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West Gate House Drogheda
M&E Strategy Report

Westgate House – Drogheda Thrive
M&E Strategy Report

Document Control Sheet

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ORS

Table of Contents

Introduction

ORS were engaged by Shaffrey Architects to undertake an M&E design for the site of the current West Gate House upgrade in West Street, Drogheda. The report summarises the M&E Strategy for the upgraded building.

The report outlines the mechanical and electrical design elements to meet the proposed approach to M&E design. This building is a listed building with Reg number 13618009 on the National Built Heritage Service website. Technical Guidance Document L Buildings other than dwellings notes 'Part L does not apply to works (including extensions) to an existing building which is a "protected structure" or a 'proposed protected structure" within the meaning of the Planning and Development Act 2000 (No. 30 of 2000)'.

In other words, Part L compliance is not strictly required for a protected structure; however, reasonable energy efficiency measures should be implemented where they do not impact the historic character of the building, as per the principles set out in SEAI and Heritage Council guidance.

The proposed approach is summarised in the following pages.

A view of the property is shown in Figure 1 below.

Figure 1: Westgate House, Drogheda

The design will follow the below regulatory requirements as applicable

- Irish Building Regulations:
- Part L (Conservation of Fuel and Energy).
- Part F (Ventilation).
- Part J (Heat-Producing Appliances).
- EU Energy Performance of Buildings Directive (EPBD).
- SEAI guidance on NZEB compliance.
- Local Authority planning guidance

1 Mechanical Services Strategy

1.1 Mechanical Plant

Plant will be located in the specified plant areas on the lower ground and basement floors. Exact locations and specifications of plant to be determined at detail design stage. Due to the age of the structure the heating plant will have to be appropriate for the design heating loads as applicable to the renovated structure, and occupancy patterns.

1.2 Soils and Waste

The soils and waste system will serve all plant rooms, kitchens and toilets, and any other space within the building requiring drainage. Pipes shall be appropriately fire-stopped at compartment lines and will discharge into the drainage. Invert level of the local drainage to be confirmed by civil works team.

1.3 Water Services

Mains water will be run from the meter and feed the mains water break tank. The mains water break tank will need to be located in a weathered and insulated enclosure. The mains water booster pump will pump water to the Cold-water storage tank (CWST), external taps and the kitchens. The CWST will be of a split sectional tank configuration and be located on the lower ground floor. Water will be pump fed via the cold-water booster to the pipe system supplying water throughout the building where it is required.
The water tank and plinth will be heavy and consideration of the proposed location will have to reviewed by the structural team to ensure the location is appropriate.

- Confirm load-bearing capacity of historic floors.
- Ensure no risk of damage to underlying historic foundations.
- Consider alternative tank locations to reduce structural impact.

1.4 Gas Services

There is gas services close by, as noted on the utility survey. Even though TGD Part L is not applicable to this building, consideration will be given to decarbonised heating and hot water provision if technically and economically feasible.

1.5 Heating Services

Heating will be provided to all spaces, taking account of the building's thermal response and activities within. Spaces will be thermostatically controlled and will be heated via radiators or fan coil units or chilled beams.

1.6 Cooling Services

Cooling will be via fan coil units or chilled beams and will be appropriate to each individual space within the building. Great care will have to be taken with structural penetrations due to the historic nature of the building.

1.7 Ventilation Services

The building will comply with TGD F Ventilation, without compromising the buildings historic character. The ventilation system shall maintain indoor air quality and control internal moisture levels. Duct routes and wall penetrations shall be sensitive to the historic nature of the building. IAQ monitoring shall be used to optimise the ventilations rates.

2 Electrical Services Strategy for Refurbishment

Electrical Plant

2.1.1 Existing Electrical Plant

All existing electrical plant will be stripped out as the building is derelict and in very poor condition.

2.1.2 New Installation

New electrical installation will be fed from a main distribution board located in plant room on the lower ground floor level.

A new sub-distribution boards will feed the following systems/areas:

- Boiler/Plant room (MCC panel)
- Ground Floor
- First floor

The new Main Distribution board will also take in electrical feeds from the following systems:

- Solar PV array (power output TBC)

2.2 General and Data Outlets

2.2.1 Existing General Power & Data

All existing power and data services will be stripped out as the layout of the building is now changing and all existing services are in very poor condition.

2.2.2 New installation

All Accessories/Switches to be either MK, Hager or otherwise approved. All sockets and switches will be plastic facades. All sockets will meet Part M requirements.

Figure 2: Example of a Part M compliant socket

All general power and lighting cabling will be LSZH 6242B T&E cable that meet the Dca CPR cable rating.
Data cables will be CAT6a or fibre in fibre tubing to ensure internet speeds and to future proof

for improvements in the data network. All data cabling shall meet the Dca CPR cable rating.

2.2.3 Lighting

2.2.4 Existing lighting

All existing lighting and emergency lighting will be stripped out and removed.

2.2.5 New Lighting Installation

All fittings will be LED type. Switching will be controlled through local switches and/or passive infrared sensors (PIR).

Lighting	
Offices/Staff Rooms	600x600 within a lay-in ceiling or Battens
Maker's Rooms	Linear suspended lighting solution. May change depending on the use case of each room.
Entrance	Linear suspended lighting solution
Community Rooms	600x600 within a lay-in ceiling or Battens
Coffee Shop	Surface Mounted Vapour Proofs in addition to any Decorative architectural lighting.
Plant Rooms	Battens with Integral Sensor
Toilets	Recessed Spot lighting with PIRs
Circulation/ Corridor Areas	Linear suspended lighting solution within the centre of each corridor/Circulation area.
External Areas	LED mounted atop lighting columns & LED downlighters

2.2.6 External lighting

Lighting in all areas will be calculated using lighting design software that includes all roads, foopaths, cycle lanes and pedestrian walkways including the lower footpath below the raised Walkway.

Unless otherwise stated by ESB Networks, existing mini-pillars in the area will be used to provide power to the new external lighting. A provision of commando sockets to the lighting columns will be allowed for to provide for ready access to power for seasonal/festive lighting. No bollards will be considered due to damage and maintenance concerns. In areas where lighting columns cannot (or are preferred not to) be installed, LED downlighters will be allowed for. External lights will cover all lights at external entrances and to roof podium. External lighting at roof podium will be recessed lighting installed in the masonry parapet.

The Ecologist has highlighted the importance of reducing the lighting levels around the area of the waterfront due to the presence of bats in the area (See Metec Report dated 10/11/23). This concern has been considered in overall lighting strategy.

2.3 Protective Services

2.3.1 Existing Protective Services

All existing Fire Alarm & Detection and CCTV security installation will be stripped out.

2.3.2 New Installation

2.3.3 Fire Detection & Alarm System

Smoke/Heat/Carbon monoxide detectors will be fitted to ensure compliance with the latest version of IS 3218 and Part B of the Building Regulations. Smoke, heat and void detectors will be located to ensure compliance with an L2/L3 system in compliance with IS 3218:2024.

All detectors and devices will be fed with FP120 Fire-Tuff cabling throughout the building.

The Fire alarm panel will be located at the front entrance of the building at the reception desk area.

2.3.4 CCTV Security System

The CCTV security system will be suitable installed for the protection of property, equipment and other plant as well as providing coverage for security to manage and monitor security and safety of staff, customers and visitors.

Cameras will be fitted to record and document all visitors in the main entrance area and to monitor all other entrances/exits.

Camera feeds will be recorded and stored for a minimum of 31 days.

2.4 Renewables

A new PV array could be located on the roof, if requested. This would contribute to reducing the electrical energy consumption of the building, even though TGD L is not applicable.

The actions outlined above should be carried out with due care by a competent contractor. The contractor shall be responsible for maintaining the integrity and overall stability of the existing and adjoining structures for the duration of any remedial works carried out.

3.0 ADS Energy Retrofit Strategy Report

See attached

3.1 Energy Retrofit Strategy – ORS Review Comments

- While producing the M&E strategy ORS noted the building is a listed building with Reg number 13618009 on the National Built Heritage Service website. Technical Guidance Document L states Buildings other than dwellings notes 'Part L ***does not apply to works (including extensions) to an existing building which is a "protected structure" or a 'proposed protected structure***" within the meaning of the Planning and Development Act 2000 (No. 30 of 2000)'.

- ORS design will in the first instance utilising renewable sources of heating and cooling to control the internal environment wherever possible

- The design statement report notes a high level of airtightness is necessary to ensure efficiency of the space heating system. This will require very detailed management & coordination within Design Team

- Old fabrics must remain vapour permeable, and correct thermal bridging and WUFI analysis would be required in order to validate retrofit designs and ensure no moisture risk over time.

- Glazing properties will have an effect on heating and cooling. Optimised U and G values will assist on mitigating overheating risks and heat losses.

- Once above information is finalised, the U values shall be issued to ORS for inclusion in the thermal calculations.

- The heating and cooling loads will then be accurately determined to ensure appropriate plant sizing.

- PV may be installed on the roof, subject to confirmation from the structural team and architects that the roof will have the load bearing capacity to take the weight of a PV system.

All of the above referenced measures will have to be properly considered at detailed design stage, considering the use of the building, and any structural limitations regarding M&E openings in old facades.

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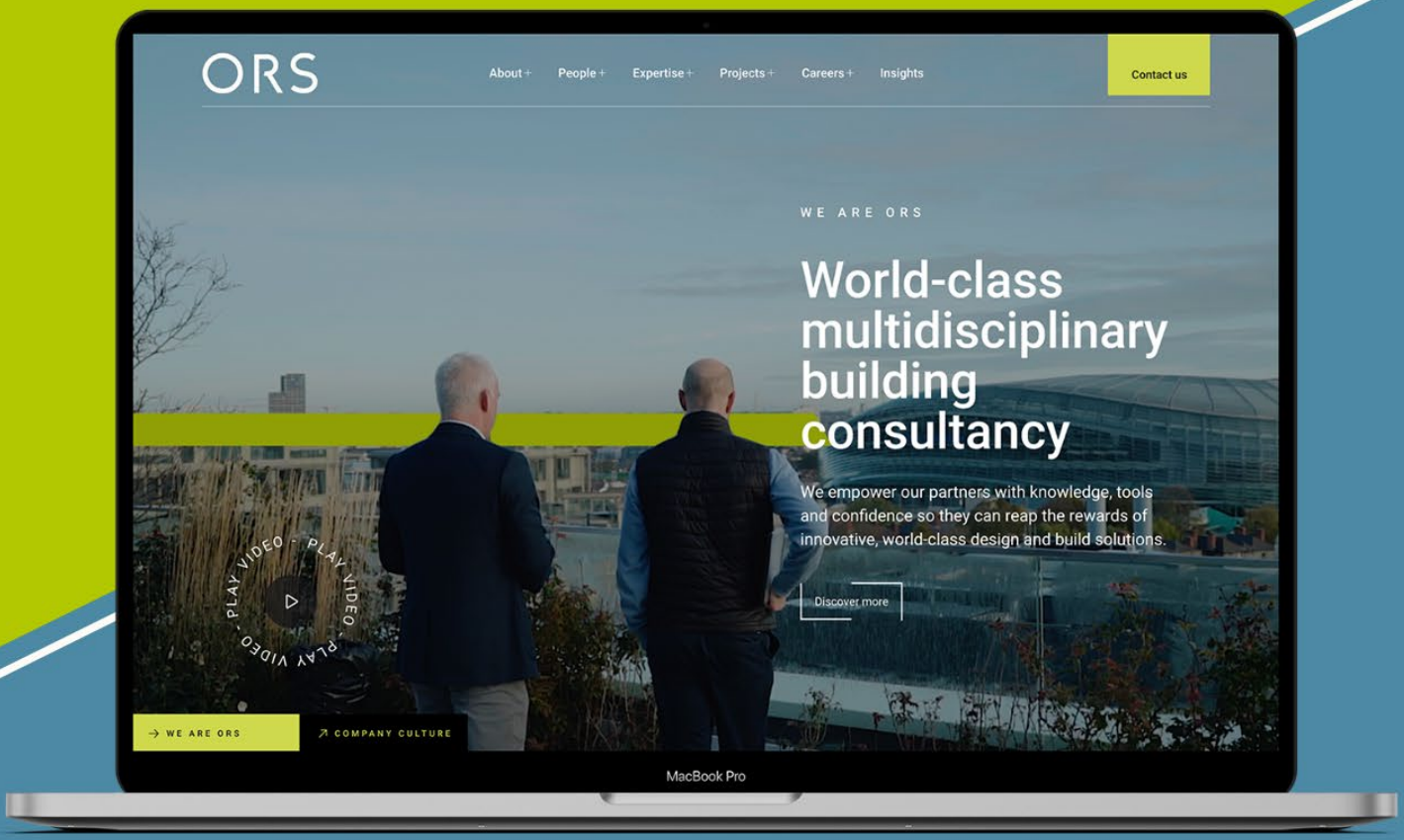

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Energy Retrofit Strategy

Context:

Energy Performance of Buildings Directive

The Energy Performance of Buildings Directive is the European Union's main legislative instrument aiming to promote the improvement of the energy performance of buildings within the European Union. European Union's Energy Performance of Buildings Directive (EPBD) foresees the de-carbonisation of existing building stock by 2050.

Renovation of Existing Buildings -Current status

The revised EPBD (EU/2023/1791), sets out Ireland's long-term framework for the renovation of existing buildings. The revised Technical Guidance Document L 2022 (Conservation of Fuel and Energy) Dwellings and Buildings Other Than Dwellings have been published to accompany the Regulations.

The Directive requires that where major renovations (defined as a renovation where more than 25% of the surface envelope of the building undergoes renovation) are carried out on a building, the building should achieve a cost optimal energy performance. This applies insofar as is technically, functionally and economically feasible. Implementation of zero-emission building standards have to date not been included in the Part L Building regulations.

Ireland's Long-Term Renovation Strategy 2020:

Ireland's Climate Action Plan targets that all public sector buildings will be retrofitted to a BER B by 2040

NZEB

Nearly Zero Energy Building (NZEB): means a building that has a very high energy performance, as determined in accordance with Annex I of the EU Energy Performance of Buildings Directive Recast (EPBD Recast) 2010/31/EU of 19 May 2010. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby.

Climate Action Plan 2024

Public Sector Building Stock De-carbonisation, Implementation and Co-ordination Plan

- Continuation of public sector building stock de-carbonisation within the Public Sector Building Stock De-carbonisation Annual Planning Framework

The Climate Action and Low Carbon Development (Amendment) Act 2021 commits Ireland to reach a legally binding target of net-zero emissions no later than 2050, and a cut of 51% by 2030 (compared to 2018 levels).

Current Public sector building obligations for

Energy performance and retrofit

Existing Obligations

- Must implement BER advisory report recommendations within the period of BER validity [SI 243 of 2012]
- Any major renovations11 must upgrade to 'cost optimal level' [Building Regulations]

Emerging obligations

- New energy performance thresholds

Renewable energy

Existing obligations

- Must consider feasibility of high efficiency alternative energy systems [SI 243 of 2012]
- Cannot install fossil-based heating systems after 2023 (except in certain exceptional circumstances) [CAP 2023]

Emerging Obligations

- 49% of energy use across commercial, public & residential buildings to be from renewable sources by 2030 [EU Fit for 55, RED3]
- Solar PV on all new buildings (>250m2) by end 20268 [EU Fit for 55, EPBD]
- Solar PV on all existing buildings (>250m2) by end 20278 [EU Fit for 55, EPBD]

Retrofit Strategy

The retrofit strategy is based on the framework suggested in the European standard I.S. EN 16883:2017 Conservation of cultural heritage and Guidelines for improving the energy performance of historic buildings (European Committee for Standardization, 2017)

The strategy is informed by published guidance from the Department of Housing, Local Government and Heritage, Improving the Energy Efficiency of Traditional Buildings: Guidance for Specifiers and Installers (2023) as well as the Architectural Heritage Protection Guidelines for Planning Authorities (2011).

Project Target
NZEB for all new buildings is being implemented through Part L 2017, Conservation of Fuel and Energy – Buildings other than Dwellings
Key components of Performance requirements

- Improved Fabric
- Advanced Services and Lighting
- Renewable Energy
- Major renovation

The implementation for meeting NZEB standards for existing building currently is through major renovation energy performance requirements, For new non-domestic building nZEB typically corresponds to A3 Building energy rating. (SEAI) .

The target energy performance objective for the building is nZEB compliance is so far as is technically and functionally feasible taking heritage value into consideration.

The classification of these buildings and structures as a Recorded Monument, Protected Structure or within and Architectural Conservation Area bestows additional statutory protection on that structure, and as such can define or possibly limit interventions that can be proposed. This could mean not all the objectives set out in the energy upgrade strategy can be achieved as it is important to =balance the need to improve the energy performance of the building with maintaining and protecting its special architectural heritage.

When undertaking works on, or in connection with, a building that is of architectural or historical interest or permeable traditional construction, the aim should be to improve the energy efficiency as far as is reasonably practicable in accordance with best conservation practice . The work should not prejudice the character of the building or increase the risk of long-term deterioration.

Technical Guidance Document (TGD) Part L 2022 – Buildings other than Dwellings
Major Renovation
TGD Part L 2022 – Buildings other than Dwellings provides two means of achieving cost optimal level:
1. Specific service energy performance improvements (Section 2.3.4); or
2. Achieving a defined Cost Optimal Energy Performance Level (Section 2.3.5)
Cost Optimal energy performance levels are defined for several building types in TGD Part L

Retrofit plan:

Implement all energy performance upgrades of the building. as part of the development work.
A fabric first approach will be taken

Heritage Value
The Architectural Heritage Impact Assessment Report has established the significance of the buildings/structures and determined the level of acceptable intervention to avoid adverse impact on the heritage special interest values of the buildings

Environment and Context
A comprehensive assessment will consider the current context and condition of the building in order to identify constraints and potential opportunities for improvements. This allows for informed decisions to be made regarding energy efficiency improvements to protect the architectural heritage and occupants' health.

Energy Performance
Guidance is provided by the following standards –

- EN 16247-2:2022 outlines the requirements, methodology and deliverables for energy audits of buildings or groups of buildings,
- EN 15603:2008 provides a frameworks for the assessment of overall energy use and calculation of energy ratings in buildings, and
- EN 15643:2021 describes the procedures to used to assess the economic, social and environmental performance of buildings.

The general intention of the energy performance objectives to achieve the best possible energy performance upgrades while also respecting the heritage significance of the building. Objectives will be assessed against the following criteria to assess their suitability as referred to in IS EN 16883:2017:

- Technical compatibility with the existing structural, constructional, technical systems;
- Heritage significance of the building and its settings;
- Economic viability;
- Energy performance – sustainability;
- Indoor environmental quality;
- Impact on the outdoor environment;
- Aspects of use.

Building condition and fabric

Major defects will be addressed in the overall works programme. Moisture damage is one of the most common issues with historic buildings and can cause major issues. Porous building fabric that has excessive moisture, particularly walls, will result in increased thermal transmittance increasing heat loss.

Traditional buildings physics:

Vapour permeability:

Traditional solid walls rely on the permeability of the building fabric to allow water vapour to evaporate during periods of drying out. This permeability must not be inhibited.

Moisture movement:

Traditional building fabric has the ability to absorb moisture (both internally and externally) and then release it. Trapping moisture within the fabric can cause serious negative consequences.

Air tightness/ventilation:

Traditional buildings would often rely on natural ventilation through the fabric to maintain a stable indoor environment. This must not be confused with draughts, which are uncontrolled excessive air flow through poorly maintained or defective fabric (i.e. poorly sealed windows, gaps/cracks in fabric). Creating a more airtight fabric will require the provision of additional ventilation to be considered.

Passive Strategies

Target Fabric Upgrades for the existing buildings

- Roofs

Insulating an attic or roof is generally one of the most effective and non-intrusive measures. All existing roofs will be upgraded.

- Floors

Areas of flooring without sensitive finishes will be upgraded. The basement flooring within the footprint of West Gate House and rear annex range contain cobble and sett finishes. and will not be lifted . unless archaeological investigation determines that this is acceptable.

- Walls

The deteriorated condition of internal plaster finishes indicate that plaster renewal will be necessary providing opportunity to provide internal insulation to walls .Interior are plain without decorative ceiling constraint Hygrothermal risk analysis will be carried out to assess risk and determine an appropriate level of insulation. The stone walls within the footprint of West Gate House and rear annex range are whitewashed , upgrade in these areas will not be feasible due to impact on the heritage value.

- Windows

Th existing windows suitable for retention are capable of being upgraded to improve thermal performance suing narrow cavity double glazing with draft-proofing measures. A similar approach will be taken with new replacement windows.

- Airtightness improvement

Upgrade works will inherently improve the airtightness of the existing buildings. Good levels of airtightness will be achieved while maintaining vapour permeable of building fabric.

New Build Element

New build elements will meet building fabric performance requirement of Part L as indicated in the Techincal Guidance Document Part L and improvement on these standards will be achieved where technically feasible and practicable to implement.

Thermal Modeling

Thermal software modeling will be used to assess the iterative addition of upgrades to determine the most effective and beneficial upgrade solutions . NEAP software or Simplified Building Energy Model (SBEMie) or other approved software will be used to publish non-domestic BER's and demonstrate compliance with Part L.

Services De-carbonisation and Energy use

(Refer to ORS report on M&E strategy)

Overall services strategy will be tested in parallel with fabric upgrade strategy
The target areas are as follows

- Space Heating
- Hot water heating
- Ventilation
- Lighting

Space Heating

Fossil fuel heating is not considered an acceptable space heating strategy . There are various renewable energy solution available however the building and site constraints have determined that Air Source Heat Pumps are the most appropriate solution. Air source heating pumps are considered as a viable sustainable heating, and hot water generation strategy for the project.

Water Heating

In most instances the water heating will be supplied by the same heating source as the space heating system. In certain instances, where it may be more appropriate and suitable a separate system, such as a dedicated under-counter electric heater for wash hand basins, where hot water requirements are typically low will be provided.

Ventilation

A high level of airtightness is necessary to ensure the efficiency of the space heating system requirement wiith a need for controlled ventilation.The complexity and spatial arrangement of building suggest a Hybrid ventilation system (natural and mechanical) will be required. The ventilation system will maintain indoor air quality and control internal moisture levels. Internal air quality (IAQ) monitoring will be used to optimise the ventilation rates. Managed ventilation solution will be considered within local areas where installation impact is not acceptable
Where full mechanical system is required AHU recovery will be utilised.

Lighting

LED lighting will be fitted throughout Light control systems will also assist in managing efficient use

Photovoltaics

The installation of PV array has been considered for this project . It has been determined the south facing roof of the Drogheda Youth Development Building is suitable for PV installation.. Other areas were assessed but determined not acceptable due to adverse impact on heritage value.