



Waterman Moylan
Engineering Consultants

ENERGY STATEMENT

for

Residential Development

Newtownpark Avenue, Blackrock, Dublin 4.

October 2020

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This document has been prepared and checked in accordance with
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Comments

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1. Introduction

The development will consist of the demolition of the existing c. 26sqm single storey shed on site and construction of a residential development comprising 140 no. residential apartments and duplex units across 5 no. 2 to 5 storey buildings (with a basement under Blocks C + D), an ancillary single storey concierge/reception building, 97 no. carparking spaces, 226 no. cycle spaces, a single storey ESB substation, hard and soft landscaped areas, public lighting, attenuation, service connections, bin stores, a new pedestrian crossing on Newtownpark Avenue and all ancillary site development works, all on the 1.46ha site.

This report identifies the energy standards with which the proposed development will have to comply with and also sets out the overall strategy that will be adopted to achieve these energy efficiency targets.

The dwellings will be required to minimise overall energy use and to incorporate an adequate proportion of renewable energy in accordance with Building Regulations Part L 2019, Conservation of Energy & Fuel (hereinafter referred to as Part L) and anticipated future revisions.

The Department of Environment has recently issued revisions to Part L of the Building Regulations which have been published as “Part L 2019”. This standard introduces the “Near Zero Energy Buildings” (NZEB) concept for dwellings. NZEB targets will require that the energy consumption of new dwellings be reduced by 25% from the previously compliant level.

The new standard comes into effect for buildings for which planning permission is applied for after November 2019 or which are commenced after this date and which are not substantially complete before November 2020.

Achieving compliance with the required energy standards will deliver apartments with a Building Energy Rating (BER) of A2.

2. Building Regulations Part L 2019

Compliance with Building Regulations Part L 2011 is broken down into six distinct categories, known as Regulation 8; parts (a) to (f).

A summary of each of these parts as listed in Technical Guidance Document L 2011 is provided below together with a description of what is required to demonstrate compliance and suggested routes to meeting the required standards.

2.1 Regulation 8 Part (a)

The regulation requires that:

Providing that the energy performance of the building is such as to limit the calculated primary energy consumption and related carbon dioxide (CO₂) to that of a nearly zero energy building within the meaning of the Directive insofar as is reasonably

Part (a) is the overarching compliance target which stipulates the required overall reduction in energy consumption and carbon emissions for new dwellings.

This requires that the energy consumption and carbon emissions of every dwelling is assessed using the DEAP software and that reductions of 70% in energy consumption and 65% in carbon emissions are achieved. The baseline against which this reduction is to be measured is considered to be a dwelling which is constructed to perfectly comply with the 2005 version of Building Regulations Part L.

The ratio of the energy consumed by the proposed dwelling to a similar dwelling constructed to 2005 energy efficiency standards is referred to as the “Energy Performance Co-efficient”

2.2 Regulation 8 Part (b)

The regulation requires that:

Providing that, the nearly zero or very low amount of energy required is covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby;

This requires that the all new dwellings are provided with a renewable energy source. The regulations state that 20% of the total energy consumed within the dwelling must be provided from renewable thermal sources (solar thermal, biomass, heat pumps) or renewable electrical sources (Photovoltaic, Micro-wind).

In practical terms, for a multiple unit development, this requirement is usually met by incorporating PV panels at roof level, incorporating air source heat pump technology or by adding an element of biomass or micro-CHP to a district heating scheme.

Where CHP is included, the renewable energy is considered to be the waste heat which is generated as a by-product of the electricity produced. Specific calculation methods are set out within TGD Part L 2019 which detail how compliance should be demonstrated.

2.3 Regulation 8 Part (c)

The regulation requires that:

Limiting heat loss and, where appropriate, availing of heat gain through the fabric of the building;

This requires that the fabric of the building is designed to minimise heat loss from the building and that the air permeability of the structure limits the unwanted passage of air into the building.

Typical compliant U-Values are as follows.

Pitched roof	0.16 W/m ² K
Flat roof	0.20 W/m ² K
Walls	0.18 W/m ² K
Floor	0.18 W/m ² K
Windows	1.4 W/m ² K

The u-values of individual elements can be relaxed if required provided that compensatory measures are taken on other elements and that the overall area weighted u-value for the entire dwelling is the same as it would have been if all individual elements had complied.

The thermal bridging details of junctions in the envelope of the building (floor-wall; wall-window; wall-roof, etc) must also be designed and constructed in accordance with the guidance set out in Limiting Thermal Bridging and Air Infiltration – Acceptable Construction Details

Every dwelling must also be subjected to an air pressure test to determine the air tightness. All dwellings must achieve and **air tightness of less than 5m³/m²/hour** when tested at 50 Pascals.

2.4 Regulation 8 Parts (d & e)

The regulation requires that:

Providing and commissioning energy efficient space and water heating systems with efficient heat sources and effective controls;

Providing that all oil and gas fired boilers shall meet a minimum seasonal efficiency of 90%;

These require that gas or oil-fired boilers are at least 90% efficient and that heating controls allow independent time control of the heating (2 zones for dwellings larger than 100m²) and hot water. Heating in each zone should also be controlled by room thermostats (in the case of heating) and cylinder stats (in the case of hot water).

2.5 Regulation 8 Parts (f)

The regulation requires that:

Providing to the dwelling owner sufficient information about the building, the fixed building services and their maintenance requirements so that the building can be operated in such a manner as to use no more fuel and energy than is reasonable.

This requires that information is provided to the dwelling owner which relates to the effective and efficient operation of the systems installed in that dwelling. Instructions on how to control the heating & hot water systems based on time and temperature requirements.

3. Building Fabric

Before considering efficient building services or renewable energy systems, the form and fabric of a building must be assessed and optimised so as to reduce the energy demand for heating, lighting and ventilation. Target performance levels have been identified by the design team and are presented below.

3.1 Elemental U-Values

The U-Value of a building element is a measure of the amount of heat energy that will pass through the constituent element of the building envelope. Increasing the insulation levels in each element will reduce the heat lost during the heating season and this in turn will reduce the consumption of fuel and the associated carbon emissions and operating costs.

It is the intention of the design team to exceed the requirements of the building regulations. Target U-Values are identified below.

U-Values	Range of Target Values Proposed	Part L 2019 (Residential) Compliant Values
Floor	0.15 to 0.18 W/m ² K	0.18W/m ² K
Roof (Flat)	0.15 to 0.20 W/m ² K	0.20 W/m ² K
Roof (Pitched)	0.10 to 0.16 W/m ² K	0.16 W/m ² K
Walls	0.15 to 0.18 W/m ² K	0.18 W/m ² K
Windows	0.9 to 1.4 W/m ² K	1.4W/m ² K

3.2 Air Permeability

A major consideration in reducing the heat losses in a building is the air infiltration. This essentially relates to the ingress of cold outdoor air into the building and the corresponding displacement of the heated internal air. This incoming cold air must be heated if comfort conditions are to be maintained. In a traditionally constructed building, infiltration can account for 30 to 40 percent of the total heat loss, however construction standards continue to improve in this area.

With good design and strict on-site control of building techniques, infiltration losses can be significantly reduced, resulting in equivalent savings in energy consumption, emissions and running costs.

In order to ensure that a sufficient level of air tightness is achieved, air permeability testing will be specified in tender documents, with the responsibility being placed on the main contractor to carry out testing and achieve the targets identified in the tender documents.

A design air permeability target of **3 m³/m²/hr** has been identified for the apartments on the site.

The air permeability testing will be carried out in accordance with BS EN 13829:2001 'Determination of air permeability of buildings, fan pressurisation method' and CIBSE TM23: 2000 'Testing buildings for air leakage'

3.3 Thermal Bridging

Thermal bridges occur at junctions between planar elements of the building fabric and are typically defined as areas where heat can escape the building fabric due to a lack of continuity of the insulation in the adjoin elements.

Careful design and detailing of the manner in which insulation is installed at these junctions can reduce the rate at which the heat escapes. Standard good practice details are available and are known as Acceptable Construction Details (ACDs). Adherence to these details is known to reduce the rate at which heat is lost.

The rate at which heat is lost is quantified by the Thermal Bridging Factor of the dwelling and measured in W/m^2K . The Thermal Bridging Factor is used in the overall dwelling Part L calculation, this value can be entered in three different ways:

0.15 W/m^2K	Used where the ACDs are not adhered to
0.08 W/m^2K	Used where the ACDs are fully adhered to
< 0.08 W/m^2K	Used where the thermal details are thermally modelled and considered to perform better than the ACDs

It is intended that the ACDs will be adhered where suitable details exist, and that thermal modelling will be carried out for non-standard junction details within proposed development and that the resultant Thermal Bridging Factor will be less than 0.08 W/m^2K .

4. Heat Sources & Renewable Energy Options & Proposals

All new dwellings must meet overall energy performance levels (as defined by the Energy Performance Coefficient - EPC) and must have a portion of their annual energy demand provided by renewable energy sources.

The renewable energy source can be thermal energy such as solar thermal collection, biomass boilers or heat pumps or it can be electrical energy as generated by photovoltaic solar panels or wind turbines. The minimum renewable energy contributions defined in Part L 2019 Part (b) is 20% of the total energy consumption for the dwelling.

Two main fuel sources are generally available for developments of this nature, natural gas and electricity. Each present distinct options for compliance with the new standards. Solutions involving gas as the primary fuel source will typically include a solar technology such as PV panels to meet the renewable energy requirements while solutions relying on electricity will include heat pump technology.

The options presented in Sections 5.1 to 5.4 below set out four possible means of complying with Part L 2019. Each is based on the building fabric performance levels identified in Table 1 in Section 4.

The final selection and combination of technologies will most likely be selected from these options based on a more in-depth technical and financial appraisal of the technologies which will be carried out during detailed design.

4.1 Option 1 – Individual Plant with Exhaust Air Heat Pumps

Exhaust Air heat pumps (EAHPs) operate in a very similar manner to air source heat pumps and utilise grid supplied electricity to extract thermal energy from a heat source, in this case, the internal air within the apartment. The internal air is extracted from kitchens and wet rooms and is drawn into the heat pump via ductwork in the ceiling void. The heat pump extracts heat from this air before expelling it from the apartment.

While the electricity consumed is not renewable energy, the efficiency at which a heat pump operates allows a significant portion of the heat delivered to be considered as renewable energy. The amount of heat considered to be renewable is determined by the efficiency of the heat pump and the “primary energy conversion factor” for grid supplied electricity. Typically, approximately 30% to 40% of the heat supplied is considered to be renewable energy.

There are a number of manufacturers offering products of this type and the certified seasonal efficiencies of some models can exceed 450% in heating mode and 170% to 190% in hot water mode. These efficiencies can deliver Part L 2019 compliance in most circumstances but in some instances may need supplementary PV panels in order to meet the required energy targets.

There is no requirement for a separate Mechanical Extract Ventilation (MEV) systems when an exhaust air heat pump is used as the heat pump draws the air from all wet rooms in the same manner as an MEV system would. The fan will run continuously to ensure that the minimum ventilation rates are maintained and the supply air to the dwelling is provided through trickle vents in each habitable room.

4.2 Option 2 – District Heating

This approach would involve the generation of heat in a central location on the site and the distribution of this heat to each apartment via a network district heating pipework. The central plant used to generate the heat could include Air Source Heat Pumps, Combined Heat and Power (CHP) plant and high efficiency gas fired condensing boilers.

A CHP unit uses gas as its energy source to create electricity which can be utilised within the proposed development. This process of creating electricity results in the generation of “waste heat” which can then be used to meet a proportion of the heating and hot water demands of the housing development. Since the

waste heat is captured it can be considered to be renewable energy and therefore contributes towards the overall 20% renewable energy requirement.

The Air Source Heat Pumps (ASHPs) utilise grid supplied electricity to extract thermal energy from a heat source, in this case, the external ambient air. While the electricity consumed is not considered renewable energy, the efficiency at which a heat pump operates allows a significant portion of the heat delivered to be considered as renewable energy. The amount of heat considered to be renewable is determined by the efficiency of the heat pump and the “primary energy conversion factor” for grid supplied electricity. Typically, approximately 40% to 50% of the heat supplied is considered to be renewable energy.

In order to meet the heating and hot water demands of the apartments in the proposed development a single district heating plant centre would be provided in the basement of the development. The plant centre would be required to generate approximately 500kW to 700kW of heat energy. In this arrangement, the CHP would typically be sized to provide up to 20% to 30% of the total annual energy consumption, heat pumps would provide 30% to 40% and the remaining energy demand will be met by the gas fired boilers.

Heating pipework will be installed throughout the scheme to distribute the heat generated in the plant room throughout the apartment development, serving each apartment via a heat interface unit (HIU). The HIU will both control and meter the consumption of heat and hot water within each individual dwelling allowing occupants to set the times they need space heating and ensuring they are charged accordingly.

Heat Recovery Ventilation would then be provided in order meet the ventilation needs of the apartments. Air is extracted from wet rooms and supplied to living spaces via a central unit which contains supply and extract fans and a heat exchanger. This system recovers the heat from the warm air being extracted from the dwelling and uses the heat recovered to raise the temperature of the incoming air stream leading to improved overall efficiency.

4.3 Option 3 – Electric Heaters, Hot Water Heat Pumps, Heat Recovery Ventilation & PV Panels

This approach includes the provision of electric storage & convector heaters in the living & sleeping areas to meet all of the space heating requirements with electric towel rads provided in main bathrooms and en-suites.

The hot water demand is met by a hot water heat pump which utilise grid supplied electricity to extract thermal energy from a heat source in a similar manner to an Exhaust Air Heat Pump. The heat pump is ducted directly to the external façade through insulated supply & exhaust ductwork and uses external air for the hot water needs. It can use up to 3 times less electricity than direct acting water heaters and produces renewable energy to aid Part L compliance.

Heat Recovery Ventilation would then be provided in order meet the ventilation needs of the apartments. Air is extracted from wet rooms and supplied to living spaces via a central unit which contains supply and extract fans and a heat exchanger. This system recovers the heat from the warm air being extracted from the dwelling and uses the heat recovered to raise the temperature of the incoming air stream leading to improved overall efficiency.

PV panels are also then needed to improve the overall renewable energy contribution and improve the overall energy performance of the dwellings. Generally, 1 or 2 PV panels will be required for each apartment.

5. Proposed Solutions for Newtownpark Avenue Development

The preceding sections of this report set out the regulatory requirements with which the scheme will have to comply while identifying a number of technologies and design approaches that may be utilised to achieve compliance.

The building fabric standards and the technology solutions discussed will all be assessed in greater detail during the detailed design stage of the project. A cost benefit analysis of all these available solutions will be carried out to determine the correct balance between an efficient building envelope and the most appropriate combination of technology and renewable energy systems.

The proposed approach to achieving Part L Compliance will be based on a combination of the solutions below once a detailed analysis has been completed at detailed design stage. A final decision will be made once capital costs, renewable targets and regulation compliance have all been compared to find the most appropriate solution:

The most likely overall solution that will be implemented will include the following measures

- Exceed minimum U-Value standards by 20% to 30%,
- Achieve air tightness standards of 3m³/m²/hr
- Ensure thermal bridging details are design to achieve thermal bridging factors of 0.08W/m²K or less.
- Utilise heat pump technology in the form of Exhaust Air Heat Pumps (as described in Section 4.1, Option 1)
- Achieving compliance with the energy standards set out in Part L 2019, (Dwellings) will deliver a building with an A2 energy rating.

6. Existing & Proposed Utilities

6.1 Natural Gas

There will be no requirement for Natural Gas on the site.

6.2 ESB Networks

ESB Networks have been contacted and an existing ESB network map for the area surrounding the proposed development has been obtained. Please see attached

There is extensive ESB Networks infrastructure in the vicinity of the site and we understand it has the capacity to cater for this new development.

There is an LV overhead cable crossing the site and it will be undergrounded as part of this new development in accordance with the ESB' requirements.

The approximate locations of the building substations required to provide power supply to the dwellings on site have been identified to comply with the ESB current guild lines and been discussed and final agreement will be obtained once the formal application is made. A formal application cannot be made at this stage but will be made as soon as the planning permission has been granted and the addresses are confirmed.

6.3 Openeir

Openeir have been contacted and an existing Openeir map for the area surrounding the proposed development has been obtained. Please see attached.

There is existing Openeir Networks infrastructure in the vicinity of the site, and we understand it has the capacity to cater for this new development. A formal application cannot be made at this stage but will be made as soon as the planning permission is granted.

The Openeir infrastructure will allow for multiple broadband providers.

6.4 Virgin Media

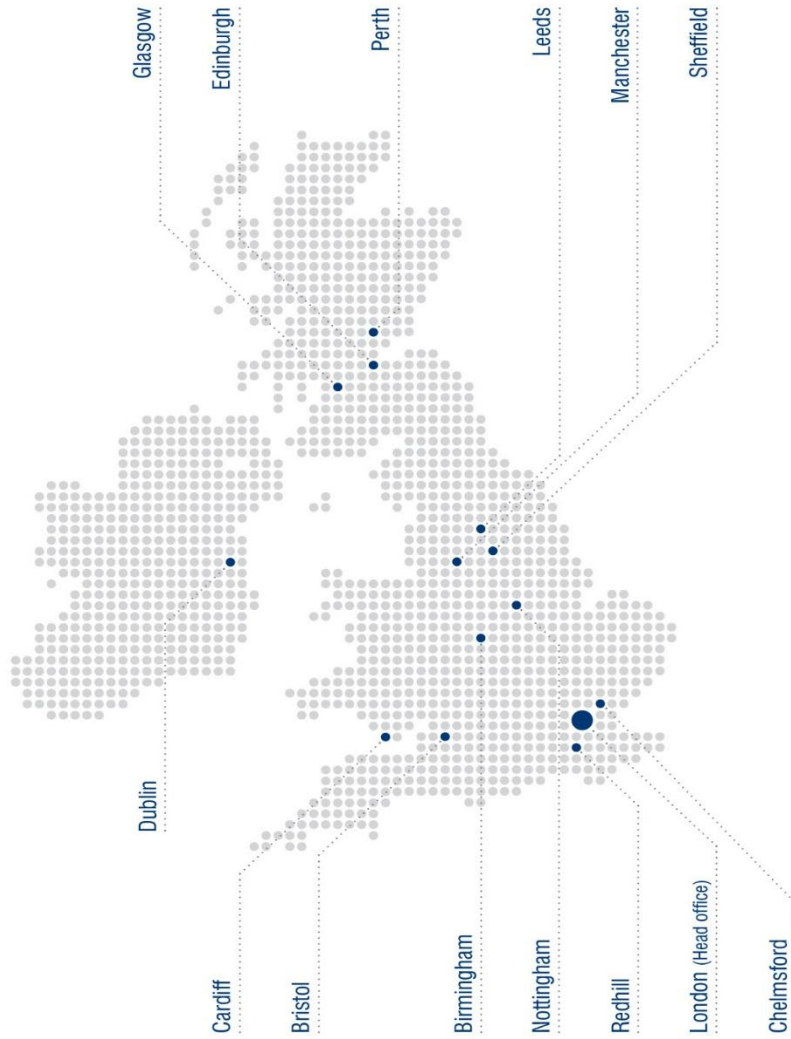
Virgin Media have been contacted and they have still advised if their Network Infrastructure is in the vicinity of the site. Once this information is received it will be incorporated into the project design

7. Microwave Telecommunication Channels.

We have reviewed the proposed development at Newtownpark Avenue and consider that the height and scale being sought for this new development will not have an impact on any current microwave telecommunication channels.

If however, a microwave link is found to be effected by this new development, during the construction stage of this project, mitigation will be employed by engaging with the telecommunication company and organising the re-alignment of their microwave links to a new hop site.

UK and Ireland Office Locations





PLANT REQUESTED FROM eircom emaps CBYD SERVICE

<https://cbyd.emaps.eircom.ie/>

Scale: 1:1000

Date: 02/04/2020

Irish National Grid Co-Ordinates
Centre XY: 321993 m, 228511 m

emaps CBYD

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COLOUR CODE:

- BLACK - 38KV & HIGHER VOLTAGE OVERHEAD LINES
- GREEN - MV(10KV/20KV) OVERHEAD LINES
- BLUE - LV (400V/230V) OVERHEAD LINES
- CYAN - 38KV & HIGHER VOLTAGE UNDERGROUND CABLE ROUTES
- RED - MV/LV (10KV/20KV/400V/230V) UNDERGROUND CABLE ROUTES

DATE: 02-Apr-2020
 ** SCALE: 1:1500

** SCALE WHEN PRINTED ON AN A3 PAGE
 XY COORDINATES DISPLAYED IN IRISH GRID COORDINATE SYSTEM

WARNING

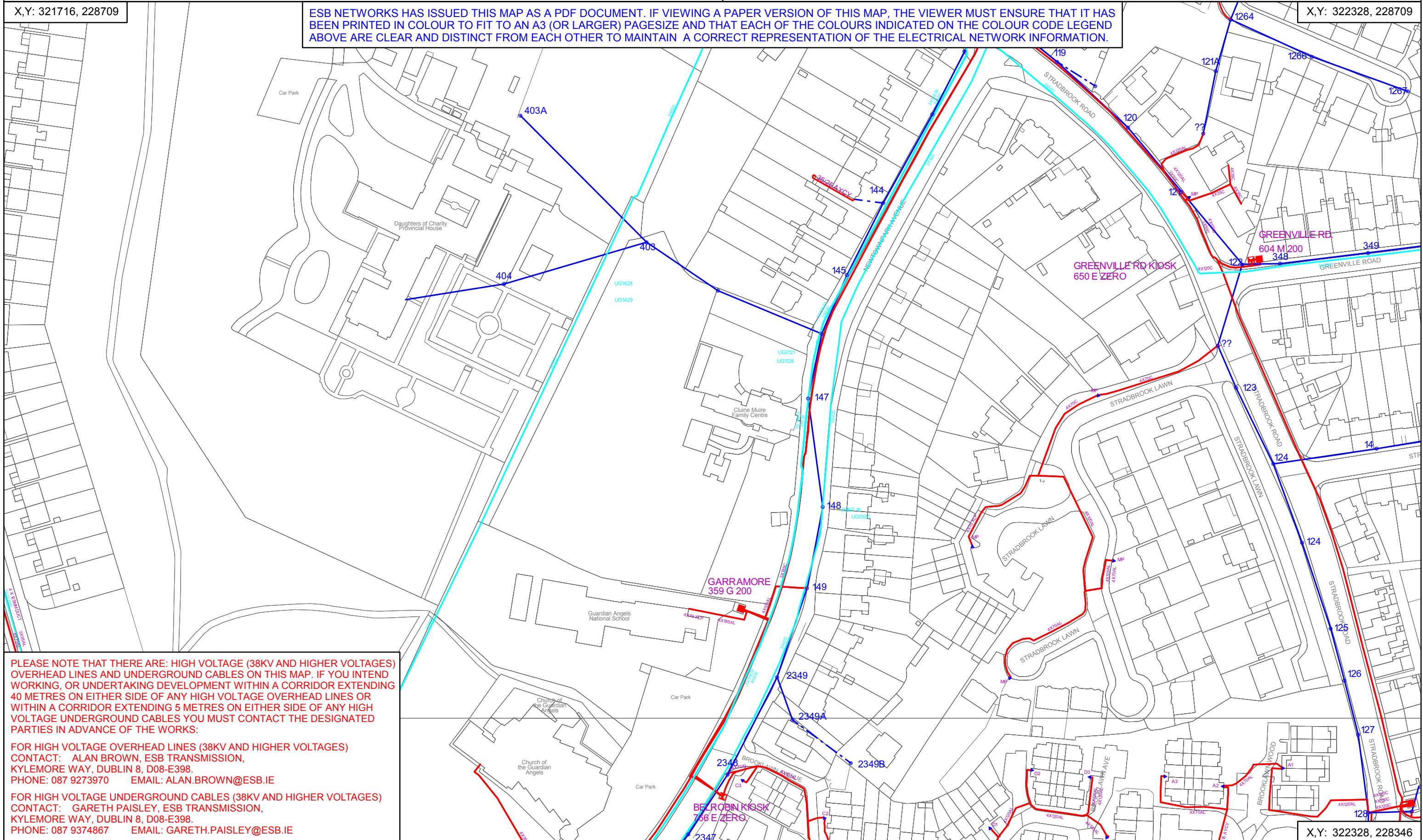
THIS MAP INDICATES THE APPROXIMATE LOCATION OF ESB TRANSMISSION (400KV, 220KV, 110KV, 38KV) AND DISTRIBUTION (20KV, 10KV, 230V/400V) UNDERGROUND CABLES AND OVERHEAD LINES IN THE GENERAL AREA OF THE PROPOSED WORKS. ESB NETWORKS TAKES NO RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THE MAP. IT IS THE USER'S RESPONSIBILITY TO INDEPENDENTLY VERIFY THE INFORMATION AND THE LOCATION OF UNDERGROUND CABLES AND OVERHEAD LINES. LOW VOLTAGE (230V/400V) SERVICE CABLES (E.G. HOUSE SERVICES, FACTORY/SHOP SERVICES, PUBLIC LIGHTING LAMP SERVICES, ETC) ARE NOT INCLUDED BUT THEIR PRESENCE SHOULD BE ANTICIPATED. THE DEPTHS OF UNDERGROUND CABLES MUST NEVER BE ASSUMED. ADDITIONAL MORE DETAILED INFORMATION IS AVAILABLE FOR HIGH VOLTAGE TRANSMISSION UNDERGROUND CABLES (38KV, 110KV, 220KV, 400KV) FROM THE LOCAL ESB NETWORKS TRANSMISSION REPRESENTATIVE - SEE ATTACHED LIST FOR CONTACT DETAILS OR CALL 1850 372 757. NO WORK SHOULD BE CARRIED OUT IN THE VICINITY OF 38KV OR HIGHER VOLTAGE UNDERGROUND CABLES WITHOUT PRIOR CONSULTATION WITH ESB NETWORKS. BEFORE ANY MECHANICAL EXCAVATION IS UNDERTAKEN, THE ACTUAL LOCATION OF ALL UNDERGROUND ELECTRICITY CABLES MUST BE ESTABLISHED AND VERIFIED ON THE SITE USING: (A) UP-TO-DATE MAP RECORDS; (B) CABLE LOCATER EQUIPMENT OPERATED IN BOTH POWER AND RADIO MODES; (C) CAREFUL HAND DIGGING OF TRIAL HOLES USING 'SAFE DIGGING PRACTICE'. REFER ALSO TO 'HSA CODE OF PRACTICE FOR AVOIDING DANGER FROM UNDERGROUND SERVICES'. ESB TAKES NO RESPONSIBILITY FOR AND SHALL BEAR NO LIABILITY, HOWSOEVER ARISING, IN RELATION TO ANY DAMAGE, INJURY/DEATH OR LOSS OF SUPPLY AS A RESULT OF DAMAGE OR INTERFERENCE WITH ITS NETWORKS.

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X,Y: 321716, 228709

ESB NETWORKS HAS ISSUED THIS MAP AS A PDF DOCUMENT. IF VIEWING A PAPER VERSION OF THIS MAP, THE VIEWER MUST ENSURE THAT IT HAS BEEN PRINTED IN COLOUR TO FIT TO AN A3 (OR LARGER) PAGESIZE AND THAT EACH OF THE COLOURS INDICATED ON THE COLOUR CODE LEGEND ABOVE ARE CLEAR AND DISTINCT FROM EACH OTHER TO MAINTAIN A CORRECT REPRESENTATION OF THE ELECTRICAL NETWORK INFORMATION.

X,Y: 322328, 228709



PLEASE NOTE THAT THERE ARE: HIGH VOLTAGE (38KV AND HIGHER VOLTAGES) OVERHEAD LINES AND UNDERGROUND CABLES ON THIS MAP. IF YOU INTEND WORKING, OR UNDERTAKING DEVELOPMENT WITHIN A CORRIDOR EXTENDING 40 METRES ON EITHER SIDE OF ANY HIGH VOLTAGE OVERHEAD LINES OR WITHIN A CORRIDOR EXTENDING 5 METRES ON EITHER SIDE OF ANY HIGH VOLTAGE UNDERGROUND CABLES YOU MUST CONTACT THE DESIGNATED PARTIES IN ADVANCE OF THE WORKS:

FOR HIGH VOLTAGE OVERHEAD LINES (38KV AND HIGHER VOLTAGES)
 CONTACT: ALAN BROWN, ESB TRANSMISSION,
 KYLEMORE WAY, DUBLIN 8, D08-E398.
 PHONE: 087 9273970 EMAIL: ALAN.BROWN@ESB.IE

FOR HIGH VOLTAGE UNDERGROUND CABLES (38KV AND HIGHER VOLTAGES)
 CONTACT: GARETH PAISLEY, ESB TRANSMISSION,
 KYLEMORE WAY, DUBLIN 8, D08-E398.
 PHONE: 087 9374867 EMAIL: GARETH.PAISLEY@ESB.IE

X,Y: 322328, 228346