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BREEAM HOME QUALITY MARK
PRE-ASSESSMENT

Job no. 33

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ISSUE SHEET

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EXECUTIVE SUMMARY

This Pre-Assessment has been commissioned from Isambard Environmental by Mr Terry Homes on behalf of Greatplanet Limited, the owners and developers of the site to support a planning application for the redevelopment of the site to include a mix of residential and non-residential uses.

For all planning applications which involve residential development the London Borough of Richmond upon Thames (LBRuT) now only require that water consumption is a maximum of 105 litres per person per day. However, it is our opinion that, based on the size of the residential development, and the need to promote sustainable design for all new buildings, the LBRuT will require a Home Quality Mark (HQM) assessment to be carried out.

With this in mind the developers are using the HQM Pre-Assessment to show how the residential element of the development achieves high levels of sustainability and have therefore targeted a '4 star' rating.

Based on the proposed specification the residential element of the development achieves 75.6% of the available credits or a '4 star' rating overall. There is the potential to increase the number of credits once the specification has been finalised. Additional credits will be targeted in the 'Energy and Cost' and 'Materials' categories if necessary.

The project team must be aware that all information must be documented in either specification or drawing format for the targeted credits to be awarded at the Design and Post Construction Stage Assessments. Credits cannot be provided where evidence is incomplete.

Currently there are no developments which have been assessed against the HQM therefore it is thought that one which is targeted to achieve a '4 star' rating will exceed current best practice in sustainability.

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1.0 INTRODUCTON

This Pre-Assessment has been commissioned from Isambard Environmental by Mr Terry Homes on behalf of Greatplanet Limited, the owners and developers of the site to support a planning application for the redevelopment of the site to include a mix of residential and non-residential uses.

For all planning applications which involve residential development the London Borough of Richmond upon Thames (LBRuT) now only require that water consumption is a maximum of 105 litres per person per day. However, it is our opinion that, based on the size of the residential development, and the need to promote sustainable design for all new buildings, the LBRuT will require a Home Quality Mark (HQM) assessment to be carried out.

With this in mind the developers are using the HQM Pre-Assessment to show how the residential element of the development achieves high levels of sustainability.

1.1 SITE CONTEXT

1.1.1 Site Location

The application site is located at 63-71 High Street, Hampton Hill, Hampton, TW12 1NH. It is rectangular in shape, measuring c. 70m by 40m and covers an area of approximately 2,800m^2. It is bounded by the High Street to the east, retail with residential over to the north on the High Street frontage and a new development of residential houses to the rear, to the west is the St Clare Business Park, accessed of Holly Road and to the south a fairly modern terrace built as offices, now largely converted for residential use.

1.1.2 Proposed Development

A planning application is to be submitted for the redevelopment of the site to include demolition of the existing buildings, excavation of basement areas underlying the majority of the site and the erection of 6 townhouses, 35 one and two bed apartments and 229m^2 GIA of non-residentiual units.

2.0 METHODOLOGY

The Pre-Assessment has been completed following a review of the information prepared by the Design Team, namely the detailed drawings prepared for planning. The specification is yet to be finalised therefore the statements made in the pre-assessment are based on professional experience. However, the client has requested that a '4 star' rating is achieved.

3.0 BREEAM HOME QUALITY MARK

The Building Research Establishment's Environmental Assessment Method (BREEAM) is a sustainability rating scheme which helps clients measure and reduce their environmental impacts of their buildings. The BRE operate a number of schemes, each designed to assess the environmental performance of different types of buildings at various stages in the life cycle.

The HQM assesses new build, residential buildings. It is a voluntary standard which encourages developers to go beyond the minimum requirements of the Building Regulations and builds on best practice in the housing sector, drawing together a range of complimentary quality and performance standards and combining the with the latest scientific research.

It was launched by the BRE in 2015 to fill the void left by the Code for Sustainable Homes (CSH) which was withdrawn by the Government following the Housing Standards Review (HSR). The HSR aimed to simplify government regulations and standards into one key set,

driven by Building Regulations. Although not a direct replacement for the CSH, the HQM measures and assesses environmental sustainability criteria in a similar way.

The HQM measures performance against a wide range of financial, wellbeing, environmental and social issues giving an overview of whole home performance and its impact on the occupier in a way that other standards are unable to do (BRE, 2015, 1).

A home which has been certified against the Mark will stand out because:

- There is a greater level of confidence in the performance and quality of the home;
- The home has been built to enhance performance beyond that required by regulation; and
- The home and its surroundings have been built to consider issues not covered by regulations, reducing the risks of unintended consequences.

The HQM enables consumers to make a smart choice and provides home builders and others with the tools to differentiate their new home by providing:

- A star rating, scored out of 5 stars; and
- Indicators of performance, ranked on a 5 point scale.

The star rating provides an overall picture of the home's quality, with 5 stars being an outstanding home of this era. The indicators focus on specific aspects of interest to home occupants in the following three key areas:

- **My Cost** which provides an indication of the overall costs of living in the home. It takes account of: energy costs; durability of materials; maintenance; performance of the home in extreme weather; and access to transport and amenity;

- **My Wellbeing** provides an indication of how the home will impact the occupier's health and wellbeing. It takes account of: quality of living space (air, temperature, light and noise); and local amenity; and

- **My Footprint** which provides an indication of how the home will impact the environment in its construction and use. It takes account of: local and global emissions in use; and impact of the home's construction.

The overall star rating and indicators are presented as a HQM 'scorecard' which provides those buying and renting new homes with an easy to understand comparator of householder costs, positive impacts on health and wellbeing and environmental footprint (BRE, 2015, 1-2).

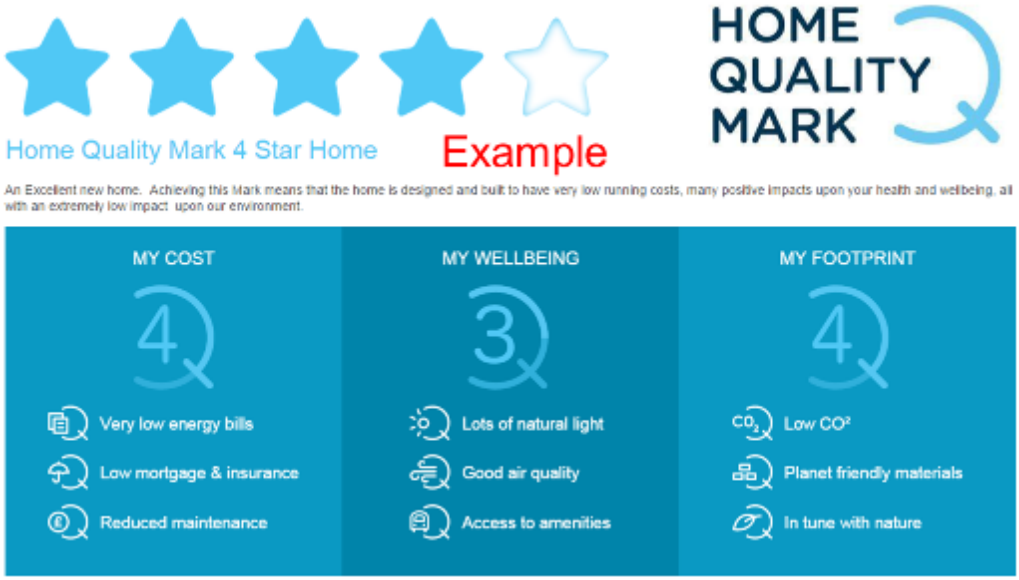

Figure 1. Example of an HQM 'scorecard'.

3.1 Assessment Issues

Environmental performance is quantified by 35 assessment issues which are categorised into 11 categories which in turn are categorised into three main sections as shown in table 1 and summarized below:

- **Our Surroundings** includes issues which address the ability of the home to work with current and future surroundings;
- **My Home** includes issues which address the provision of living spaces which are comfortable, healthy, cost effective and have reduced environmental impacts; and
- **Knowledge Sharing** includes issues which address the processes which enhance understanding and co-operation between the designer, constructor, client and householder.

Each assessment issue has a number of 'credits' available and this number reflects the issue's importance relative to other issues in the scheme. They are awarded where evidence has been provided to confirm that the specific requirements and performance standards have been met. The sum of these credits determines the star rating and performance against each of the HQM indicators.

Section	Category	Issue	Available credits
Our Surroundings	Transport and Movement	Accessible Public Transport	16
		Alternative Sustainable Transport Options	15
		Local Amenities	19
	Outdoors	Ecology	30
		Recreational Space	20
	Safety and Resilience	Flood Risk	18
		Managing the Impact of Rainfall	16
		Security	10
My Home	Comfort	Indoor Pollutants	10
		Daylight	16
		Internal and External Noise	4
		Sound Insulation	8
		Temperature	20
		Ventilation	12
	Energy and Cost	Energy Forecast and Cost	62
		Decentralised Energy	10
		Impact on Local Air Quality	11
	Materials	Responsible Sourcing of Construction Products	31
		Environmental Impact form Construction Products	31
		Life Cycle Costing of Materials	18
		Durability of Construction Products	10
	Space	Drying Space	3
		Access and Space	10
		Recyclable Waste	10
	Water	Water Efficiency	10
Knowledge Sharing	Home Delivery	Commissioning and Performance	10
		Quality Improvement	10
		Considerate Construction	4
		Construction Energy Use	5
		Construction Water Use	5
		Site Waste	15
	User Experience	Aftercare (mandatory criteria)	10
		Home Information	5
		Smart Homes	7
	Future Learning	Post Occupancy Evaluation	9
Total			**500**

Table 1. Assessed issues and available credits.

3.2 Scoring System and Rating Methodology

There are two elements to the scoring approach taken: there is a single overarching Star Rating and a set of three occupant focussed Indicators which represent the degree to which the home meets the requirements set out in each of the 35 assessment issues described above.

3.2.1 *How the Star Rating is calculated*

The overall Star Rating is based on a total overall score which is calculated out of a maximum of 500 credits. In the HQM all credits are equal.

There is one mandatory criterion. This is the requirement for a building warranty (*Aftercare* criterion 1) which refers to and applies to all star ratings. If the mandatory criterion is not achieved, an HQM certificate cannot be issued.

To achieve a Star Rating a minimum total number of credits must be achieved as shown in table 2 below.

	1 Star	2 Star	3 Star	4 Star	5 Star
Minimum total credits	150	225	275	375	400
Percentage	30	45	55	75	80

Table 2. Minimum standards required for each Star Rating.

3.2.2 *How the Indicators are calculated*

The Indicators reflect key areas of concern to the householder. The respective score for each Indicator are generated in parallel with the overall HQM score.

The Indicators are scored out of 5 and are awarded on the basis of the total minimum number of points as shown in table 3 below:

	Indicator				
Indicator bands	**1**	**2**	**3**	**4**	**5**
My Cost	81	121	148	202	215
My Wellbeing	82	123	150	205	219
My Footprint	121	182	222	303	323
Percentage	**30**	**45**	**55**	**75**	**80**

Table 3. Minimum number of points required for each Indicator band.

Each of the 35 assessment issues was rated in terms of the likelihood that it will impact householders living costs (My Costs), health and wellbeing (My Wellbeing) and environmental footprint (My Footprint). The ratings are classed as 'No, Low, Medium, High or Very High Impact' which is calculated using a decimal as shown in table 4 below:

No	Low	Medium	High	Very High
0	0.25	0.5	0.75	1

Table 4. Issue Impact Decimals.

A key technical principle of HQM is that of 'rigour'. A number of issues such as Energy and Cost and Environmental Impact from Construction Products have more than one route available for achieving credits. These are described as either foundation or comprehensive. This allows credits to be awarded where some evidence is available (but the credits are capped in such instances), but where there is greater confidence in the level of performance as a result of the robustness of evidence available, more credits can be awarded (www.homequalitymark.com/consultation, first accessed 25th October 2016).

3.3 Routes to Certification

There are two routes in obtaining an HQM rating: completing both Design and Post Construction Stage Assessments; or by only completing a Post Construction Stage Assessment.

A Design Stage (DS) Assessment provides a rating of the new building's performance as specified and is normally carried out before the start of work. It is carried out during the design process using the specification and other evidence to document measures to be implemented during construction. Upon completion of the DS Assessment an interim star rating and certificate is issued before the start of work (BRE, 2015, 202).

A Post Construction Stage (PCS) Assessment can either be completed by reviewing the DS Assessment or by undertaking a PCS Assessment where a DS Assessment has not been previously completed. Where the latter is the case the assessment will be based on actual 'as-built' information. In either case, upon completion of the PCS Assessment a final star rating and 'scorecard' will be issued after the new build has been completed (BRE, 2015, 202).

4.0 RESULTS OF THE PRE-ASSESSMENT

A summary of the results of the Pre-Assessment are shown in table 5 and figure 2 with the full results shown in Appendix 1. Based on the available information from the Design Team and a number of assumptions using professional experience the following ratings have been achieved for the residential development:

	Credits available	Credits achieved	% of credits achieved
1.01 01 Accessible Public Transport	16	4	25.00
1.01 02 Alternative Sustainable Transport Options	15	10	66.66
1.01 03 Local Amenities	19	19	100.00
1.01 Transport and Movement	50	33	66.00
1.02 01 Ecology	30	28	93.33
1.02 02 Recreational Space	20	8	40.00
1.02 Outdoors	50	36	72.00
1.03 01 Flood Risk	18	18	100.00
1.03 02 Managing the Impact of Rainfall	16	16	100.00
1.03 03 Security	10	10	100.00
1.03 Safety and Resilience	44	44	100.00
1 Our Surroundings	**144**	**113**	**78.47**
2.01 01 Indoor Pollutants	10	10	100.00
2.01 02 Daylight	16	14	87.50
2.01 03 Internal and External Noise	4	4	100.00

2.01 04 Sound Insulation	8	6	75.00
2.01 05 Temperature	20	9	45.00
2.01 06 Ventilation	12	12	100.00
2.01 Comfort	70	55	78.57
2.02 01 Energy and Cost	62	24	38.71
2.02 02 Decentralised Energy	10	10	100.00
2.02 03 Impact on Local Air Quality	11	8	72.73
2.02 Energy and Cost	83	42	52.60
2.03 01 Responsible Sourcing of Construction Products	31	31	100.00
2.03 02 Environmental Impact from Construction Products	31	13	41.94
2.03 03 Life Cycle Costing of Construction Products	18	9	50.00
2.03 04 Durability of Construction Products	10	10	100.00
2.03 Materials	90	63	70.00
2.04 01 Drying Space	3	3	100.00
2.04 02 Access and Space	10	10	100.00
2.04 03 Recyclable Waste	10	7	70.00
2.04 Space	23	20	86.95
2.05 01 Water Efficiency	10	8	80.00
2.05 Water Use	10	8	80.00
2 My Home	**276**	**188**	**68.12**
3.01 01 Commissioning and Performance	10	10	100.00
3.01 02 Quality Improvement	10	10	100.00
3.01 03 Considerate Construction	4	4	100.00
3.01 04 Construction Energy Use	5	5	100.00
3.01 05 Construction Water Use	5	5	100.00
3.01 06 Site Waste	15	15	100.00
3.01 Home Delivery	49	49	100.00
3.02 01 Aftercare	10	10	100.00
3.02 02 Home Information	5	5	100.00
3.02 03 Smart Homes	7	7	100.00
3.02 User Experience	22	22	100.90
3.03 01 Post-Occupancy Evaluation	9	6	66.66
3.03 Future Learning	9	6	66.66
3 Knowledge Sharing	**80**	**77**	**96.25**
Total	**500**	**378**	**75.60%**
Rating	**-**	**-**	**4 Star**

Table 5. Summary of results achieved for the Pre-Assessment.

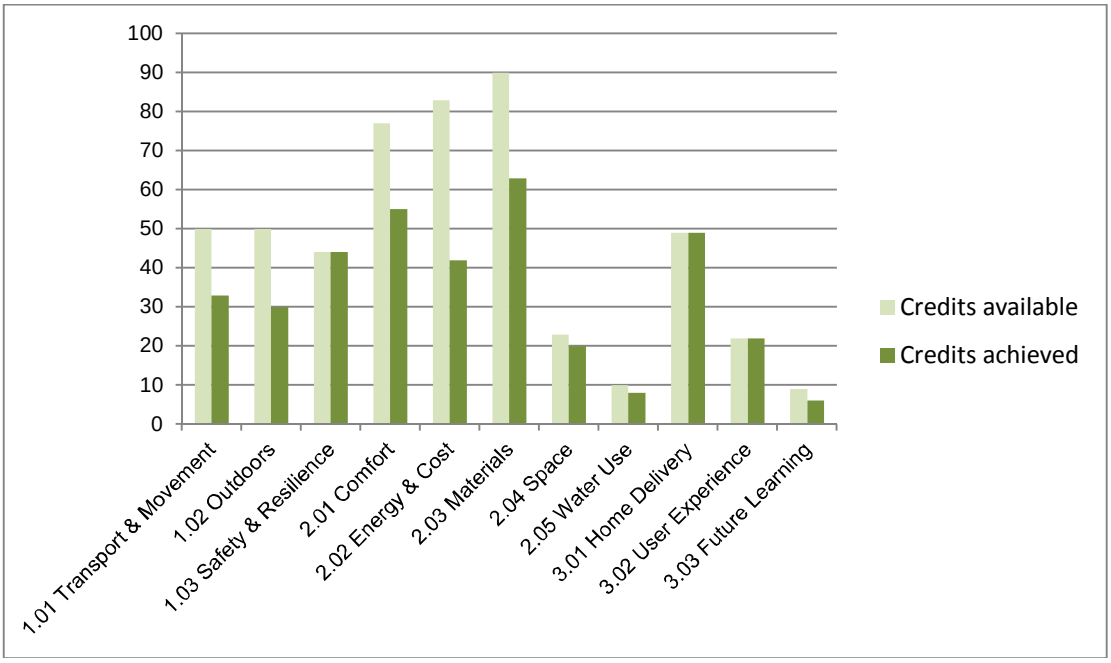

Figure 2. Summary of results achieved for the Pre-Assessment.

The residential element of the development achieves a '4 star' rating.

The strategy to achieve the projected figures shown in table 5 is shown in Appendix 1. There is the potential to increase the number of credits once the specification has been finalised. Additional credits will be targeted in the 'Energy and Cost' and 'Materials' categories to achieve a higher '4 star' rating if necessary.

5.0 CONCLUSION

This Pre-Assessment has been commissioned from Isambard Environmental by Mr Terry Homes on behalf of Greatplanet Limited, the owners and developers of the site to support a planning application for the redevelopment of the site to include a mix of residential and non-residential uses.

For all planning applications which involve residential development the London Borough of Richmond upon Thames (LBRuT) now only require that water consumption is a maximum of 105 litres per person per day. However, it is our opinion that, based on the size of the residential development, and the need to promote sustainable design for all new buildings, the LBRuT will require a Home Quality Mark (HQM) assessment to be carried out.

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Based on the proposed specification the residential element of the development achieves 75.6% of the available credits or a '4 star' rating overall. There is the potential to increase the number of credits once the specification has been finalised. Additional credits will be targeted in the 'Energy and Cost' and 'Materials' categories if necessary.

The project team must be aware that all information must be documented in either specification or drawing format for the targeted credits to be awarded at the Design and Post Construction Stage Assessments. Credits cannot be provided where evidence is incomplete.

Currently there are no developments which have been assessed against the HQM therefore it is thought that one which is targeted to achieve a '4 star' rating will exceed current best practice in sustainability.

6.0 REFERENCES

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APPENDIX A - STRATEGY TO MEET HQM '4 STAR' RATING

BREEAM Category	Assessment Issue	Criteria	Available credits	Targeted credits	Comments/assumptions
1 OUR SURROUNDINGS					
1.01 TRANSPRT AND MOVEMENT	**1.01 01 Accessible Public Transport**	Access to public transport	16	4	The development achieves an Accessibility Index of 2.
	1.01 02 Alternative Sustainable Transport Options	Cycle storage	6	3	There will be a minimum of 1 storage space per home.
		Cycle networks	3	3	The development is connected to safe cycle routes via safe pedestrian routes.
		Electric charging points	4	4	Electric car charging points are provided on the development in locations which have safe pedestrian access and be made available to all occupiers. Their location will be shown as part of the Home Information provisions.
		Car clubs	2	0	The home will have access to: a car pool; lift sharing scheme; or a community electric vehicle hire scheme and this is shown as part of the Home Information. These credits have not been targeted.
	1.01 03 Local Amenities	Key local amenities	12	12	There is a wide range of local amenities located within 500m of the development which are accessible via a safe pedestrian route. These include: a post office; a cash point; GP surgery; pharmacy; a grocery store; Bushy Park; and several restaurants.
		Beneficial local amenities	7	7	
1.01 Transport and Movement total credits			**50**	**33**	
1.01 Transport and Movement scores totals %			**-**	**66.00**	

1.02 OUTDOORS	**1.02 01 Ecology**	Previously developed lands	6	6	The site has previously been developed with buildings and hardstanding which are to be demolished.
		Appointing an expert	2	2	An ecologist has been appointed to carry out a survey.
		Early appointment	2	2	The ecologist has been appointed before site clearance and the start of construction.
		Comprehensive route: ecologist's survey	3	3	An ecologist has been appointed to carry out a survey.
		Comprehensive route: maintaining and enhancing ecological value	10	10	The ecologist's recommendations have been incorporated into the development. A soft landscaping plan will predominantly use native species and, combined with the incorporation of the ecologist's recommendations, the ecological value of the site will be significantly increased.
		Comprehensive route: protecting against invasive or diseased species on site	2	2	Any invasive or diseased species identified by the ecologist will be dealt with as per their recommendations.
		Comprehensive route: maintaining ecology in communal areas	3	3	The ecologist will prepare an Ecological Management Strategy which will detail how the site is to be managed for the next 3 years as a minimum.
		Comprehensive route: local biodiversity records	2	0	Any survey data collected by the ecologist will be added to the local biodiversity records, These credits have not been targeted.

1.02 OUTDOORS (continued)	**1.02 02 Recreational Space**	Accessible public recreational space	4	4	Bushy Park and a recreation ground are both within 500m of the site.
		Private space	6	1	Private space will be a minimum of 1.5m^2 for 1 and 2 bedroom units and a minimum of 1m^2 per additional bedroom for 3 and 4 bedroom units.
		Communal space	2	0	Each home has access to have 10m^2 of communal space per bedroom. These credits have not been targeted.
		Management strategy	3	3	Suitable management and maintenance arrangements will be provided before practical completion.
		Growing space	2	0	Following consultation with the local authority and local growing initiatives growing space has been provided in communal areas. These credits have not been targeted.
		Expert input	1	0	Expert advice is sought at the design stage to inform the design of the growing space. This credit has not been targeted.
		Initial planting	2	0	The growing space is planted with edible species. This credit has not been targeted.
		1.02 Outdoors total credits	**50**	**36**	
		1.02 Outdoors scores totals %	-	**72.00**	

1.03 SAFETY AND RESILIENCE	**1.03 01 Flood Risk**	Flood risk	18	18	A flood risk assessment has been prepared by RAB Consultants Limited and confirms that the site lies in an area of low flood risk.
	1.03 02 Managing the Impact of Rainfall	Home Information	required	required	Rainfall management will be provided as part of the Home Information.
		Comprehensive route: peak rate of run-off	5	5	The proposed drainage strategy will ensure that the peak rate of run-off post-development is no greater than it was before development by using appropriate SUDS techniques.
		Comprehensive route: volume of run-off	7	7	The proposed drainage strategy will ensure that the volume of run-off post-development is no greater than it was before development by using appropriate SUDS techniques.
		Comprehensive route: water quality	2	2	Suitable prevention control policies will be implemented using appropriate SUDS techniques commensurate with an area of low flood risk.
		Comprehensive route: designing for maintenance and operation	2	2	A suitable maintenance agreement for the ownership, long-term operation and maintenance of any specified SUDS techniques will be prated for the occupiers.
	1.03 03 Security	Security Needs Assessment	required	required	A suitably qualified security specialist will be appointed to carry out an evidence-based Security Needs Assessment before RIBA Stage 2 – Concept Design.
		Security features	10	10	The security specialist's recommendations will be incorporated. Occupants will be provided with details of any installed security measures.
1.03 Safety and Resilience total credits			**44**	**44**	
1.03 Safety and Resilience scores totals %			**-**	**100.00**	

1 OUR SURROUNDINGS TOTAL CREDITS	**144**	**113**	
1 OUR SURROUNDINGS SCORES TOTALS %	**-**	**78.47**	

BREEAM Category	Assessment Issue	Criteria	Available credits	Targeted credits	Comments/assumptions
2 MY HOME					
2.01 COMFORT	**2.01 01 Indoor Pollutants**	Minimising emissions from building product types	4	4	All building products will be required to meet strict emission limits in order to reduced indoor air pollution.
		Minimising formaldehyde from all sources	3	3	The formaldehyde concentration in indoor air will be measured post construction but before first occupation and will not exceed 0.1mg/m^3 averaged over 30 minutes.
		Minimising airborne TVOCs (total volatile organic compounds) from all sources	3	3	The TVOC concentration in indoor air will be measured post construction but before first occupation and will not exceed 0.3mg/m^3 averaged over 8 hours.
	2.01 02 Daylight	Average daylight factor (kitchens)	6	6	A daylighting report prepared by West & Partners shows that all kitchens have achieved a minimum average daylighting factor of 2%.
		Average daylight factor (living spaces)	6	4	A daylighting report prepared by West & Partners shows that all living rooms, dining rooms and studies achieved a minimum average daylighting factor of 1.8.
		View of sky	4	4	A daylighting report prepared by West & Partners shows that 80% of the working plane in each living room, dining room and study receives direct light from the sky.
	2.01 03 Internal and External Noise	Suitably qualified acoustician	required	required	A suitably qualified acoustician will be appointed.
		Internal noise levels	2	2	All homes will be designed and built to ensure that internal noise levels do not exceed 35dB for habitable and non-habitable rooms during the day (07:00 – 23:00) and 30dB for bedrooms and 35dB for non-habitable rooms during the night (23:00 – 07:00).
		External noise levels	2	2	All homes will be designed and built to ensure that external noise levels do not exceed 50dB during the day (07:00 – 23:00).

2.01 COMFORT (continued)	**2.01 04 Sound Insulation**	Sound insulation between homes	4	3	A compliant test body will be used to ensure that airborne sound levels for separating walls and floors are a minimum of 50dB and impact sound levels are a maximum 57dB.
		Sound insulation between rooms	4	3	A compliant test body will be used to ensure that airborne sound levels for internal walls and floors are a minimum of 45dB.
	2.01 05 Temperature	Home information	required	required	The operation of the heating controls will be provided as part of the Home Information.
		Foundation route: current conditions	5	5	The HQM high temperature tool will confirm that for current weather data the threshold temperature is below 22ºC.
		Foundation route: predicted climate change environment	4	4	The HQM high temperature tool will confirm that for projected climate change weather data the threshold temperature is below 22ºC.
	2.01 06 Ventilation	Home information	required	required	The operation of the ventilation controls will be provided as part of the Home Information.
		Ventilation air intakes	4	4	The air ventilation intakes will avoid drawing in external air pollution.
		Ventilation rates	4	4	A mechanical extract ventilation system (MEVS) has been in installed which has a minimum ventilation rate of 21 litres per second for 2 bedroom units and will have a boost air flow rate of at least 25% greater than the applicable minimum ventilation rate.
		Maintenance and controls	4	4	Maintenance will be able to be carried out by the occupier in a safe manner. For MEVS controls will be provided which enable sufficient control of the background continuous ventilation rate to meet varying occupancy levels without having to enable 'boost' mode.
		2.01 Comfort total credits	**70**	**55**	
		2.01 Comfort scores totals %	**-**	**58.57**	

2.02 ENERGY AND COST	**2.01 01 Energy and Cost**	Home information	required	required	Energy efficiency measures will be provided as part of the Home Information.
		Foundation route: energy performance	30	19	A Home Energy Performance Ratio (HEPR) of 0.57 will be targeted to be able to achieve 19 credits. The HEPR is unique to the HQM and defines the performance of a home in terms of its: heating and cooling energy demand (the fabric performance); primary energy consumption (system efficiency); and total resulting CO_2 emissions. For each metric the home's performance is compared against the national Building Regulations compliance standard (the baseline figure) and the comparison expressed as a percentage improvement. This percentage improvement is then compared against a best practice performance level for modelled stock of house types and then 'translated' into a ratio of performance for each metric. These ratios are then weighted for each metric and added together to determine a single overall HEPR (BRE, 2015, 89).
		Towards carbon negative	6	0	The build is required to achieve an HEPR of less than 0.9. These credits are not targeted.
		Foundation route: cost	9	5	A cost output of 0.5 will be targeted to be able to achieve 5 credits. The cost output is unique to the HQM and is based on the energy cost factor metric taken from the SAP assessment. A home's actual performance is compared against the relevant national Building Regulations compliance standard (the baseline figure) and the comparison expressed as a percentage improvement. This percentage improvement is then compared against a best practice performance level for modelled stock of house types and then 'translated' into a cost output (BRE, 2015, 89).

2.02 ENERGY AND COST (continued)	**2.01 02 Decentralised Energy**	Home information	required	required	The PV installation, its operations and benefits will be provided as part of the Home Information.
		Feasibility study	2	2	An Energy Strategy has been prepared by SVM Consulting Engineers.
		Implementation of feasibility study findings: installation	6	6	The Strategy has concluded that PVs are the most appropriate technology with which to reduce CO_2 emissions for the residential development. The PVs will be installed as per the recommendations in the Strategy.
		Monitors and controls	2	2	The smart meter will be able to display the operational status of the PVs to the occupants so that they can make decisions regarding their operation and efficiency.
	2.01 03 Impact on Local Air Quality	Impact on Local Air Quality	11	8	The individual gas boilers will be required to emit less than 56mg/kWh of dry NO_x.
	2.02 Energy and Cost total credits		**83**	**42**	
	2.02 Energy and Cost scores totals %		**-**	**50.60**	

2.03 MATERIALS	**2.03 01 Responsible Sourcing of Construction Products**	Legally harvested and legally sourced timber	required	required	All timber and timber based products used on the project will be legally harvested and traded timber.
		Product procurement policy and product environmental information	3	3	It will be a requirement that by the end of RIBA Stage 2 – Concept Design that the developer has a documented policy and procedures which sets out procurement requirements for all suppliers and trades to adhere to relating to the responsible sourcing of construction products. The policy will be made available to all appropriate internal and external staff. There will be a preference for construction products to be obtained from responsible sources and from suppliers who can show certification to an appropriate scheme.
		Responsible sourcing of construction products	28	28	It will be a requirement that a minimum of 65% points are achieved in the HQM assessment tool to demonstrate that construction products have been sourced from responsible sources.
	2.03 02 Environmental Impact from Construction Products	Product procurement policy and product environmental information	8	8	It will a be requirement that by the end of RIBA Stage 2 – Concept Design that the developer has documented policy and procedures for all suppliers and trades to adhere to relating to the sourcing of construction products with lower environmental impact. The policy will be made available to all appropriate internal and external staff. There will be a preference to specify construction products with Environmental Product Declaration (EPD).
		Foundation route: building life cycle assessment	8	5	It will be a requirement that a minimum of 10 products will have EPD's.

2.03 MATERIALS (continued)	**2.03 03 Life Cycle Costing of Construction Products**	Homeowner's life cycle cost report	9	9	A Home Owner's Life Cycle Cost report will be prepared by the end of RIBA Stage 2 – Concept Design to enable the occupant to make informed decisions regarding key maintenance and operation costs. As a minimum it will include maintenance and operation costs for major and minor replacements, ground maintenance and utilities and will be reported for 1 year intervals up to a maximum of 60 years; and a summary highlighting the most significant findings. A final version of the homeowner's report will be provided as part of the Home Information and will be updated by the end of RIBA Stage 4 – Technical Design.
		Component level life cycle cost optimisation	9	0	By the end of RIBA Stage 4 – Technical Design a component level LCC appraisal is carried out and appropriate examples provided by the design team. These credits have not been targeted.
	2.03 04 Durability of Construction Products	Integral elements	7	7	It will be a requirement of the design to specify durable products which can withstand severe material and cosmetic material degradation. Material degradation includes corrosion, limescale build-up and abrasion.
		Finishing elements	3	3	It will be a requirement of the design to specify durable products which can withstand severe material and cosmetic material degradation. Material degradation includes corrosion, limescale build-up and abrasion
		2.03 Materials total credits	**90**	**63**	
		2.03 Materials scores totals %	-	**70.00**	

2.04 SPACE	**2.04 01 Drying Space**	Adequate external drying space	1	1	Suitable, secure drying equipment, either internal or external, will be provided to all units which will meet the following requirements: • 4m+ for units with 1 to 2 bedrooms; and • 2m+ per bedroom for units with 3 or more bedrooms. It will be a requirement than the ventilation strategy is not compromised.
		Adequate internal drying space	2	2	
	2.04 02 Access and Space	Nationally described space standards	4	4	All homes will meet the requirements of the Technical Hosing Standards for space.
		Flexible design	2	2	All homes will have flexible internal space to meet every day needs and long-term demands. Home Information relating to the flexible space arrangements will be provided to all occupiers.
		Accessible design	4	4	Internal and external space associated with all homes meet the optional requirements of either the Building Regulations Part M, Category 2 – Accessible and adaptable dwellings OR Category 3 – Wheelchair user design.
	2.04 03 Recyclable Waste	Consultation with the waste collection authority	2	2	The waste collection authority will be consulted to determine waste collection patterns and the number of recyclable streams and type and size of waste collection containers such as wheelie bins, communal bins etc.
		Recyclable waste	5	5	Dedicated indoor space will be provided in the kitchens for recyclable waste. One and 2 bedroom units will be provided with 30 litres and units with 3 or more bedrooms will be provided with 40 litres.
		Composting	3	0	All homes are provided with either of the following facilities for composting for garden or food waste: individual facilities; local communal facilities; or composting collection services. All homes are provided with an internal composting storage unit of at least 10 litres. These credits have not been targeted.
		2.04 Space total credits	**23**	**20**	
		2.04 Space scores totals %	-	**86.96**	

2.05 WATER	**2.05 01 Water Efficiency**	Water efficient fittings	8	8	All homes will achieve the advanced water fittings standard of consuming less than 100lppd based on the following flow rates: • WCs – 4/2l dual flush • Showers - ≤6l/min • Baths - ≤170 litres • Basin taps - ≤5l/min • Kitchen sink taps - ≤6l/min • Dishwashers - ≤1.25l/place setting • Washing machines - ≤8.17l/kg
		Water recycling	2	0	Rainwater or greywater recycling systems have been specified. These credits have not been targeted.
		2.05 Water total credits	**10**	**8**	
		2.05 Water sores totals %		**80.00**	

2 MY HOME TOTAL CREDITS	**276**	**188**	
2 MY HOME SCORES TOTALS%	**-**	**68.11**	

BREEAM Category	Assessment Issue	Criteria	Available credits	Targeted credits	Comments/assumptions
3 KNOWLEDGE SHARING					
3.01 HOME DELIVERY	**3.01 01 Commissioning and Performance**	Commissioning and testing strategy	required	required	A schedule which identifies and timetables the commissioning of building services will be prepared in-line with current best practice. The principal contractor will be responsible for the programme of works.
		Commissioning building services and control systems	5	5	Appropriate project team members will be appointed to conduct and manage commissioning activities in-line with current best practice for the following services: hot water; heating; ventilation; and low and zero carbon technologies.
		Testing building fabric	5	5	There will be a programme of post-completion testing and inspection of thermal bridging in order to ensure quality assurance.
	3.01 02 Quality Improvement	Collaborative working	2	2	By RIBA Stage 2 – Concept Design the roles and responsibilities of the client, design team, principle contractor and HQM assessor will have been identified and documented. General and specific risks relating to poor performance such as thermal bridging will have been identified and managed and communicated to the workforce by toolbox talks, briefings and meetings.
		Quality control	5	5	To ensure quality control a suitably qualified person will be appointed early in the design process.
		Feedback from previous projects	3	3	Where appropriate, any lessons learned by the construction team on other projects will be incorporated for this development at 63-71 Hampton Hill.
	3.01 03 Considerate Construction	Considerate Construction	4	4	The principal contractor will register with the Considerate Constructors' Scheme and demonstrate that they will significantly go beyond best practice achieving a minimum of 35 points overall and 7 in each category.

3.01 HOME DELIVERY (continued)	**3.01 04 Construction Energy Use**	Contractor's energy efficient checklist	2	2	The principal contractor will be required to complete the energy construction checklist which will record the actions to be taken to reduce metered energy consumption on-site.
		Energy monitoring and reporting	2	2	They will also target, monitor and report on the results of these actions on a weekly basis for both the principal and any sub-contractors.
		Detailed monitoring and reporting	1	1	Monitoring will be conducted on a weekly basis.
	3.01 05 Construction Water Use	Contractor's water efficiency checklist	2	2	The principal contractor will be required to complete the water efficiency checklist which will record the actions to be taken to reduce metered energy consumption on-site.
		Water efficiency monitoring and reporting	2	2	They will also target, monitor and report on the results of these actions on a weekly basis for both the principal and any sub-contractors.
		Detailed monitoring and reporting	1	1	Monitoring will be conducted on a weekly basis.

3.01 HOME DELIVERY (continued)	**3.01 06 Site Waste**	Product procurement policy	1	1	A Resource Management Plan (RMP) has been prepared by RIBA Stage 2 – Concept Design and sets out procurement requirements for all suppliers and trades to minimise construction waste.
		Construction resources efficiency	8	8	An RMP covering non-hazardous waste will be prepared and relate to on-site construction and dedicated off-site manufacture or fabrication (including demolition and excavation waste) generated by the building's design and construction. It will require that a maximum of 1.9 tonnes per 100m^2 is generated.
		Diversion of construction waste from landfill	4	4	Waste materials will be sorted into separate key waste groups and a minimum of 95% by tonnage will be diverted from landfill.
		Diversion of excavation waste from landfill	2	2	Waste materials will be sorted into separate key waste groups and a minimum of 95% by tonnage will be diverted from landfill.
		3.01 Home Delivery total credits	**49**	**49**	
		3.01 Home Delivery sores totals %	**-**	**100.00**	

3.02 USER EXPERIENCE	**3.02 01 Aftercare**	**Building warranty**	**mandatory**	**mandatory**	**A building warranty for each individual unit will be provided to each occupier from a warranty provider who is a member of, and fully complies with, 'The Consumer Code for Home Building' or is recognised by the Trading Standards Institute.**
		Basic aftercare support	required	required	Home Information relating to aftercare support will be provided to the occupier. It is intended that a 'welcome' visit by a member of the development team will be arranged to show the occupier around their new home and to answer any questions which they may have regarding its operation and facilities.
		4-6 week visit	3	3	It is intended that a follow up visit 4-6 weeks after the initial visit is made to offer advice to the occupier on how to conserve energy wherever practical and to operate the 'energy saving technology' such as the heating, ventilation, and lighting controls; PV cells; and smart meters. Information regarding the Post Occupancy Evaluation, how the occupier can get involved and the benefits of carrying one out will also be provided.
		Remote support	3	3	A commitment has been made to provide remote support to the occupants for the first 3 years of occupation.
		On-site support	4	4	A commitment has been made to provide on-site support to the occupants for the first 3 years of occupation.

3.02 USER EXPERIENCE (continued)	**3.02 02 Home Information**	Core home information	2	2	Home Information regarding the new home will be provided in both hard and soft formats to the occupier and written in plain English. It will cover the detailed operation and maintenance of all home systems; provide emergency contact details such as fire, police and landlord; provide a quick start guide as a first point of call for finding more detailed information for example on sustainable transport options, security features, energy and cost and water use; provide key health and safety information and emergency procedures specific to the home; and provide a copy of the HQM 'scorecard'.
		Issue specific home information	3	3	Specific home information on the following issues will be provided: alternative sustainable transport options; recreational space; flood risk; managing the impact of rainfall; security; temperature; ventilation; energy and cost; decentralised energy; life cycle costing of construction products; access and space; aftercare; and smart meters.

3.02 USER EXPERIENCE (continued)	**3.02 03 Smart Homes**	Connectivity	1	1	All homes will be provided with the latest digital technology and will include 3G or 4G, broadband and digital television connectivity.
		Basic starter solutions	2	2	Sensors and transmitters will be self-charging and monitor: electricity and primary heating fuel consumption; and internal temperature. They will be linked to a wireless unit which will display: current and cumulative electricity consumption; primary heating fuel consumption; and current and total cost; CO_2. A mains isolation switch will be installed allowing for the connection of a secondary meter. Home information will be provided.
		Advanced starter solutions	3	3	In addition to the above sensors and transmitters will be provided which measure humidity in the kitchen; CO_2 in the main living room and bedroom; external temperature; motion sensors at the main entrance and water consumption. They will be linked to a wireless unit which will display: current and cumulative electricity consumption, primary heating fuel consumption; current and total cost; CO_2 and humidity levels; and water consumption. They will be able to generate customisable reports and produce accessible historic data.
		Controls	1	1	An intuitive and remote control system will be provided which will be capable of operating all of the installed smart technology. The system will allow other smart devices to be wirelessly connected.
		3.02 User Experience total credits	**22**	**22**	
		3.02 User Experience sores totals %	**-**	**100.00**	

3.03 FUTURE LEARNING	**3.03 01 Post-Occupancy Evaluation**	Foundation route: basic POE	3	3	Between 12 and 18 months after first occupation a suitable qualified person will gather the occupants feedback relating to the operation and functionality of their home on a range of measures including: thermal comfort during summer and winter; lighting, actual energy and water consumption; and overall quality. The developer will disseminate the POE results and lessons learnt to key stakeholders in order to share good practice.
		Foundation route: enhanced POE	3	3	A commitment has been made to conduct one of the following in addition to a basic POE: energy audit; water audit; forensic walk-through; LZCT performance monitoring; humidity monitoring; or temperature monitoring.
		3.03 Future Learning total credits	**9**	**6**	
		3.03 Future Learning sores totals %	**-**	**66.00**	

3 KNOWLEDGE SHARING TOTAL CREDITS	**80**	**77**	
3 KNOWLEDGE SHARING SCORES TOTALS %	**-**	**96.25**	

TOTAL CREDITS	**500**	**378**	
TOTAL SCORES TOTALS %	**100**	**75.60**	