4.0 sustainability statement...

RENEWABLE ENERGY

Checklist Requirements and Policy Text

Checklist Item

Reduce predicted site CO_2 emissions by at least 10% through the use of on site renewable energy

Illustrating Compliance

1. Carbon emissions from the total energy needs (heat and power) of the development should be reduced by at least 10% by the on site generation of renewable energy. The following approach should be adopted:

- Calculate predicted electricity and heat demand for the site (kWh)
- Convert energy demand (kWh) to carbon dioxide emissions (CO_2)
- Identify renewable energy technologies that are suitable for the site
- Calculate level of carbon dioxide emissions offset through use of renewable energy technology (should be at least 10% to comply with policy)

2. All external lighting is to be solar-powered, wherever possible.

Commentary

Renewable energy production is discussed in detail within Sections 5.0 of this report.

A feasibility study for all renewable energy sources has been carried out in Sections 5.0 and 6.0 The six renewables technologies have been investigated and assessed from a practical and economic point of view. Renewables spreadsheets are contained within appendix d. These examine the % energy savings available from each renewable technology.

From benchmark energy figures, Biomass is considered to be worthy of initial appraisal and consideration. This renewable technology has been estimated to provide 12.71% of the sites energy demand.

A community heating (district heating) scheme which will enable multiple units to be heated from a single energy source. It is proposed that a solution of this type is adopted within the proposed development.

Irrespective of the overall system size and fuel type community heating schemes comprise of three common components

- Heat source
- Heat distribution network
- Customer connections

Heat Source

The heat source can be provided from a number of sources, (CHIP, Biomass, Gas boilers) However, they would typically have a single, centralised plant room containing the boilers), thermal store and pumps.

The locating and sizing of the plant room has been taken into account and accommodated within the development A minimum area of approximately 20 m^2 has been allocated for modular, centralised boilers, thermal stores, metering and pumps in the basement car park area

The use of centralised boilers within the proposed development has been appraised in comparison to individual boilers and (even without pursuing the option for fire the boilers from a biomass source, as proposed in section 7.0 of this report) there are marginal energy and CO2 benefits of its inclusion, it will future proof the development for the decentralised energy supply presently being promoted by the GLA

There are capital cost and space implications of installing a centralised system over individual boilers, due to required pipework distribution routes across the site and within each apartment riser, and the for the centralised plant room boilers, pumps, thermal stores and flue.

Centralised boilers are sized to cover peak heat load requirements for the development, which in a residential development are generally early morning and late afternoon As such a modular boiler system is proposed so the system can respond to changes in residents' requirements, occupancy levels and unit sizes. To allow flexibility and redundancy of fuel selection, where a biomass boiler system is proposed then a conventional gas boiler system shall provide the back-up. A medium sized thermal store is also proposed to assist balancing the heat loads

4.0 sustainability statement...

Operation and maintenance of the centralised boilers will need to be undertaken by a management company) on behalf of the residents This raises two main issues in relation to costs for residents that will be higher than operating their own individual boilers. The billing process can be expensive to manage and operate The proposed development will use individual heat meters for recording each apartment's usage, as well as charging an annual service charge covering maintenance and equipment depreciation.

An alterative approach to a single service charge avoids the cost of monitoring and billing individuals via the heat meters but disassociates residents from energy efficient practice through the use of a 'flat fee' for the heating and hot water charged to residents as an annual service charge

Distribution Network

In community heating schemes, heat (normally as hot water), is distributed from a central boiler plant to customers via well insulated distribution pipes These pre-insulated pipes are fitted with automatic leak detection equipment and 'zoned' isolation valves to enable local maintenance without disrupting the whole system

On sites such as Waldegrave Arms, well designed systems shall minimise any distribution losses, therefore community heating could provide a net efficiency benefit relative to multiple, individual boilers

Customer Connections

Each unit would be supplied with a heat exchanger providing hot water for the domestic heating system and water use and maintaining a distribution separation between the two systems

Customer Metering

Individual heat meters will be required in each unit to enable metering and subsequent billing. The heat meters (or their displays) would ideally be located in the communal corridor areas within the blocks for convenient reading. The cost of installing the metering systems and operating the billing system can be substantial and would possibly require an energy services management company to operate the scheme efficiently.

4.0 sustainability statement...

CONSTRUCTION MATERIALS

Checklist Requirements and Policy Text

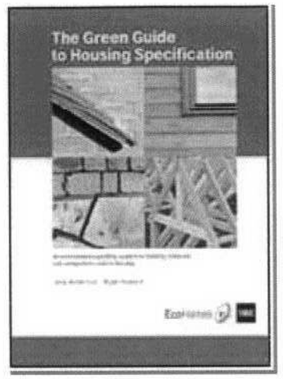
Checklist Item

Specify environmentally-friendly construction materials

Illustrating Compliance

1. Wherever possible, existing buildings or their building materials should be reused, providing that this allows policy on energy, materials and water conservation to be complied with
2. The majority of timber products should be obtained from sustainable sources (CSA, FSC, MTCC, PEFC, SFI) and balance from a temperate source (i.e. non tropical wood)
3. Insulation materials must not contain substances known to contribute to stratospheric ozone depletion or have the potential to contribute to global warming
4. PVC windows should not be used
5. Low emission finishes, construction materials, carpets and furnishings should be used wherever practical
6. Recycled aggregates should be used wherever possible for road sub surface and parking areas
7. Materials used in the development should be sourced locally wherever possible

Commentary



The Green Guide rates common construction specifications according to their environmental performance on a rating of A (good) to C. The rating is derived using the BRE Environmental Profiles Methodology for life-cycle assessment, and Ecopoints, which is a single-score measure of environmental impact, based on an industry consensus of the relative importance of different environmental issues.

Green Guide ratings are calculated by looking at where a particular specification's environmental impact falls within the range of impacts for an element as a whole – specifications within the best third of the range are awarded an A rating.

In considering the building fabric of the development, the design team have sought to balance the estimated energy savings during the building or elemental lifetime with the initial embodied energy of a material and energy consumption during the buildings life (due to maintenance). This will minimise the embodied energy, erection, maintenance and demolition costs during the lifetime of the buildings.

A number of materials specified for incorporation in the building will contain a high recycled content either from post-industrial or post-consumer origins.

Structural Steel

All new steel has a recycled content of between 10 and 100 per cent. Generally, steel produced in the UK contains around 16% recycled content, but the recycling rate is a more important factor in Life Cycle Assessment.

Steel is 100 per cent recyclable and can be recycled many times over with current technology, without any degradation in terms of properties or performance. This property sets steel apart from most other common construction materials.

In addition, the intrinsic economic value of scrap steel ensures that it is efficiently recovered from the waste stream and either reused or recycled. The recovery rate of steel construction products from UK demolition sites is currently 94 per cent with 10 per cent being reused and 84 per cent recycled. The use of recycled steel means a reduction of about 30% in energy use for primary production.

Timber

4.0 sustainability statement...

Care will be encouraged to ensure that timber for carcassing, formwork and finishing is derived from sustainable and renewable sources.

Responsibly sourced timber products are arguably the most renewable and low impact construction material in common use. Forests provide a carbon sink and growing trees absorb carbon. Forests can also provide the habitat for a wide variety of plant and animal life, and give amenity value to society. Increasingly, emphasis is being placed on ensuring that forests are managed in a responsible way.

Sustainably certified wood is grown in well-managed forests and tracked through a chain of custody to its final destination to ensure its provenance shall be specified for the Waldegrave Arms development. Key requirements of the certification include: fair labour practices, the avoidance of forest depletion and timber replacement programmes to ensure continued forest health.

EcoHomes, measures the proportion of timber for basic building elements will be from specified sources, therefore ensuring good use through out the development. It is also aimed to ensure that the windows, and external walls will be specified so that 80% of these elements are 'A' rated according to the Green Guide for Housing Specification.

All windows within the development will be made of wood.

Insulating Materials

All insulating materials specified will have a Global Warming potential of less than five and zero ozone depletion potential.

Global warming potential (GWP) is a relative measure of how effective a gas is at preventing the passage of infra-red radiation. The GWP measures the total energy absorbed by 1kg of released gas over a fixed period of time. CO_2 is given a GWP of 1.0.

Internal Fabric

Interior finish materials shall contain recycled or rapidly renewable content where possible

The materials selected for Waldegrave Road shall be selected for the internal walls shall be specified to ensure that 80% will be 'A' rated according to the Green Guide to Housing Specification.

If more credits are required through the EcoHomes scoring scheme to ensure the developments gets an Excellent rating, a larger proportion of finishing elements could be specified from compliant schemes.

Recycled Aggregates

The construction industry uses 360-370 million tonnes of material each year. 52% of this is in the form of crushed aggregates with a 30% comprising sand and gravel. Most of this is virgin material and its extraction results in significant effects on the environment.

The recycling of recycled aggregates for ground slabs, roads and paths, will be encouraged within the development at Waldegrave Arms.

Local Sourcing of Materials

Materials used within the development will be encouraged as far as possible. This will have limits due to the required finished quality of the apartments and flats and the limited supplies nearby.

Locally sourcing materials have good environment credentials as transport emissions constitute a large part of the developments environmental impact.

4.0 sustainability statement...

WATER SAVING/RECYCLING

Checklist Requirements and Policy Text

Checklist Item

Use water conservation devices and recycling techniques

Illustrating Compliance

1. Water saving devices to be installed wherever possible in the development, e.g. low flush toilets and spray taps
2. Use rainwater harvesting in gardens and soft landscaping where appropriate (e.g. water butts, central rainwater collection systems)

3. Use of greywater and rainwater for all non potable purposes should be explored

Commentary

RAINWATER HARVESTING

A rainwater recycling system enables rainwater, usually captured from suitable areas by roof guttering and outlet, to be diverted to a collection tank, via filters. The collected water can then be pumped to various outlets for re-use. As water demand rarely coincides with the supply of rainfall a means of storage is essential to ensure the system works satisfactorily with the maximum demand achieved from rainwater.

Harvested water is not generally considered suitable for all water uses and therefore decisions must be made as to where this water is best used. Recycled water is often used for WC flushing, this being a high water user and able to utilise low grade water without the risk of being used for ablutions.

Bypass collectors ensure that all the rainwater to be collected would be filtered of fine particles and allow, during storm conditions for rainwater to discharge directly to the main drainage system. An overflow outlet would also connect the rainwater storage tank to the main drainage system. A typical system is shown on the schematic drawing below.

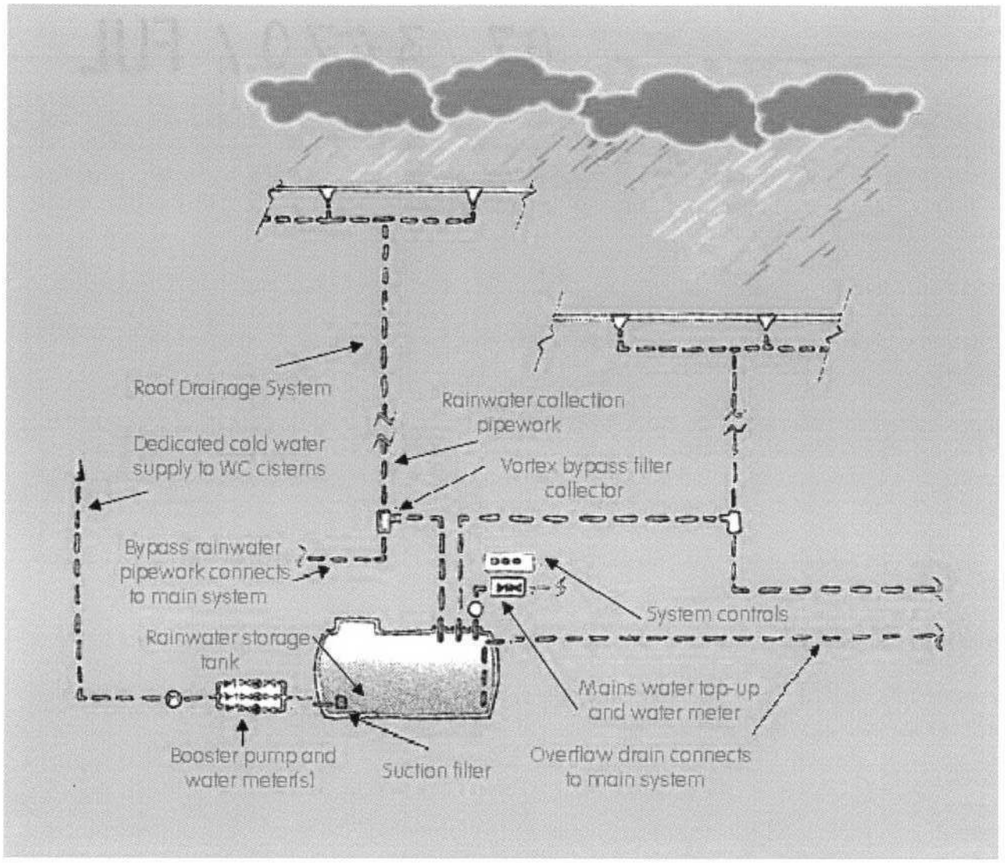
At the Waldegrave Arms site, a suitable area for collection could be provided by the flat roof areas of the residential development.

In order to provide rainwater harvesting on site a separate water distribution system would have to be installed along side the standard drainage systems. It is felt that there would be a risk from incoming tenants/flat owners confused by two systems, leading to potential dangers with water quality and flooding. Therefore it is not considered any further for the development.

WATER BUTTS

Water Butts are planned for the site to irrigate soft landscaping. These are very simple and cost effective, and will reduce the financial and environmental costs for the development. These are to be installed in suitable locations to allow easy access for irrigation at ground level.

4.0 sustainability statement...



INDIVIDUAL WATER METERS AND MONITORING WATER USE THROUGH BUILDING LIFE

Studies conducted within the UK have shown a reduction of 11% of annual water usage in buildings fitted with water meters. Furthermore the reduction of water usage during peak periods is as much as 30%.

Significant savings can be achieved by monitoring the water usage during the life of a building. Exact gains are difficult to calculate however monitoring the water usage areas of high water usage can be identified and procedures implemented to reduce water usage.

Conservation of water will be provided by the inclusion of water meters for each of the residential units. This will encourage the monitoring of water used, and allow more control for the occupiers.

DUAL FLUSH CISTERNS

Toilet flushing accounts for up to a third of the total water consumption in commercial buildings and has therefore been a focus for water efficiency campaigns and promotions by water companies. The Water Supply (Water Fittings) Regulations 1999 lowered the maximum flush volume for toilets from 7.5 litres to 6 litres. The regulations also allow dual flush and valve flush mechanisms, which were prohibited under the previous Byelaws.

While 6 litres maybe considered the base case for new purchases, the manufacturers claim that about 75 to 80% of current sales are now dual flush toilets. Dual flush toilets must have a secondary flush of no more than 2/3 of the full flush. Generally they are specified a half flush of 3 litres and a full flush of 6 litres. Most of such WCs in reality consume about 10-25% more than the specified flush volume they were designed to use. This is mainly because water enters the flush tank during flushing.

Alternatively, WCs with ultra-low full-flush volume of 4.5 or 4 litres can be installed. One example is the 4/2 litre dual flush If a Cera style of toilet, which uses significantly less water than other styles. (4/2 refers to the volume of water used for each type of flush in this case 4 litres for the main flush and 2 litres for the short flush)

SPRAY TAPS

Spray taps introduce air into the jet of water reducing the noticeable effect of the lower flow rate. The exact savings are typically 50% (i.e. a conventional tap flow rate of 10l/minute may be reduced 5l/minute). These are to be specified for the Waldegrave Arms development.

Reduced flow taps are generally less appropriate for cleaners sinks as they would simply increase the time taken to fill the basin/bucket. In these situations, variable flow rate taps shall be used.

SHOWERS

The volume of water used by showers depends on a number of factors, as outlined in the Environment Agency "Conserving Water in Buildings" including the heating mechanism, the presence of fixed or adjustable controls and most importantly the flow rate (which is determined by spray pattern, mains pressure and variability, the use of pumped systems and the position of header tank.)

In order to achieve a low development water consumption, showers with flow rates of less than 9l/s are to be specified.

4.0 sustainability statement...

Measures to mitigate the use of water, including the use of dual-flush toilet cisterns with ultra-low full-flush volume, rainwater recovery for WC flushing and individual water metering are estimated to have the potential to reduce water use on site by 72% in comparison with a conventionally designed site without these features implemented.

Decisions on the use of the above water saving devices will be considered later in the design stage, and full figures for the predicted water consumption will be calculated. Water consumption figures will then enable specifications for the rainwater harvesting system to be considered.

4.0 sustainability statement...

RECYCLING

Checklist Requirements and Policy Text

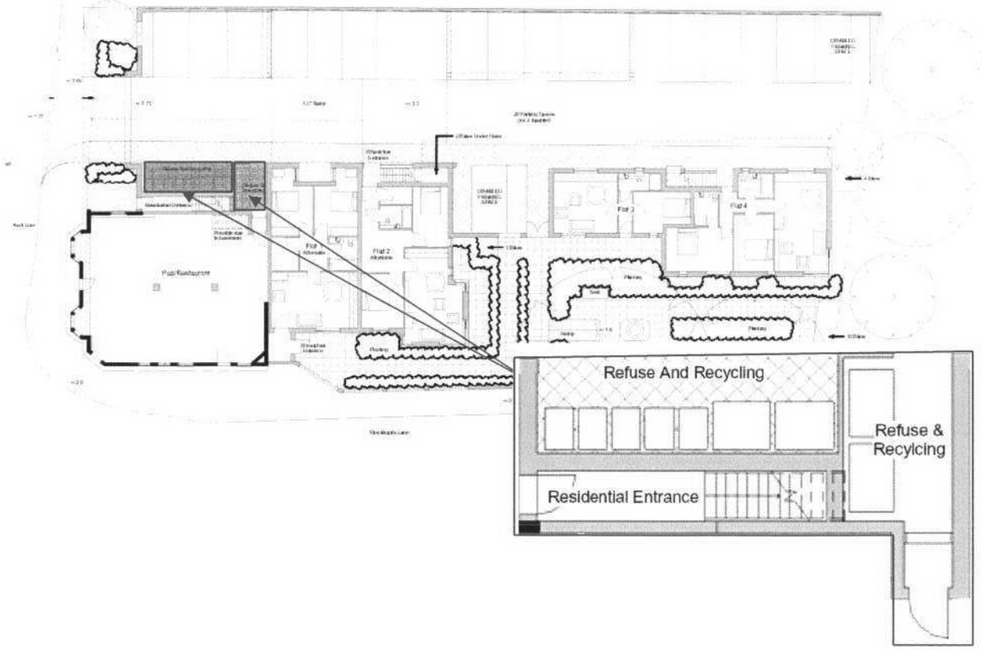
Checklist Item
Provide internal/ external recycling facilities
Illustrating Compliance
1. All development of buildings should provide internal and external recycling facilities

Commentary

The proposed design has integrally-designed waste separation/recycling facilities (internally and externally), at an appropriate scale for the types and volumes of waste/recyclables likely to be generated within easy reach of all areas and with good vehicular access to facilitate collections.

The Waste Service Areas will facilitate the efficient and cost effective collection of recyclable materials from the site's operations by ensuring that sufficient waste is accumulated before it is collected, making the service economically viable. The main types of waste anticipated are paper, plastics, cardboard, glass bottles and aluminium cans.

Internally, each residential flat will have designated a recycling area, separate from waste to encourage recycling. All residential facilities will be sized in line with the requirements of EcoHomes 2006 and the London Borough of Richmond upon Thames.



4.0 sustainability statement...

The council provide a Supplementary Planning Guidance document – Recycling for new development to provide guidance on recycling measures with the following characteristics:

- The typical recycling facility consists of 5 x 360 litre wheelie bins for the recycling of paper, glass (green, brown and clear) and cans.
- The bin lids will be locked to reduce contamination and vandalism. There are small apertures to insert the recyclable materials.
- The recycling service is free; there is no charge for the supply of the bins, there is no additional fee for delivery of the bins and the collection service is completely free also.
- The wheelie bins are placed in the vicinity of the normal domestic refuse bins (or in any other suitable location approved by the management agent and residents). If it is not an enclosed area, the bins could be placed in frames so as to be safer and tidier.
- Collections are carried out fortnightly (we will provide additional bins if the existing bins become too full during the two week period).

Examples of the recycling bins can be seen below.

Example of recycling bins provided by Richmond upon Thames council.

4.0 sustainability statement...

SURFACE WATER RUN OFF

Checklist Requirements and Policy Text

Checklist Item

Prevent water pollution and overburdening of drainage systems

Illustrating Compliance

1. Estimate waste water and surface water run-off impact on drainage system
2. Wherever practicable, use sustainable urban drainage systems (SUDS) to provide attenuation of water run-off to either natural water-courses and/ or municipal drainage systems. Ensure multiple benefits of SUDS are sought, such as wildlife improvements.
3. Describe how ongoing maintenance of SUDS will be ensured
4 Need to consider provision of water and sewage utilities infrastructure to service proposed development

ENV 35 - SURFACE WATER RUN-OFF

Planning permission will not normally be granted for new development or redevelopment if such development would result in an increased flood risk in areas downstream due to additional surface water run-off. Where development is permitted which is likely to increase the risk of flooding, it must include appropriate attenuation measures for the disposal of surface water, defined by the Council in consultation with the Environment Agency.

ENV 39 - CLEAN WATER, FOUL SEWERS AND SEWAGE TREATMENT

In considering proposals for development, the Council will take account of the capacity of existing water and sewerage services and the impact of development proposals on them. Where necessary the Council will seek improvements to utility infrastructure related and appropriate to the development.

Development proposals for the provision of infrastructure or for utilities and related services will generally be considered favourably where:

a) there would not be an unacceptable impact on amenity including visual impact and the environment of the surrounding area generally or an adverse effect on public safety;
b) there are adequate access and servicing arrangements; and
c) there would not be an unacceptable impact on traffic conditions.

Commentary

WASTE WATER AND SURFACE WATER ESTIMATES

Waste water and surface water run-off impacts on the drainage system with the increased scope from the new development over the existing pub have been estimated using EcoHomes guidance.

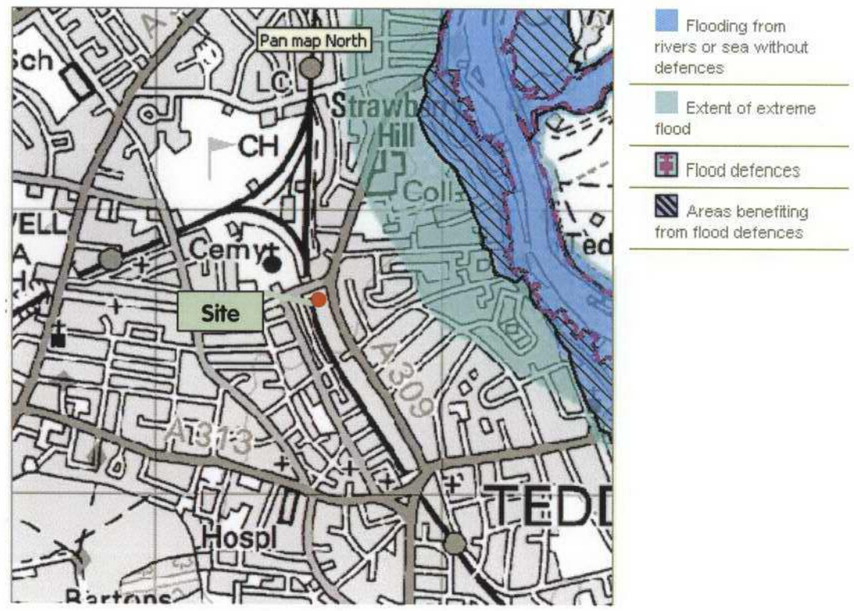
Surface water run off has been estimated to be 600mm. This has been established due to the Thames area average annual rainfall from the Met Office, 2002, map of average rainfall between 1961 -1990.

Waste water has been estimated as 40.24m^3/bedspace/year with dual flush WCs, flow regulators on taps, low flow rate shower, standard bath and low water use washing machine and washer dryers following sanitary ware specified. Calculations for this are contained within appendix b.

4.0 sustainability statement...

SUSTAINABLE URBAN DRAINAGE SYSTEMS

Sustainable Urban Drainage (SUDS) is an alternative approach to drainage to manage run-off flow rates and thereby reduce the impact of urbanisation on flooding, protect or enhance water quality, provide a habitat for wildlife in urban watercourses and encourage natural groundwater recharge. The techniques are typically specified to attenuate the peak flow rate of water run off, from hard surfaces to natural watercourses or drainage systems and during storms in areas with a medium or higher annual probability of flooding.



At the Waldegrave Arms site, urbanisation has been in place for some considerable time and historically the local sewerage systems have coped with the existing development. Since the redevelopment significantly affects the proportion of hard landscaping present, it follows that the site shall impose an additional discharge into the existing drainage systems.

As shown in the image from the Environment Agency website flood section opposite, there is a low annual probability of flooding at the site (less than 1 in 1000 chance of river and sea flooding).

Underground rainwater tanks and permeable paving are to be specified in order to attenuate 50% of the surface water discharge from hard surfaces and the roof .

Porous paving will allow water to soak through the paving into natural water tables rather than direct collected rainwater into public sewers and watercourses. Care needs to be taken to ensure that the local conditions will permit a soakaway to function adequately, and advice will be sought from the relevant statutory body to confirm this.

Rainwater collection from the roof will be done by the provision of water butts. This will store the water and allow reuse for irrigating the soft landscaping within the front garden.

4.0 sustainability statement...

MICROCLIMATE

Checklist Requirements and Policy Text

Checklist Item

Design out negative microclimatic effects

Illustrating Compliance

Prove how negative impact on the microclimate of existing surrounding public realm and buildings has been mitigated:

•Deep shadows (particularly over water) and loss of solar gain
•Increased wind speeds (e.g. wind tunnel effect)

Commentary

The residential flats reduce energy requirements with the incorporation of passive, natural ventilation, whilst being designed to ensure good use of daylight, to reduce requirements for artificial lighting and space heating requirements. These built forms and technologies, provide effective sustainable design principles, therefore reducing the requirements of the new energy efficient heating system.

Neighbouring buildings are situated a fair distance away from the development so the orientation of the development will avoid casting shadows on neighbouring buildings even when the sun is its least effective positioning.

The Waldegrave Arms development is not excessively high, consisting of only three stories. Therefore it is not thought that down streams and turbulent break up points will affect the site. The shape and form of the development and layout at ground level does not show signs of funnelling effects that would affect pedestrian discomfort.

4.0 sustainability statement...

PUBLIC TRANSPORT

Checklist Requirements and Policy Text

Checklist Item

Facilitate the use of public Transport

Illustrating Compliance

1. Ensure that the development provides short direct safe links to public transport and / or enhancement of the public transport network

TRN 2 TRANSPORT AND NEW DEVELOPMENTS

The Council will only permit new development, or changes of use where it can be demonstrated that the transport infrastructure can accommodate it, or be adapted to do so, without creating congestion and hazards on the road network. Transport Assessments will be required to support development proposals where there are significant transport issues to be addressed. New development should:

(a) provide adequately for the needs of disabled people, pedestrians and cyclists;
(b) provide links to the pedestrian and cycle network and add to and enhance it, wherever appropriate;
(c) make provision for short, direct links to public transport and add to / enhance the public transport network wherever possible;
(d) be acceptable in terms of traffic generation and traffic impact on the road network (taking into account the cumulative effects with other existing and committed developments in the area), and in terms of the availability of public transport and its ability to meet increased demand;
(e) adequately provide for vehicular access and servicing, having regard to the needs of safety and to ensure that limited improvements in vehicular access are only allowed where they do not increase overall highway congestion;
(f) where possible minimise the environmental impact and amount of land used by transport facilities, including roads, parking and turning heads. Street signs and furniture should be well designed and rationalised wherever possible;
(g) be acceptable in terms of impact on air quality and noise levels caused by traffic generated.
(h) seek in appropriate cases the concept of planning advantages appropriate to the site and commensurate to the scale of development in accordance with the Council's transportation policies.

Commentary

Waldegrave Arms development is located very close to a variety of transport links that run frequently and to many destinations. It is located approximately 730m to Strawberry Hill station with routes serving over-ground rail networks, and Waldegrave Road (A309) itself has bus routes linking it to the whole of London.

A pair of bus stops are located close to the site, within 50m walking distance with busses on route 33 (between Fulwell and Hammersmith) running at 8 minute intervals. The over-ground railway stations of Strawberry Hill and Teddington are within walking distance of the site.

There are 20 parking spaces provided within the site to provide for the residential development. Two of the spaces have been designated and sized as accessible car parking spaces for disabled motorists. The dimensions of the designated accessible car parking bays are to be a minimum 3.6m x 4.8m.

The designated bays will be clearly sign posted as being accessible parking spaces in addition to being identified on the floor surface of the bay by the use of widely recognized wheelchair pictograms.