large development proposal. While it is nearby to the existing network the railway is a significant barrier which will increase the cost of connection. It should also be noted that while the OPDES is likely to facilitate low carbon heat in the future compared to a traditional gas boiler system the infrastructure is costly compared to many systems. The heat price is likely to be more costly than burning gas.

[1] https://www.gov.uk/guidance/standard-assessment-procedure

Development of an energy strategy should ensure running costs are taken into account. If the recommendation is made to not make a connection to the OPDES a good case will need to be made to the LLDC.

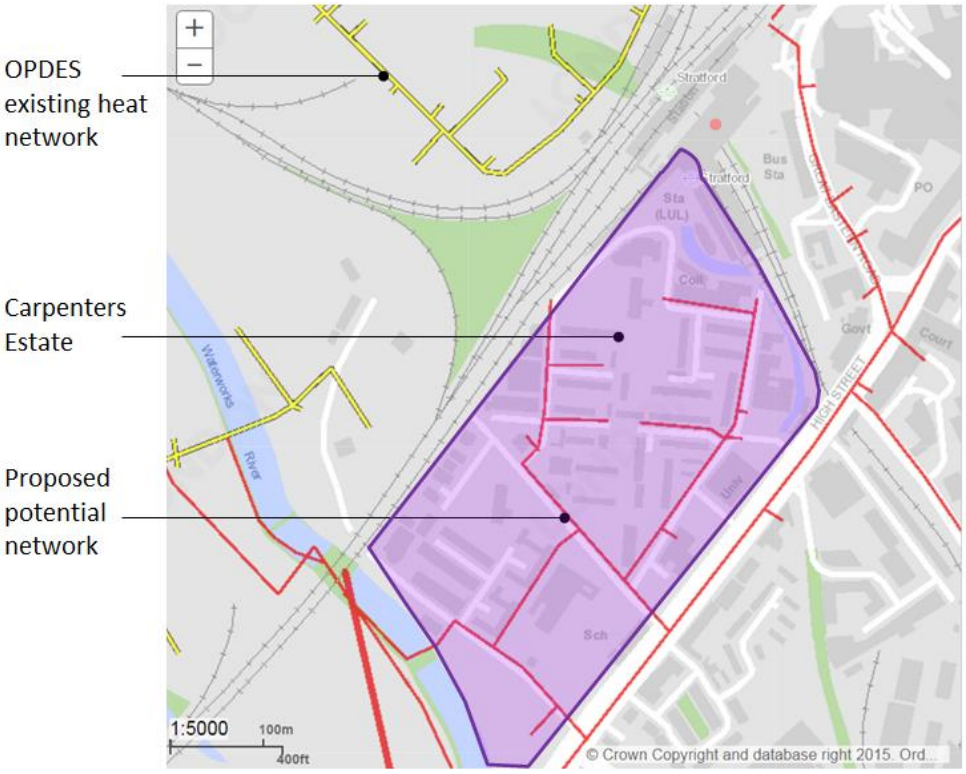

Figure 3 District heating networks nearby to the site.

APPENDIX I – POLICY CONTEXT IN DETAIL

5.2 The London Plan, Spatial Development Strategy for Greater London 2011

The London Plan: Spatial Development Strategy for Greater London published in March 2015 (consolidated with alterations since 2011) forms the statutory Development Plan and policy principles, those relevant to this report include:

London Plan Policy 5.2 Minimising Carbon Dioxide Emissions
Development proposals should follow the energy hierarchy

1. *Be Lean: use less energy;*
2. *Be Clean: supply energy efficiently;*
3. *Be Green: use renewable energy.*

The GLA Guidance on Preparing Energy Assessments (March 2016) states the Mayor will apply a 35% carbon reduction target beyond Part L 2013 of the Building Regulations, which is deemed broadly equivalent to the 40% *target set for the period of 2013-2016 in Policy 5.2 of the London Plan.*

London Plan Policy 5.3 Sustainable Construction

A. *The highest standards of sustainable design and construction should be achieved in London to improve the environmental performance of new developments and to adapt to the effects of climate change*
B. *Proposals should demonstrate that sustainable design standards are integral to the proposal*
C. *Major development proposals should meet the minimum standards outlined in the Mayor's supplementary planning guidance. The standards include measures to achieve other policies in this Plan and the following sustainable design principles:*

- *minimising carbon dioxide emissions across the site, including the building and services*
- *avoiding internal overheating and contributing to the urban heat island effect*
- *efficient use of natural resources (including water), including making the most of natural systems both within and around buildings*
- *minimising pollution (including noise, air and urban runoff)*
- *minimising the generation of waste and maximising reuse or recycling*
- *avoiding impacts from natural hazards (including flooding)*
- *ensuring developments are comfortable and secure for users, including avoiding the creation of adverse local climatic conditions*
- *securing sustainable procurement of materials, using local supplies where feasible, and*
- promoting and protecting biodiversity and green infrastructure

London Plan Policy 5.6 Decentralised Energy in Development Proposals
Development proposals should evaluate the feasibility of Combined Heat and Power (CHP) systems, and where a new CHP system is appropriate also examine opportunities to extend the system beyond the site boundary to adjacent sites.

Major development proposals should select energy systems in accordance with the following hierarchy:

1. *Connecting to existing heating or cooling networks;*
2. *Site wide CHP network;*
3. *Communal heating and cooling.*

London Plan Policy 5.7 Renewable Energy
Within the framework of the energy hierarchy major development proposals should provide a reduction in expected carbon dioxide emissions through the use of on-site renewable energy generation, where feasible.

London Plan Policy 5.9 Overheating and cooling
Major development proposals follow the cooling hierarchy:

1. *Minimise internal heat generation through energy efficient design;*
2. *Reduce the amount of heat entering a building in summer through orientation, shading, albedo, fenestration, insulation and green roofs and walls;*
3. *Manage the heat within buildings through exposed internal thermal mass and high ceilings;*
4. *Passive ventilation;*
5. *Mechanical ventilation;*
6. *Active cooling systems (ensuring they are the lowest carbon options).*

London Plan Policy 5.13 Sustainable Drainage
Development should utilise sustainable urban drainage systems (SUDS) unless there are practical reasons for not doing so, and should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible in line with the drainage hierarchy:

London Plan Policy 5.15 Water Use and Supplies
Development should minimise the use of mains water by:

1. *Incorporating water saving measures and equipment;*
2. *Designing residential development so that mains water consumption will meet a target of 105 litres or less per head per day.*

Sustainable Design and Construction Supplementary Planning Guidance (SPG), 2014:
Water

- *residential schemes should be designed to meet 105l or less per person per day.*

Materials
Design for development should prioritise materials that:

- *have low embodied energy, including those that can be re-used intact or recycled.*
- *at least three of the key elements of the building envelope (external walls, windows, roof, upper floor slabs, internal walls, floor finishes/coverings) are to achieve a rating of A+ to D in the BRE's the Green Guide of Specification.*
- *timber and timber products should be sourced from accredited Forest Stewardship Council,*
- *will not release toxins to internal and external environments.*
- *design of developments should maximise the potential to use pre-fabricated elements.*

5.3 London Legacy Development Corporation

The carpenter's estate sits within the London Legacy Development Corporation (LLDC) planning authority boundary. London Legacy Development Corporation local plan was adopted in July 2015 and is currently under review. It contains the following key policies:

Strategic Policy SP.1: Building a strong and diverse economy
Strategic Policy SP.2: Integrating the natural, built and historic environment
The Legacy Corporation will create a high-quality built and natural environment that integrates new development with waterways, green space and the historic environment, by ensuring development. Including *Maintains and promotes local distinctiveness … is at least air quality neutral and minimises impact from noise*
Policy BN.3: Maximising biodiversity
Policy BN.4: Designing residential schemes
Demonstrate that the scheme will receive adequate levels of daylight and sunlight, … in accordance with Site Layout Planning for Daylight and Sunlight (Building Research Establishment, 2011)

Policy BN.5: Requiring inclusive design
Residential proposals will be considered acceptable where they respond to the needs of all users, and provide an accessible and inclusive environment by providing 90% of dwellings in accordance with Optional Requirement M4 (2) Category 2 of Part M of the Building Regulations, and 10% of dwellings in accordance with Optional Requirement M4 (3) Category 3 of Part M of the Building Regulations

Policy BN.8: Maximising opportunities for play
Take account of the existing or future need for play space in the local area, identifying relative deficiencies; be inclusive and accessible… easily observed

Policy BN.11: Reducing noise and improving air quality

Strategic Policy SP.4: Planning for and securing infrastructure to support growth and convergence
Strategic Policy SP.5: A sustainable and healthy place to live and work

Policy S.1: Health and wellbeing
Policy S.2: Energy in new development
Developments will be expected to minimise carbon dioxide emissions to the fullest extent by:

1. *Reducing energy requirements*
2. *Supplying the energy that is required more efficiently;*
3. *Meeting those requirements through renewable energy sources where possible*

Policy S.3: Energy infrastructure and heat networks
Applications for major development should demonstrate that opportunities to connect to existing energy networks in the Legacy Corporation area … and to facilitate connections from existing development to those networks, have been maximised through provision of … heating and cooling network infrastructure … where it is viable to do so.

Proposals for bridges, will be required to demonstrate that provision is included to accommodate utilities network

Strategic Policy S.4: Sustainable design and construction
Major developments should evidence

1. *Resource efficiency*
2. *Carbon dioxide emissions reduction (including utilisation of renewable,*
3. *low- and zero-carbon energy sources)*
4. *Natural heating and ventilation*
5. *Utilisation of decentralised energy sources*
6. *Living roofs*
7. *Sustainable drainage systems.*

Non-domestic spaces should achieve a minimum BREEAM Very Good, achieving maximum score for water use
Policy S.5: Water supply and waste water disposal
Strategic Policy S.6: Waste Reduction
Development proposals should demonstrate how they have: designed out waste through lean design, maximised the reused and recycled content within the materials used for construction … maximised the opportunities for reuse or recycling of materials remaining from construction

Policy S.7 Overheating and urban greening
Set out.. measures to avoid overheating (including overheating analysis against a mid-range climate scenario for the 2030s) and excessive heat generation and, where appropriate, to maximise urban greening

Policy S.8 Flood risk and sustainable drainage measures
The rate of surface water run-off from development sites should be restricted to no greater than the equivalent for a Green Field site of an equivalent size using sustainable drainage techniques as a first choice

Supplementary Planning Guidance
Carbon Offset SPD, August 2016

APPENDIX II – THE CARPENTER'S ESTATE SUSTAINABILITY MATRIX

1 RESIDENTIAL SUSTAINABILITY MATRIX COVER SHEET

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Sustainability Criteria			Description and metric
Energy targets	1	Dwelling Emission Rate	Provides a design stage based output for carbon emissions between dwellings, based on the National Calculation Methodology (NCM). This provides a bench mark which is comparable between dwellings. It is used in determining compliance against Building Regulations; measured in $KgCO_2/m^2/yr$
	2	Regulated Energy Consumption	The overall energy requirements in dwellings that are regulated under Part L of the Building Regulations
		Heating Demand (FEES)	The overall energy requirement for heating demand for a given dwelling. This provides a metric for the fabric energy efficiency of a dwelling; measured in $kWh/m^2/yr$
		Electrical Load (Fans, pumps lighting)	The electrical demand associated with running the dwelling (fans, pumps & lighting) excluding heating. The criterion provides benchmarks for the electrical demand; measured in $kWh/m^2/yr$
	3	U-values (W/m^2K)	A measure of the overall thermal performance of individual fabric elements. Ranging from limiting elemental values for a notional building in Part L1A to Passivhaus Values
	4	Thermal Bridging	As the standard of building fabric improves, thermal bridges represent a greater proportion of energy loss from a dwelling. By assessing this, risks from thermal bridges can be mitigated during the design stage by good detailing. Overall figures for thermal bridges are measured in W/m^2k
	5	Airtightness target at 50 Pa	The rate of infiltration is a significant contributor to the rate of heat loss from the dwelling. Air tightness targets range from the Part L notional building to the Passivhaus standard; measured in $m^3/h.m^2$
As Built Performance & Running Costs	6	Fabric integrity	Evidence suggests that air tightness can degrade over time; this criteria considers options for managing build quality in relation to thermal performance
	7	Smart Homes	By increasing engagement and feedback occupants have the opportunity to become more energy aware and take responsibility for reducing their own bills. This criteria measures provision of equipment and data to enable residents to engage with their energy production
	8	Communal Services (e.g. lifts, lighting)	This criteria offers a range of design solutions for reducing energy consumption of communal areas, to reduce energy use and bills for the landlord & tenants
	9	Service Charge	Inefficient systems and plant can cause large service charges for residents. This criteria considers a range of approaches for reducing service charges through design and management are presented
	10	Post occupancy Evaluation	Post occupancy evaluation can highlight any difficulties in operation, aiming to reduce the gap between "as designed" and "as built" performance. Thus, POE can help to promote better buildings and reduce costs. This is achieved through feedback cycles for improvement
Health & Wellbeing	11	Thermal Comfort	Overheating in dwellings is a critical issue and should be considered at an early stage by architect and engineer
	12	Solar control	Over exposure to solar gains contributes to overheating in many dwellings, this criteria considers varying levels of mitigation through external shading
	13	Daylighting	Improving the amount of natural light in a room can improve the quality of the space while reducing energy demand from lighting measured in % daylight factor (DF)
	14	Ventilation (Inc. thermal mass)	Ventilation serves to remove stale air, odours and is essential for reducing overheating in summer. Ventilation coupled with effective thermal mass can mitigate overheating even further. However, it should be noted that thermal mass may create problems if purge ventilation is not used effectively. A range of design solutions are considered for this criteria
	15	Noise Levels (internal & external)	Reducing noise levels can improve occupants sleep and create a better quality space. This can be hard to achieve in urban areas but it is more attainable if accounted for in the early stages of design. The criteria measures the internal noise levels for habitual and non-habitual rooms in dB, providing post completion benchmarks for designers
	16	Sound Insulation (between units & internal to units)	By reducing sound encroachment between dwellings the quality of the space is improved. The criteria provide options which improve upon Part E; focusing on the ability of a dwelling to reduce sound transmission, as opposed to wider strategies implemented on site
	17	Pollution	
		Indoor Pollutants	Indoor pollutants can arise from volatile organic compounds (VOC) contained within construction materials & finishes. These can continue to off gas for significant periods of time after installation. By selecting materials & finishes which are low VOC, the indoor air quality of a space can be improved. Design targets are suggested to attenuate off gassing
		Local Air Pollution	New developments may contribute to sources of local air pollution. This criteria considers the options for limiting the contribution from any combusting plant to local pollution, specifically NO_x
	18	Biophilia	The positive connection between humans and plants and the effects of plants on a space is well known. The criteria consider how to increase the connection between humans and plants within and around the dwelling with the aim of increasing wellbeing
	19	Access & Inclusivity	By taking steps to improve the inclusion of groups of differing abilities, ethnicities and ages for the site / dwellings, the development can aspire to have a greater sense of community. Measured by a range of design options

2 RESIDENTIAL SUSTAINABILITY MATRIX COVER SHEET

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Sustainability Criteria			Description and metric
Nature	20	Growing space	Addressing the need for personal and shared spaces to enable residents to grow produce by offering different design solutions
	21	Biodiversity	By aiming to mitigate the impact of the development on local flora / fauna. The criteria seek to improve and encourage biodiversity through varying levels of biodiverse centric briefs
	22	Communal land management & maintenance	By promoting shared ownership with landlords of common areas, the criteria aims to improve these spaces with varying levels of maintenance and commitment from landlord and tenants
Water	23	Mains water consumption	Reducing the mains water consumption at point of use, providing benchmarking targets for the development to aim for, which can be compared to other developments in the area. Measured in l/p/day
	24	Drainage systems	Addressing dwellings foul & surface water drainage can negate impacts on the environment. By tackling these factors through design, solutions are provided to reduce dwelling discharge and increase the run off lag time
Materials and Waste	25	Lifecycle carbon in fabric and material efficiency	Embodied carbon represents a significant proportion of total carbon within a development. Increasingly so as the proportion of operational carbon reduces with energy efficiency. A range of options are considered to convey design approaches from low embodied carbon materials to more efficient material use
	26	Recycled, reclaimed and renewable content	By increasing the recycled content of the building, waste can be diverted from landfill and the use of virgin materials can be reduced. The criteria are measure as a recycled percentage of the whole material content
	27	Responsible sourcing	Responsible sourcing ensures that the supply chain becomes more sustainable, through managing environmental & social impacts of specific products. Benchmarks are provided based on increasingly onerous environmental management systems.
	28	Building for disassembly and material recovery	Designing for direct reuse avoids material wastage or down cycling of materials. The criteria suggest various solutions to address this at incremental levels of involvement in the design process
	29	Healthy materials	Healthy materials do not have a negative impact on the internal environment and health of the occupants. Measured in progress against the Well Building Standard criteria 04 VOC Reduction
	30	Operational Waste	
		Recycling	Promoting recycling within the site will reduce the amount of waste going to landfill; design solutions propose ways of including recycling within a development
		Composting	Composting allows for the further use of biodegradable waste and diverts recyclable waste from landfill. Strategies are provided to achieve this at different levels of engagement for a development
Transit	31	Transport	This criteria aims to reduce greenhouse gas emissions from transport and encourage the provision of facilities to give rise to low carbon modes of travel
	32	Community Facilities	Increasing community facilities helps to foster a sense of place. The criteria address this by offering a range of services & engagement to the community
	33	Play space and social landscape	By moving beyond static places the criteria tries to develop further ways of thinking about stimulating, engaged play for a range of ages
	34	Security	Developing security measures that aim to safeguard occupants against crime, the criteria promotes security to be included from an early stage in the design
	35	Stakeholder involvement and design process	By engaging the stakeholders early in the design process it is hoped that the final development will better serve the occupants it was built for. Target solutions are provided which prompt increasing levels of stakeholder engagement
	36	Home Information Support	The criteria aim to provide residents with more information on their home with the aim to improve performance through conscientious behaviour. Varying levels of support are suggested
Construction Impacts	34	Construction Site Management	The criteria set benchmarks for considerate construction scheme (CCS) scores for the contractor, incrementally increasing, with the option to push beyond CCS
	35	Construction Waste	By offering design solutions to streamline waste disposal, the criteria aim to reduce the amount of waste from site going to landfill

1 CARPENTER'S ESTATE NEIGHBOURHOOD PLAN RESIDENTIAL SUSTAINABILITY MATRIX OVERLAY- ENERGY CRITERIA

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		Sustainability Criteria	Minimum Standard	Best Practice	Innovative	Pioneering	Matrix Notes	Neighbourhood plan policies
Energy targets	1	Dwelling Emission Rate	Comply with Building Regulations - Notional Building (Part L1a 2013)	35% reduction over the 2013 Notional Building	100% reduction over the Notional Building (Zero Carbon)	In addition, meet a significant percentage of operational energy consumption (as calculated in SAP - Section 16) by carbon neutral on-site or near-site sources		4.3 Requires an EPC B or C. This is not directly comparable to the matrix scale
	2	Regulated Energy Consumption Heating & Cooling Demand (FEES)	Pass Part L1a TFEE regardless of building form	Part L1a TFEE rates - Approximately: 39kWh/m2/yr apartment blocks and mid terraces 46kWh/m2/yr end terrace, semi detached and detached	32kWh/m2/yr end terrace, semi detached and detached 38kWh/m2/yr end terrace, semi detached and detached	25kWh/m2/yr end terrace, semi detached and detached (equivalent of Passivhaus)	TFEES = Target Fabric Energy Efficiency Standards determined through the Standard Assessment Procedure (SAP)	Fabric standards not mentioned but are related to the EPC B or C requirement
		Electrical Load (Fans, pumps lighting)	16 kWh/m2/yr	15 kWh/m2/yr	13 kWh/m2/yr	12 kWh/m2/yr	34.4 kWh/m2/yr - BedZED average monitored	
	3	U-values (W/m^2K)						
		Wall	0.18 (Part L 2013)	0.15	0.13	0.1		
		Average window	1.4 (Part L 2013)	1.2	1	0.8	Minimum U-values from notional building might not achieve the FEES. For instance, if the facade is heavily glazed, then the U-vales will need to be improved to achieve the FEES.	4.3 Requires 'insulation' for refurbished homes but does not specify standards
		Roof	0.13 (Part L 2013)	0.12	0.1	0.1		
		Ground floor	0.13 (Part L 2013)	0.12	0.1	0.1		
	4	Thermal Bridging	Thermal bridging not calculated - default value 0.15 W/m^2K	Use Accredited Construction Details - 0.08 W/m2K	Use Enhanced Construction Details - 0.04 W/m2K	Design to Passivhaus standard of thermal bridging - 0.01 W/m2K		
	5	Airtightness target at 50 Pa	5 $m^3/h.m^2$ (Part L 2013)	3 $m^3/h.m^2$	2 $m^3/h.m^2$	1 $m^3/h.m^2$		
As Built Performance & Running Costs	7	Smart Homes	Use standard utility meters only, no additional functionality	Provide monitoring of electricity and heat (online or standalone) including live consumption & historic use, which can be visualised in terms of cost, energy and carbon dioxide emissions	In addition, monitor internal environmental conditions, including air quality and temperature, with data visualisation	In addition, allow users to monitor indoor air quality & energy consumption remotely via their smart phone/tablet. Energy consumption can be broken down to individual appliance level of detail. Remote control of environmental conditions. Devices are intuitive & easy to use.	Air quality could be monitored via levels of CO_2, humidity or VOCs Smart devices are electronic devices, generally connected to other devices or networks via different wireless protocols	4.3 References 'Smart meters only'
	8	Communal Services (e.g. lifts, lighting)	Comply with Building Regulations / Domestic Building Services Compliance Guide	Specify energy efficient light fittings and automatic controls. Arrange layout to encourage the use of stairs.	Estimate communal energy use during design stage. Take steps to reduce consumption, e.g. efficient external lighting.	Design to the CIBSE Heat Networks Code of Practice LEDs specified for all communal areas		Not mentioned
	9	Service Charge	Standard blanket service charge. No requirement for transparency and accountability beyond legal requirements	Invest in the fabric - build to last & specify robust finishes. Favour hardwearing products & finishes. Specify long-life and low maintenance elements. Service charge is openly reported at point of marketing, including yearly increase. Information is provided on inclusions.	Building managers are integral to the design process, to optimise the number, quality and performance of equipment and fittings. Service reporting includes comparisons to other local charges. Charge is minimised through efficient management and maintenance practice.	Design building services primarily on the basis of their maintenance requirements. Meter all communal energy uses, optimise performance. Explore additional security to reduce repair bills. Put feedback mechanisms in place to enable residents to reduce their service charge payable. E.g. energy saving behaviour or time spent on upkeep of communal grounds.		Not mentioned
	10	Post occupancy Evaluation	No minimum target	Light touch POE, involving occupant survey and review of energy consumption. Sample of 4+ homes	In depth POE, POE, involving occupant survey and review of commissioning and handover and energy consumption. Sample of 4+ homes	POE covers all key aspects of As built performance (e.g. the commissioning, handover material, controls, thermal comfort, occupant usability). Feedback results to residents as well as design team		Not mentioned
Health & Wellbeing	9	Thermal Comfort	Pass the criteria in SAP Appendix P	Design & assess overheating using a dynamic simulation model of a small sample of 'at risk' units using CIBSE TM52 comfort criteria and the CIBSE design summer year weather file.	Design & assess overheating using a dynamic simulation model of a sample of 'at risk' units using CIBSE TM52 comfort criteria as well as CIBSE guide A fixed method for bedrooms. Test using UKCP09 weather files for a 2020 medium level climate change scenario. For London Use TM49 weather files. Where thermal comfort criteria not met, design should integrate future proofing measures, such as potential for additional shading and comfort cooling.	Design & assess overheating using a dynamic simulation model of sample 'at risk' units using CIBSE TM52 comfort criteria as well as CIBSE guide A fixed method for bedrooms. Test using UKCP09 weather file for a 2050 high level climate change scenario. Use TM49 weather files in London. Conduct sensitivity analysis considering a range of different occupancies. Where the criteria are not met, integrate future proofing measures, including the potential for additional shading and comfort cooling.		Not mentioned.
	10	Solar control	Comply with criterion 3 of Part L1a (limits to solar gains) using SAP	Provide fixed external shading and manual internal blinds	Orientate and size windows for capturing useful daylight only, provide external shading with upgrade strategy to deal with hotter summers. Use solar control glass.	Incorporate insulated shutters/blinds with reflective outer coating		Not mentioned.
	11	Daylighting	No minimum targets	Achieve average daylight factors >1.5% in living rooms where possible. Glare and uniformity taken into account.	Dual aspect views for variety of light. At least one habitable room to receive direct sunlight for part of each day. Building form heavily influenced by daylight design. Average daylight factor >2% for kitchens and >2% for living rooms.	Building form is led by daylight design. Achieve >1.5% in bedrooms and living spaces. 80% of all working planes to receive direct light from the sky.	Design to CIBSE Lighting Guide 10, BS8206 Part 2 and the BRE Site Layout Guide 10	Not mentioned.
	12	Ventilation (inc. thermal mass)	Comply with building regulations	Use natural ventilation if possible. Otherwise, MVHR for background ventilation & windows for purge ventilation.	Natural cross-ventilation for purge ventilation and options for secure night -time ventilation	Follow an entirely passive approach. Undertake a risk analysis of occupancy conditions & equipment loads	Free cooling = directly coupled cooling	Not mentioned.
	13	Noise Levels (internal & external)	An acoustician is appointed to reduce noise disturbance to occupants in functional spaces. Internal noise levels are measured and do not exceed the following averages: Day - 40dB (habitable) & 40dB (non-habitable) Night - 35dB (habitable) & 40dB (non-habitable)	Internal noise levels are measured and do not exceed the following averages: Day - 35dB (habitable) & 35dB (non-habitable) Night - 30dB (habitable) & 35dB (non-habitable)	Internal noise levels are measured and do not exceed the following averages: Day - 30dB (habitable) & 30dB (non-habitable) Night - 25dB (habitable) & 30dB (non-habitable) External noise levels are measured and do not exceed 55dB.	Internal noise levels are measured and do not exceed the following averages: Day - 30dB (habitable) & 30dB (non-habitable) Night - 25dB (habitable) & 30dB (non-habitable) Maximum internal noise levels are also measured and do not exceed 45 dB LAFmax. External noise levels are measured and do not exceed 50dB.		Not mentioned.
	14	Sound Insulation (between units & internal to units)	Compliance with Building Regulations Part E	For separating walls & floors, building regulations are surpassed by 5dB for airborne sound insulation and impact sound insulation values are at least 5dB lower. Sound insulation levels for internal partitions are also surpassed by 5dB. Doors & flanking paths must be addressed to avoid negating	For separating walls & floors, building regulations are surpassed by 8dB for airborne sound insulation and impact sound insulation values are at least 8dB lower. Sound insulation levels for internal partitions are also surpassed by 8dB. Doors & flanking paths must be addressed to avoid negating acoustic benefits.	For separating walls & floors and internal partitions, airborne sound insulation values are at least 8dB higher. A considerable further improvement is made on impact sound insulation values beyond the 8dB target, in accordance with the acoustician's recommendations.		Not mentioned.
	15	Indoor Pollutants	CE marking of construction products. Comply with Part F ventilation requirements (NO2; carbon monoxide; TVOCs)	Low VOC products specified	Specify moisture tolerant materials. Reduce use of toxic materials. Provide air for ventilation from high level.	Formaldehyde & TVOC concentration is measured post-construction/pre-occupancy	https://www.wellcertified.com/	Not mentioned.
		Local Air Pollution	Comply with local planning requirements	Low NOx boilers specified < 56mg/kwh	Very low NOx boilers specified < 40mg/kwh	Provide energy without any on-site combustion		Not mentioned.
	16	Biophilia	No minimum targets	Provide views of nature/natural systems. Vary intensities of natural light and shadow. Material elements reflect local ecology	Provide natural/organic forms, patterns & colours. Provide private places for withdrawal/reflection. Unimpeded views over a distance.	Thermal & airflow variability Presence of water		Not mentioned.
	17	Access & Inclusivity	Comply with DDA requirements / Building Regulations Part M. Build all dwellings in accordance with Category 1.	Consider people of different ages and ethnicities. 90% of dwellings are built in accordance with Category 2 of Part M, 10% Part 3	Design public realm with seating suitable for all ages. Carefully consider texture and tone of materials for partially sighted to increase contrasts to ease wayfinding.	Provide a high proportion of Category 3 dwellings (wheelchair accessible) . Provide mobility scooter parking & pram storage at ground level. Consider sound environments to accommodate hard of hearing and wayfinding for partially sighted/blind.		4.1; 4.3: 100% dwellings to meet lifetime homes standard and lifetime neighbourhood standards

Key to Matrix and HOME QUALITY MARK overlap — Home Quality Mark basic level — Home Quality Mark enhanced level — Home Quality Mark maximum level

(2) CARPENTER'S ESTATE NEIGHBOURHOOD PLAN RESIDENTIAL SUSTAINABILITY MATRIX OVERLAY - WIDER PARAMETERS

MAX FORDHAM

		Sustainability Criteria	Minimum Standard	Best Practice	Innovative	Pioneering	Matrix Notes	Neighbourhood plan policies
Nature	18	Growing space	No minimum targets All dwellings have balconies (London Only)	Provide private space where residents may choose to pursue container gardening	Provide on-site allotments (or roof box allotments) for residents to hire for nominal sum	Create partnerships with local allotment schemes to increase opportunities beyond site provision. Communal garden is maintained through local residents gardening club. Provide a seed bank/equipment rental service.		4.2
	19	Biodiversity	Local planning requirements met. Mitigate against negative biodiversity impacts where feasible.	Consult an ecologist on biodiversity enhancement, adopt key recommendations- giving preference to local species. Valuable ecological features of site protected where feasible. Integrate landscape and water strategy with landscape management plan. Provide access to communal green space- either on or off site.	Adopt all ecologist's recommendations to significantly increase biodiversity. Biodiversity weighted equally in green infrastructure strategy and cohesively integrated into landscape. Wider microclimate concerns given consideration with deciduous planting to reduce summer urban heat island and internal solar gain where appropriate. Access to private and communal green space. New links to existing habitats	Design for major increase in biodiversity on site. Incorporate living green technologies in building design (e.g. living walls for cooling).	Biodiversity is the variety of species within an ecosystem, used as a measure of the health of biological systems.	4.2
	20	Communal land management & maintenance	No minimum targets	No loss of green space, and some enhancement. Communal land management and maintenance is considered at design stage and incorporated into strategy	Quality of communal land is safe-guarded through robust management and maintenance strategies, and an organisational leadership commitment. Make provision for long-term up-keep and replenishment of perishables.	Costs are transparent and itemised on service charge. Residents input into maintenance of communal ground, with opportunity to decrease service charge through involvement of up-keep. Involve maintenance teams in landscape design.		4.2
Water	21	Mains water consumption	125L/p/day to conform with Building Regulations	110 - 105 L/p/day	<100 L/p/day	<80 L/p/day Rainwater or greywater is used for WC flushing		Not mentioned
	22	Drainage systems	Carry out Flood Risk Assessment No increase in storm water run-off.	Thorough site hydrological characterisation allowing for climate change, design responds to environment, including SUDS where appropriate. Rainwater butts for individual homes.	Fully integrate drainage system into the environment. Rainwater harvesting for irrigation and WCs. Enable grey water re-use. Consider reed bed treatment for irrigation.	Closed loop water system. Waste-to-Energy plant or alternatives to water base foul drainage.	Highly site specific	4.3 suggests use of water butts
Materials & Waste	23	Lifecycle carbon in fabric and material efficiency	Embodied and end of life carbon not assessed. Consider building design efficiency as part of cost analysis	Analyse impact of embodied carbon in lifecycle at feasibility to decide scope of embodied carbon analysis. If appropriate identify high impact elements through high level desktop study. Use LCA and/or embodied carbon data to adjust spec of top impact (and quantify savings). Engineer structure to minimise material mass.	Conduct detailed LCA of elements with largest impacts at stage 2 or 3 and reappraise at stage 4*. Use results for material selection.	Conduct detailed LCA of every stage of building design and construction following BSEN 15978. Consider designing out waste, off-site construction and transport impacts as part of full analysis.	No standard metric. Wise, 04/06/2010, Building.co.uk, Sturgis Associates, "Redefining Zero".	4.3: Requires any development proposing demolition to produce comprehensive independent analysis of impacts (including embodied carbon). Reused material not referenced but implied in the requirement to refurbish rather than replace
	24	Recycled, reclaimed and renewable content	0 - 10% of total material value derives from reused or recycled content.	10 - 15% of total material value derives from reused or recycled content. Carry out a pre-demolition materials re-use survey if appropriate Statement to 're-use and recycle existing resources'	15 - 35% of total material value derives from reused or recycled content. And 0 -15% total material value locally salvaged materials	>35% total material value derives from reused or recycled content. >15% total material value Use some locally salvaged materials	Recycled content measured by value. See WRAP for further info Recycled aggregate from <30km	
	25	Responsible sourcing	All timber is legal & sustainable or FLEGT-licensed	25% total material value BES 6001 certified (or equivalent)	50% total material value BES 6001 certified (or equivalent)	Supply all materials with an environmental product declaration, written in accordance with ISO 14025 standards Eliminate polluting materials from the building - such as PVC or other 'Red List' materials identified in the Living Building Challenge	FLEGT= Forest Law Enforcement, Governance and Trade	Not mentioned
	26	Building for disassembly and material recovery	Preference for standard sizes of elements such as steel beams/columns or precast units	Hold a design review to consider options for high grade material recovery Employ existing standard sizes and components to reduce wastage	Demonstrate flexibility of future use by typical conversion example designs. Use material product service contracts* for some materials. Consider fastenings for easy dismantling	Long life / loose fit and adapatability and / or deconstruction drives design. Building can be deconstructed through demountable parts. Use of BIM to track components. Check compliance through interrogating detailed design. Use material product service contracts where possible	Use bolts in preference to glues to ensure high grade materials can be reclaimed	Not mentioned
	27	Operational Waste	Comply with local planning requirements for provision of waste storage	Provide waste bins which are easily accessible	Provide waste bins which are accessible, well lit and uncluttered. Use 'iceberg' systems with chute access. Or link to neighbourhood scheme for larger developments.	Provide neighbourhood underground automatic waste conveying system, which reduces street litter and significantly decreases number of vehicle trips required		Not mentioned
		Recycling	Adequate space for storing recyclable waste	Provide internal storage for recycling within dwellings. Encourage occupants to recycle.	Include within communal recycling facilities an onsite 'store area' for reuse of salvageable materials (e.g. for DIY, craft and art projects). Provide incentives for recycling.	Include Freecycle 'shop front' for clothes and reusable furniture, within green concierge's domain. Provide paint re-use point for left over paint for residents and local charities.		Not mentioned
		Composting	Comply with local planning requirements	Either the council or a private scheme provide a local service for food scrap collection	Provide on site composting for biodegradable waste	Feed waste stream into on or off-site anaerobic digestion for biogas production		Not mentioned
Community Infrastructure	28	Transport	Some covered cycle storage	Support cycling provisions fully as part of travel plan. Consider access in site selection.	Develop a fully site specific travel plan covering site infrastructure and awareness raising. Provide electric vehicle charging points.	Accessibility drives site selection. Car free development. Feed transport into personal carbon trading scheme.	Adequate provision of storage lockers for clothes, helmet etc, can require a significant amount of internal space	4.4
	29	Community Facilities	Comply with local Planning requirements	Provide some communal facilities as per 'expected' norm in area In addition provide low cost workspace and training and outdoor gym	Green concierge provides key point of contact to all residents. Runs events & programmes including community awareness, recycling incentives/competitions, energy efficiency education, local transport information, re-use scrap stores, etc.	Green concierge service includes rentable tools/infrequently used items - e.g. lawn mowers, hedge strimmers, drills, step ladders etc	4.1	4.1
	30	Play space and social landscape	Provision in accordance with local planning requirements	Provide a variety of play opportunities in communal locations Involve children in design of landscape not just play areas No reference to type of play, only mention of 'Youth Zone' and meeting Lifetime Neighbourhoods reqs.	Provide overlooked play spaces for good neighbourhood supervision, but with shelter to provide intimacy. Spaces are pocket sized, 3 age ranges are catered for range of ages. Conduct play space design reviews. Consider play in internal shared spaces	Spaces/play 'equipment' are adaptable by users (not fixed) to provide enhanced stimulation, creativity & sustained interest. Provide benches at regular intervals to enable older people to roam further. Provide play space close to homes and adult activities (e.g. gardening). Consider play in all aspects of landscape design	Pioneering design engages all ages throughout a development	4.2
	31	Security	Compliance with Building Regulations Part Q	Consult a security specialist. Provide good lighting and security fobs for children. Position family units lower in blocks to provide better outdoor access. Carefully manage any deck access	Meet section two of Secured by Design	Security measures are a key influence on the design. Design for a 7 year old to roam at will Universal direct access to safe spaces (no security checks or cars) Meet 90% sections of Secured by Design		4.4 requires better lighting for the footbridge
	32	Stakeholder involvement and design process	Use of industry Standards. Standard client briefing.	Consult with stakeholders early with the declared intention that this may affect design proposals. Stakeholders fully understand standards and design.	Open design process with published response to stakeholder proposals. Test design strategy with stakeholders. Set new boundaries.	Feed back results into industry standards Conduct Post Occupancy Evaluation (POE)		Neighbourhood plan approach aligns with Innovative approach
	33	Home Information Support / engagement	Provide EPC	Produce a non-technical user guide and issue to each resident. Provide guidance on procuring low energy appliances/equipment.	Follow the soft landings framework Make the user guide available online and interactive	Involve green concierge with new resident's induction and existing tenants on-going education programme New residents . sign an sustainable / environmental charter		Not mentioned
Construction Impacts	34	Construction Site Management	Main contractor has CCS (or alternative) Energy use in construction metered	Main contractor has 36 pts under CCS. Main contractor operates EMS including monitoring and setting targets for energy, water, materials and transport usage	Main contractor has CCS score 40 or more. Energy water, materials and transport usage targets are met and results published	Contractor to propose strategy for reducing energy on site (e.g. through energy efficient site offices and use of Stage IIIB compliant energy efficient site equipment or use of temporary renewables)		Not mentioned
	35	Construction Waste	Contractor to produce a Resource Management Plan (RMP) detailing how waste streams will be segregated and predicted waste generation figures	Regularly review RMP for performance. Divert 90% by weight of non hazardous project waste from landfill	Divert 95% by weight of non-hazardous waste from landfill. Publish lessons learnt. Provide > 1% of project delivery costs from local suppliers and businesses held within local supply chain networks Source > 5% operative staff members locally (use Upskill employment groups or apprenticeship training schemes) In addition set targets for energy, water, fuel use - report against them	Achieve zero net waste for project	See WRAP for guidance on SWMP's and waste minimisation strategies	4.1 Requires employment of local people

Key to Matrix and HOME QUALITY MARK overlap ✓ Home Quality Mark basic level ✓✓ Home Quality Mark enhanced level ✓✓✓ Home Quality Mark maximum level