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PRELIMINARY ENERGY REPORT
FOR THE
RESIDENTIAL DEVELOPMENT
AT
STONEY HILL ROAD, RATHCOOLE, CO DUBLIN

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1.0 INTRODUCTION

MANDE Consulting Ltd. (MandE) prepared this Energy Report, on behalf of "Romeville Developments Limited", for a proposed residential development on a site located at Stoney Hill Road, Rathcoole, County Dublin.

The purpose of the report is to provide a building energy statement outlining the energy performance of the proposed development and identifying the services and renewable design strategy for the proposed development to demonstrate compliance with the building regulations.

2.0 DESCRIPTION OF THE DEVELOPMENT

Applicant Name

Romeville Developments Ltd

Site Address

Land to the East of Stoney Hill Road, Rathcoole, County Dublin

Project Name

Stoney Hill Road, Rathcoole

Context Description

The proposed development site ('subject land') formed part of the entire residential zoned landholding for a 204 housing scheme, with associated infrastructure and facilities, that was granted planning permission through the Strategic Housing Development (SHD) process by An Bord Pleanála (ABP) on 12th November 2020 (Ref. ABP-307698-20).

The proposed development of the subject land will be for a portion of this housing number (42 no. dwellings) and will be on approx. a quarter of the landholding. The new housing will provide much needed high-quality family housing at a time where housing need is exceptionally high and housing supply is at crisis point, both locally and nationally.

Development Description

The proposed development comprises of the demolition of 1 no. residential property and 1 no. ancillary outbuilding and will consist of the construction of a residential development of 42 no. 3 bedroom dwellings in a mix of terraced and semi-detached unts. The proposed dwellings will comprise of 2 no. typologies (Typology F and Typology L). Typology F will comprise of 21 no. dwellings and Typology L will comprise of 21 no. dwellings. Typology L are two storey and typology F are two storey, plus second floor loft accommodation with front dormer windows. The total proposed residential development gross floorspace is circa: 5,622 sqm.

The proposed development also includes 84 no. in curtilage surface car parking spaces, circa 3,281 sq.m public open spaces in an eastern part and a western park, (including proposed play equipment), an additional large parkland to the south of the site of circa 11,797 sq.m comprising the first phase of a linear park, private domestic gardens, a new vehicular, pedestrian and cycle entrance from Stoney Hill Road, an internal road network, including footpaths / cycleways, 3 no. refuse/bin stores, public lighting, landscaping, boundary treatments, drainage and engineering works and all other associated and ancillary development / works.

2.1 ENERGY & CARBON EMISSIONS STRATEGY

This report outlines the energy performance of the proposed new development and compare with the standards prescribed in the building regulations TGD Part L. As part of the development's efforts to further reduce energy consumption, the residential units shall target a minimum BER energy rating of 'A2'/'A3'.

The built environment has been designed in order to maximise the quality of life within the development, with the health and wellbeing of the user in mind. Generous open spaces surrounding the housing units have been defined and orientated for this purpose.

Passive surveillance has been incorporated into the design. This reduces the risk of crime to all residents within the scheme, littering, and loitering of green spaces. The garden design of each unit in the scheme is integral to the health and wellbeing approach of the development and have been maximized in specific units where possible.

The proposed houses and duplex units have been designed to meet the requirements set out in the set out in the Sustainable Residential Development in Urban Areas Guidelines for Planning Authorities; Urban Development and Building Heights Guidelines for Planning Authorities.

The dwellings shall include several energy conservation measures to achieve a high energy rating for each property:

- High-performance thermal envelope with low U-values for the fabric
- Airtight construction
- Ventilation system
- Heat Pump (HP) Technology
- Energy efficient lighting to be used throughout.

The sustainable design of the proposed development ensures that each dwelling in the development performs efficiently and complies with the NZEB criteria.

3.0 LEGISLATIVE BACKGROUND

The Planning and Development Act 2000 (as amended) sets out clear requirements for the monitoring and review of local authority housing strategies. Section 95 subsection (1)(b) requires that a planning authority's development plan should include objectives to ensure that the housing strategy is implemented. Louth county council stated objectives are as follows:

"To support the development of quality residential schemes with a range of housing options having regard to the standards, principles and any specific planning policy requirements (SPPRs) set out in the Sustainable Residential Development in Urban Areas Guidelines for Planning Authorities; Urban Development and Building Heights Guidelines for Planning Authorities."

3.1 BUILDING REGULATIONS – PART D

The practical implementation of the Design and Material principles has informed the design of the building envelope, internal layouts, facades and detailing has informed the materiality of the proposed development.

The proposed dwellings and buildings are designed in accordance with the Building Regulations, in particular Part D 'Materials and Workmanship', which includes all elements of

the construction. The Design Principles and Specification are applied to the housing units and the communal / amenity parts of the development.

3.2 BUILDING REGULATIONS – PART L

The current edition of the Building Regulations Technical Guidance Document Part L – Conservation of Fuel and Energy – Dwellings sets out the requirements for the minimum fabric and air permeability requirements, maximum primary energy use and carbon dioxide (CO_2) emissions as well as the minimum amount of energy derived from renewable sources, as calculated using the Domestic Energy Assessment Procedure (DEAP) methodology. The compliance with the requirements of this document is compulsory for all new dwellings.

Three design aspects demonstrate compliance:
1. The quality of building fabric
2. The limitation of primary energy use and CO_2 emissions
3. The use of energy from renewable sources

The current edition of the Building Regulations "TGD-L" sets out the design requirements for Nearly Zero Energy Buildings (NZEB). In accordance with the requirements of The European Energy Performance of Buildings Directive Recast (EPBD) all new buildings must achieve the Nearly Zero Energy Building (NZEB) standard.

The table below outline the minimum fabric U value for each element as outlined in the Building Regulations TGD-L:

Maximum Building Fabric U-values

Building Fabric Element	TGD-L / NZEB U-value (W/m^2K)
- Pitched Roof	0.16
- Flat Roof	0.20
- External Walls	0.18
- Ground Floor / Exposed Floor	0.18
- External doors, Windows, Rooflights	1.40
Air Permeability (Air Tightness)	5.0 $m^3/h\ m^2$ @ 50Pa

The table below outline the minimum energy values for the dwelling as outlined in the Building Regulations TGD-L:

Energy / Carbon Performance Targets

Element	TGD-L / NZEB
Maximum Permitted Energy Performance Coefficient (MPEPC)	0.30
Maximum Permitted Carbon Performance Coefficient (MPCPC)	0.35

Renewables	TGD-L / NZEB
Minimum Amount of Energy from Renewable Sources	20%

In addition, TGD-L 2019 set out the minimum requirements in relation to:

- Heating Appliance Efficiency
- Space Heating and Hot Water Supply System Control
- Insulation of Hot Water Storage Vessels, Pipes and Ducts
- Mechanical Ventilation systems

3.2 SOUTH DUBLIN COUNTY COUNCIL – DEVELOPMENT PLAN 2022 - 2028

The development is subject to the South Dublin County Council Development Plan 2022-2028. The following council policies have been considered as part of the proposed Energy strategy:

Chapter 1 - Climate Action
It is the **policy** of South Dublin County Council:

Policy CA1: Climate Action (CA)

To support the implementation of International and National objectives on climate action including the Climate Action and Low Carbon Development Act 2015 (and any amending legislation), the 'Climate Action Plan 2019' (and any updated Plans) and ensure that South Dublin's Climate Change Action Plan and County Development Plan are aligned.

Chapter 6 - Housing
It is the **policy** of South Dublin County Council:

Policy H7: Residential Design and Layout Promote high quality design and layout in new residential developments to ensure a high-quality living environment for residents, in terms of the standard of individual dwelling units and the overall layout and appearance of the development.

Policy H10: Internal Residential Accommodation Ensure that all new housing provides a high standard of accommodation that is flexible and adaptable, to meet the long-term needs of a variety of household types and sizes.

It is an **objective** of South Dublin County Council:

H7 Objective 1: To promote a high quality of design and layout in new residential development and to ensure a high-quality living environment for residents, in terms of the standard of individual dwelling units and the overall layout and appearance of the development in accordance with the standards set out in the Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas, DEHLG (2009) and the accompanying Urban Design Manual – A Best Practice Guide and the Design Standards for New Apartments (DHLGH as updated 2020) and Chapter 13 *Implementation and Monitoring*

H7 Objective 2: To ensure that new residential developments incorporate energy efficiency measures and promote innovation in renewable energy opportunities.

H10 Objective 1: To promote the provision of high-quality houses and apartments/duplexes within sustainable neighbourhoods by achieving the appropriate quantitative and qualitative standards, in accordance with Ministerial Guidelines and as set out in Chapter 13 Implementation and Monitoring.

H10 Objective 2: To support the design of adaptable residential unit layouts that can accommodate the changing needs of occupants, through extension or remodelling subject to the protection of residential amenity.

H10 Objective 3: To consider the need for housing units to provide enough space to allow for individuals to work from home.

Chapter 10 - Energy

It is the **policy** of South Dublin County Council:

Policy E1: Responding to European, National and Regional Policy and Legislation:

- Respond to the European, National and Regional Climate Action Programme and UN Sustainable Goal 13 through the integration of climate action policies and objectives which promote renewable energy and energy conservation and an increase in energy efficiency
- Promote an increase in energy efficiency and the growth of locally based energy alternatives in an environmentally acceptable and sustainable manner

Policy E2: South Dublin Energy Profile: Further develop and implement climate action and energy related initiatives in the County in conjunction with EMRA, the Dublin Energy Agency (Codema), Climate Action Regional Office (CARO) and all relevant stakeholders, promoting energy efficiency and renewable energy measures across the County

Policy E3: Energy Performance In Existing and New Buildings: Support high levels of energy conservation, energy efficiency and the use of renewable energy sources in new and existing buildings including the retro fitting of energy efficiency measures in the existing building stock in accordance with relevant building regulations, national policy and guidance and the targets of the National and South Dublin Climate Change Action Plans.

Policy E4: Electric Vehicles: Promote the delivery of EV charging facilities in accordance with relevant regulations and national and regional policy and guidance. (see also Chapter 7, Sustainable Movement)

Policy E5: Low Carbon District Heating Networks:

1. Support the delivery of low carbon district heating networks at appropriate locations across the County and subject to proven feasibility. Support also complementary technologies such as combined cooling, heat and power (CCHP), large scale heat pumps, and renewable energy opportunities, including geothermal energy, energy from waste, biomass and bio-gas.

2. Support the investigation of both deep and shallow geothermal energy sources throughout the County. Deep geothermal projects are particularly suited to areas demonstrating high heat densities.

3. Support the delivery of District Heating Proposals subject to proven feasibility within areas demonstrating heat demand density in excess of 150TJ/km2 (including for the identified areas of Low Carbon District Heating Potential in Tallaght, Clonburris/Grange Castle and Clondalkin). Future developments within these areas should connect into existing or confirmed District Heating Systems. Where a District Heating scheme has not been confirmed new development should be designed so that it can connect into such a scheme when one is delivered.

4. Support for low carbon district heating networks is subject to the appropriate environmental assessments being undertaken to ensure no significant impact on the wider environment including human health.

Policy E6: Waste Heat Recovery and Utilisation: Promote the development of waste heat technologies and the utilisation and sharing of waste heat in areas where feasibility is proven for its use in the delivery of low carbon district heating technology.

It is an **objective** of South Dublin County Council:

E2 Objective 1: To seek to reduce the reliance on fossil fuels in the County by reducing the energy demand of existing and new development.

E2 Objective 2: To promote the generation and supply of low carbon and renewable energy alternatives, having regard to the opportunities offered by the settlement hierarchy of the County and the built environment.

E3 Objective 1: To reduce the need for energy, enhance energy efficiency and secure the use of renewable energy sources in refurbished and upgraded dwellings and other buildings through the design and location of new development, in accordance with relevant building regulations and national policy and guidance.

E3 Objective 3: To require all new development to be designed to take account of the impacts of climate change, and that energy efficiency, energy provision and renewable energy measures are incorporated in accordance with national building regulations and relevant policy and guidelines.

E2 Objective 4: To support and facilitate the actions and targets of the National and South Dublin Climate Action Plans where they relate to private and public buildings in the County.

E4 Objective 1: To support the implementation of the EV charging strategy for the Dublin Region.

E4 Objective 2: To ensure that EV charging points are installed such that they do not cause significant obstruction to lower carbon forms of transportation (i.e. footpaths, cycle lanes, access to DART or Luas stations, or bus lanes/stops).

E5 Objective 1: To future proof the built environment in Low Carbon District Heating Areas of Potential to enable the delivery of local energy networks and a move towards de-centralised energy systems

E5 Objective 4: To support community energy grids and micro grids in the generation of electricity by renewable sources.

E5 Objective 5: To support the recording and monitoring objectives of the plan by incorporating an 'Energy Assessment Form' into the planning application process providing information relating to energy use within larger developments of over 20 residential units or 3000sq m commercial or equivalent mixed use to include annual and peak demand for heat and electricity,

floor area, BER rating, heating system details, details of renewables on site, EV charging details.

E6 Objective 1: To require future proofing of and promote the development of waste heat technologies and the utilisation and sharing of waste heat where feasibility is proven for its re-use as part of a low carbon district heating network.

Chapter 11 – Infrastructure and Environmental Services
It is the **policy** of South Dublin County Council:

Policy IE5: Information and Communications Technology (ICT): Promote and facilitate the sustainable development of a high-quality ICT network throughout the County in order to achieve social and economic development, whilst protecting the amenities of urban and rural areas.

Policy IE7: Environmental Quality: Seek to take appropriate steps to reduce the effects of air, noise and light pollution on environmental quality and residential amenity in line with European, National and Regional policy and legislation.

It is an **objective** of South Dublin County Council:

IE5 Objective 1: To promote and facilitate the provision of appropriate telecommunications infrastructure, including broadband connectivity and other innovative and advancing technologies within the County in a non-intrusive manner

IE5 Objective 2: To co-operate with the relevant agencies to facilitate the undergrounding of all electricity, telephone and television cables in urban areas wherever possible, in the interests of visual amenity

IE5 Objective 5: To ensure that above ground utility boxes are sensitively located and finished to reduce their visual impact and promote soft planting around existing and new ones where feasible.

IE5 Objective 8: To investigate the potential for the provision of fibre optic cables in the County to facilitate the delivery of high-speed broadband and to work collaboratively with providers in facilitating the same.

IE7 Objective 1: To implement the provisions of national and EU Directives on air and noise pollution and other relevant legislative requirements in conjunction with other agencies as appropriate. (Consistent with RPO 10.10 of the RSES)

IE7 Objective 6: To ensure external lighting schemes minimise light spillage or pollution in the immediate surrounding environment and do not adversely impact on residential or visual amenity and biodiversity in the surrounding areas

4.0 SUITABILITY OF ENERGY TECHNOLOGIES

TRADITIONAL HEATING TECHNOLOGIES		
Traditionally the following technologies were used to provide space heating and hot water for residential developments:		
Direct Electric Heating Direct acting electric heaters, with or without storage element, is used to provide space heating. Domestic hot water is generated in a hot water cylinder fitted with an electric immersion heater. While the capital cost of this solution is low, it cannot satisfy the requirements of the current Building Regulations – Part L. However, this solution may still be viable in certain applications (e.g. in a small, well insulated, mid-floor apartment), if supplemented with a suitable Renewable Technology as listed in the next section.	✘	Not deemed suitable as it would require a large amount of energy to be generated from renewable sources to offset poor primary energy efficiency of direct electric heating.
Hydronic Heating using Boilers Hydronic heating utilises water as the medium for transporting the heat energy from the heat source (boiler) to heat emitters (radiators). The boiler is fired with the fuel available on site, i.e. natural gas, LPG, heating oil, coal, wood. While this solution used to be the most widespread through the industry, it has its limitations in meeting the requirements of the current Building Regulations – Part L. Generally, it must be supplemented with one or more of the Renewable Technologies listed in the next section.	✘	Not deemed suitable as it would require a large amount of energy to be generated from renewable sources to offset relatively poor primary energy efficiency of individual gas fired boilers.
Warm Air Heating Combined heating and mechanical ventilation system using air as the medium for transporting heat. Rarely used in Ireland and more suitable for houses than apartments.	✘	Not deemed suitable for apartments.
Communal Heating A variation of the hydronic heating with the individual boiler in each replaced with a centrally located boiler(s) serving all dwellings. A Heat Interface Unit (HIU) installed in each dwelling provides control and metering of heat energy used in the dwelling. Communal heating benefits from improved efficiency of the central boilers over individual, often oversized boilers. It also creates an opportunity to introduce Renewable Energy Technologies that would not be viable at small scale, e.g. Biomass or CHP (Refer to the next Section).	✘	Not deemed suitable for a project of this scale.

RENEWABLE ENERGY TECHNOLOGIES

The use of renewable energy technologies is promoted and required by the Building Regulations Part L since 2005, gradually increasing with each revision of the Regulations, i.e. 2011 and 2021. The current TGD-L for nearly Zero Energy Buildings (nZEB) require that at least 20% of building energy is derived from renewable sources.
There is a number of low & zero carbon technologies available that may be suitable for a development of this type.

Wind Power (micro turbines) Micro wind turbines are normally fitted to the roof of the building. They convert energy of wind into electricity. Typically, they provide small amounts of electrical energy.	✘	Not deemed suitable for a suburban location due to aesthetical and noise implications.
Wind Turbines A mast mounted wind turbine can generate significant amounts of electrical energy. However due to the physical size and clearances required from buildings or trees, they are suitable for sites with large open areas.	✘	Not deemed suitable for a suburban location due to size, aesthetical and noise implications.
Solar Photovoltaic Solar Photovoltaic (PV) collectors convert the energy of the sun into electricity that can be used within the household reducing the amount of electricity imported from the grid. PV collectors can be installed on the roof or integrated with external walls. While only up to 20% of the sun irradiation available is recovered, this energy form (electricity) comes with the flexibility of being suitable for many uses.	✘	Not deemed suitable due to complexity of the system and the required maintenance implications.
Solar Thermal Solar Thermal collectors convert the energy of the sun into heat energy used to generate domestic hot water or/and contribute to the central heating. Typically, the collectors are installed on the roof, however certain types can be integrated with external walls without compromising on the solar energy yield. While the solar energy recovery rate of 70-80% is superior to that of PVs, the heat energy can only be used to heat water. Also, solar thermal systems require a certain level of maintenance in order to operate efficiently.	✘	Not deemed suitable due to complexity of the system and the required maintenance implications.
Biomass Fired Heating Biomass Fired Heating uses CO_2 neutral fuels (wood chips, wood pellets, straw) to generate heat energy for heating and domestic hot water. This technology requires a significant amount of space to accommodate boilers, fuel storage and transportation, fuel deliveries by trucks. It also required regular ash removal and a stepped-up maintenance regime. Generally suitable for large communal / district heating schemes only, where a frequent maintenance can be justified. To be fully sustainable, the fuel needs to be sourced locally. Also, while the CO_2 generated may be environmentally neutral, there are other emissions (NOx, smoke) that may not be suitable for urban sites.	✘	Not deemed suitable due to added complexity of the system, additional maintenance required. Also, implications in relation to the fuel deliveries and local emissions of CO_2, NO_x and particulates.

RENEWABLE ENERGY TECHNOLOGIES – CONTINUED		
Combined Heat & Power Combined Heat & Power (CHP) is a system that utilises an internal combustion engine to mechanically drive an electric generator and produce electricity. At the same time the waste heat emitted from the engine is utilised for space or hot water heating purposes, resulting in an improved overall energy efficiency over a traditional electricity generation in power plants. Generally suitable for communal / district heating schemes only.	✗	Not deemed suitable for a project of this scale.
Geothermal / Ground Source Heat Pump Ground Source Heat Pump (GSHP) utilise the natural heat of the ground. A refrigeration cycle is used to draw energy from the low-temperature medium (ground) and heat the higher-temperature medium (heating water). The amount of energy transferred is much higher than the amount of energy required to power the system. There are two general types of GSHP systems: with horizontal or with vertical collector. Horizontal collector comprises a large amount of piping installed below the ground, i.e. it may suitable for large open areas. Vertical collector comprises of piping coil in a deep borehole, i.e. it is more suitable where space comes at a premium.	✗	Not deemed suitable due to added complexity of the system and additional cost.
Air Source Heat Pump Air Source Heat Pump (ASHP) utilise the natural heat of the ambient air. A refrigeration cycle is used to draw energy from the low-temperature medium (air) and heat the higher-temperature medium (heating water). The amount of energy transferred is much higher than the amount of energy required to power the system. The energy efficiency of an ASHP is generally lower than that of a GSHP especially during the coldest weather, and it may require supplementation with electric heater at peak heat demand times, however such occurrences are not very often in the relatively mild climate in Ireland. The capital investment for an ASHP is lower than for a GSHP as the expensive ground collector required for the latter is not present.	✓	Suitable. It is proposed to use ASHP unit in individual heating systems subject to further assessment at the detailed design stage.
Exhaust Air Heat Pump Exhaust Air Heat Pump (EAHP) is a certain type of an ASHP which draws energy from the air being extracted from the house through the ventilation system. As the temperature of this air is constant throughout the year, the output and energy efficiency of an EAHP also stays constant, i.e. it is not affected by low ambient air temperatures. Another advantage of an EAHP is that it can help in ventilating the house with its constantly running fan. The downside of EAHPs is the limited output that is related to the ventilation requirements of the house – EAHPs are deemed suitable for relatively small and well insulated houses or apartments.	✓	Suitable. It is proposed to use EAHP unit in individual heating systems subject to further assessment at the detailed design stage.

5.0 DWELLING BUILDING DESIGN

High-performance building fabric elements are being considered and selected to minimise unnecessary heat loss from the internal spaces.

In addition to the reduction in energy consumption and associated carbon emissions for space heating and ventilation through a high performance fabric, high efficiency heating systems are being proposed for use throughout the development, minimising heat losses through the buildings fabric as well as a lower then required air permeability rate, helps to ensure lower energy consumption rates and associated carbon emissions are achieved throughout the year thus reduces the overall cost of heating for the end user.

The buildings will be designed and constructed in accordance with the building regulations and best practices and can be summarised as follows:

Fabric Insulation Values

The following target U-values have been adopted for the project:

Fabric	Target U Value	Building Regulations (U value)
Floor	0.18W/m^{2}K	(TGD-Part L max. = 0.18W/m^{2}K)
External walls	0.18W/m^{2}K	(TGD-Part L max. = 0.18W/m^{2}K)
Flat roof	0.16W/m^{2}K	(TGD-Part L max. = 0.16W/m^{2}K)
External doors and windows	1.40W/m^{2}K	(TGD-Part L max. = 1.40W/m^{2}K)

Air permeability

The target air permeability of 5.0m^3/h/m^2 is consistent with the maximum air permeability allowed under TGD-L. This level or air permeability should be achievable by adherence to the Building Regulations Part L Acceptable Construction Details or alternative calculation methods as outlined by SEAI.

6.0 BUILDING SERVICES SYSTEMS DESIGN

Energy technologies for this development shall be selected on the following basis:

- Operation strategy: individual vs communal
- Compliance with the Building Regulations – Part L (NZEB)
- Life-cycle cost

The selection of technologies will be confirmed at the detailed design stage; however it is envisaged that a combination of technologies shall be required to achieve building regulation compliance on the Apartment and Housing development as follows:

Renewable Technologies

In order to demonstrate the compliance with the Building Regulations Part L, each dwelling is required to have a portion of its energy requirements provided from a source of renewable energy.

In addition to heat pumps additional Solar PV panels on the roof of the residential buildings maybe provided as required to ensure building regulation compliance subject to detailed design.

Heating system

Individual Air Source Heat Pump or Exhaust Air Heat Pump subject to detailed design.

The dwelling shall be heated by means of either underfloor heating or low temperature radiators / fan coil units. In addition, electrical radiant panel heaters shall be considered during the detailed design.

Heating controls in the dwellings consists of a heating zone with individual time and temperature controls.

Domestic hot water

Domestic hot water shall be generated in every dwelling with individual time and temperature controls.

Ventilation

There are two options currently being analysed for use within the development. The solution will be confirmed in the detailed design.

i. The first option is the introduction of a 'whole house extract ventilation system' (MEV), which operates by extracting warm, stale air from dwelling wet rooms.
ii. The second option is a whole dwelling approach with 'mechanical ventilation with heat recovery system (MVHR). The unit works by extracting warm, stale air from 'wetrooms' (kitchen, utility, bathroom, etc.), and extracting the embodied energy (heat) from this exhaust air and re-introducing this captured energy into the incoming fresh air.
iii. Cooker extract hoods shall be installed in the Kitchen.

Lighting

All lamps in the dwellings shall be provided with high energy efficiency lamps Class A CFL or LED.

External Lighting will be energy efficient and provided with LED type with photocell technology.

Water Conservation Measures

The requirements for low flow sanitary ware (water restrictors) in each dwelling shall be considered in the detailed design. This is a water conservation initiative and reduces water waste by restricting water flowrates to a shower within the dwelling.

The shower head fittings could be provided with a reduced water flow to allow for the conservation of water use as well as reducing energy used to heat hot water.

Lighting

Provision for natural daylight in modern buildings helps to create a better internal environment for occupants and helping to assist in the well-being of the inhabitants.

All light fittings are to be based on LED type (A+ Rated bulb) located throughout each occupiable space, such as bedroom, lobby, living/dining etc. A significant reduction in electrical energy usage may therefore be achievable through the use of high efficiency lights.

External Lighting will be energy efficient and provided with LED type with photocell technology.

7.0 CONCLUSION

This Sustainable/Energy Report provides significant and relevant detail in relation to the energy of the proposed development, in support of the standards, principles and any specific planning policy requirements (SPPRs) set out in the Sustainable Residential Development in Urban Areas Guidelines for Planning Authorities; Urban Development and Building Heights Guidelines for Planning Authorities'.

As demonstrated in this report, the proposed development will be constructed to high building standards and will provide a sustainable, energy efficient development for future occupants.