

Former Congregational Church, Street Lane, Ardingly,
West Sussex, RH17 6UB
Energy & Sustainability Statement

18th September 2024

Version 2

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1 Introduction

The following energy and sustainability statement has been prepared to support the planning application for Former Congregational Church, Street Lane, Ardingly, West Sussex, RH17 6UB

The proposed development comprises the conversion and change of use of a former Congressional Church in the village of Ardingly, East Sussex to a 3 bed family home with 1 no. associated on site parking space.



Location Plan
1:1250

Figure 1.1 Former Congregational Church, Ardingly - Site location

This report summarises the energy efficiency, sustainable design and construction measures that have been incorporated into development in order to meet the sustainability requirements of Mid Sussex District Council.

2 Policy

2.1 National Planning Policy Framework (NPPF) (2023)

So that sustainable development is pursued in a positive way, at the heart of the Framework is a presumption in favour of sustainable development.

Plans and decisions should apply a presumption in favour of sustainable development.

For plan-making this means that:

- a) all plans should promote a sustainable pattern of development that seeks to: meet the development needs of their area; align growth and infrastructure; improve the environment; mitigate climate change (including by making effective use of land in urban areas) and adapt to its effects;
- b) strategic policies should, as a minimum, provide for objectively assessed needs for housing and other uses, as well as any needs that cannot be met within neighbouring areas, unless:
 - i. the application of policies in this Framework that protect areas or assets of particular importance provides a strong reason for restricting the overall scale, type or distribution of development in the plan area; or
 - ii. any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole.

For decision-taking this means:

- c) approving development proposals that accord with an up-to-date development plan without delay; or
- d) where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date, granting permission unless:
 - i. the application of policies in this Framework that protect areas or assets of particular importance provides a clear reason for refusing the development proposed; or
 - ii. any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole

2.2 Mid Sussex District Plan 2014 – 2031

DP39: Sustainable Design and Construction

Strategic Objectives: 1) To promote development that makes the best use of resources and increases the sustainability of communities within Mid Sussex, and its ability to adapt to climate change.

All development proposals must seek to improve the sustainability of development and should where appropriate and feasible according to the type and size of development and location, incorporate the following measures:

- Minimise energy use through the design and layout of the scheme including through the use of natural lighting and ventilation;
- Explore opportunities for efficient energy supply through the use of communal heating networks where viable and feasible;
- Use renewable sources of energy;
- Maximise efficient use of resources, including minimising waste and maximising recycling/re-use of materials through both construction and occupation;
- Limit water use to 110 litres/person/day in accordance with Policy DP42: Water Infrastructure and the Water Environment;
- Demonstrate how the risks associated with future climate change have been planned for as part of the layout of the scheme and design of its buildings to ensure its longer term resilience

2.3 Building Regulations Part L1/2 2022

Where there is a material change of use of the whole building, such work shall be carried out as is necessary to ensure that the building complies with the applicable requirements of Part L1.

Where existing thermal elements are retained, reasonable provision would be to upgrade those thermal elements whose U-value is worse than the threshold values provided in Part L1/L2 to achieve U-values as stated within the documents.

Material Change of Use

In normal circumstances, reasonable provision where there is a material change of use or a change to the building's energy status:

Where controlled services or fittings are being provided or extended, to meet the standards set out in Part L1 / Part L2. If the area of openings is more than 25% of the total floor area, either openings should be reduced or the area be compensated

Where the work involves the provision of a thermal element, to meet the standards set out in Part L1 / Part L2

Where the thermal element is being retained, to upgrade it if applicable to meet the standards set out in Part L1 / Part L2

Where an existing window or door which separates a conditioned space from an unconditioned space has a U-value worse than 3.3 W/m²K, to provide a replacement to meet the standards set out in Part L1 / Part L2

3 Energy Strategy

3.1 Energy Performance

An energy strategy has been developed following the energy hierarchy ‘Be Lean, Be Clean, Be Green, Be Seen’. Energy calculations using Building Regulations approved and accredited software have been undertaken to calculate the savings associated with the measures incorporated.

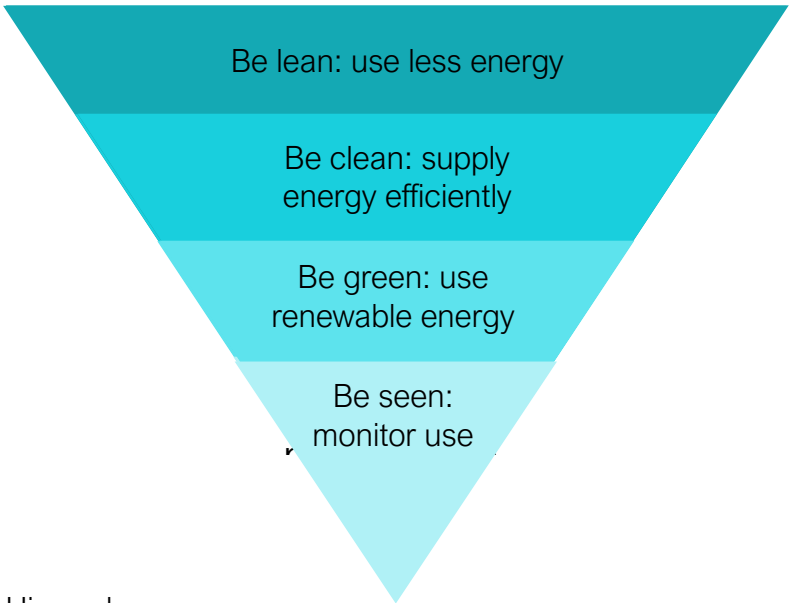


Figure 3-1 The Energy Hierarchy

The energy consumption and carbon emission figures within this report have been calculated in line with Part L1 using the approved Standard Assessment Procedure for the Energy Rating of Dwellings (SAP). This report has been produced by Lucy Walsh who is an On Construction Domestic Energy Assessor (OCDEA).

3.2 Be Lean

As part of the Be Lean approach, passive design measures have been considered throughout the pre-planning stage to reduce initial energy demand.

Solar gain control, overheating & daylight

As an existing building, there are limitations on what can be done with the glazing in terms of orientation and size. All existing glazing that is being retained is double glazed. Some units will be replaced to accommodate changes in layout and the repositioning of external walls and internal layout. The new glazing will incorporate low emissivity coatings to limit overheating without compromising light transmittance.

Mechanical ventilation with heat recovery (MVHR) is proposed to provide fresh air efficiency whilst retaining the heat already generated within the building. By specifying mechanical ventilation, this ensures that the dwelling will have access to continuous ventilation even in times where windows

would need to stay shut, for example to mitigate noise or air pollution. The ventilation strategy will provide filtered air and therefore results in maintained high quality of air supply.

A natural ventilation strategy will be available when preferred through openable windows. The dwelling benefits from dual aspect openings and a double height living space which will encourage cross and stack ventilation.

Building fabric

Designing an efficient thermal envelope will reduce the need for space heating and cooling as heat transmittance through the thermal elements is reduced.

As part of a ‘fabric first’ approach, thermal upgrades to the existing building fabric have been considered and specified to exceed current Building Regulations minimum requirements, as detailed in Table 3.1 below.

Fabric Component	Residential Specification Existing – (In line with Appendix 3 of GLA’s Energy Assessment Guidance June 2022).	Residential Specification Proposed
Existing external walls – main hall	0.30 W/m2K (solid brick wall with 100-125mm internal insulation)	0.30 W/m2K
Existing external walls – extensions	0.3 W/m2K	0.15 W/m2K (Upgraded insulation)
New walls	n/a	0.15 W/m2K
Flat roof	0.16 W/m2K (assumed)	0.12 W/m2K (Upgraded insulation)
Sloped roof above main hall	0.16 W/m2K (assumed)	0.12 W/m2K (Upgraded insulation)
Plane roof above extensions	0.16 W/m2K (assumed)	0.12 W/m2K (Upgraded insulation)
Ground Floor – main hall	0.25 W/m2K	0.25 W/m2K (Upgraded insulation)
Ground Floor – extensions	0.25 W/m2K	0.12 W/m2K (Upgraded insulation)
Existing windows - double	1.6 W/m2K	1.6 W/m2K
New windows / glazed doors	n/a	1.2W/m2K
Existing external doors	3 W/m2K	n/a
New external doors	n/a	1 W/m2K
Air Tightness	Default	5 (m3/h m2 @ 50 Pa)
Thermal Bridging	Default	Default

Table 3.1 Proposed fabric improvements

Building services

Lighting

100% of the proposed lighting will be provided by LED and low energy light fittings specified to have a luminous efficacy greater than 105 lm/W.

All external lighting will be adequately controlled to ensure that spaces are only lit out of daylight hours and when the area is occupied.

Ventilation

Mechanical ventilation with heat recovery (MVHR) is proposed to provide fresh air efficiency whilst retaining the heat already generated within the building. By specifying mechanical ventilation, this ensures that the dwelling will have access to continuous ventilation even in times where windows would need to stay shut, for example to mitigate noise or air pollution. The ventilation strategy will provide filtered air and therefore results in maintained high quality of air supply

A natural ventilation strategy will be available when preferred through openable windows. The dwelling benefits from dual aspect openings and a double height living space which will encourage cross and stack ventilation.

Metering

A smart energy metering system will be installed to allow for monitoring and management of energy consumption.

Space Heating and Hot Water

Space heating and hot water will be provided by an internal air source heat pump as discussed in more detail in the next section.

In order to boost the efficiency of the hot water supply, a waste water heat recovery system will be investigated at detailed design, to be installed for each shower and bath.

Material Change of Use

As per the Part L1 material change of use criteria, all the minimum fabric standards have been met. However the criteria also require that where the glazing to floor area ratio is more than 25% that this is compensated for.

The project comprises the conservation and change of use of an existing building and as such will retain and utilise existing openings. This will impact the area of glazing of the proposed building.

Table 3.3 demonstrates the ratio of the total openings’ area to the total floor area of the proposed dwelling.

Floor area (m²)	Glazed area (m²)	Glazed to floor area ratio
173	50.47	29.17%

Table 3.3 Glazing to floor area ratio

The dwelling is slightly over the 25% glazing threshold, however following the fabric and M&E improvement measures proposed in this report, this will be compensated for. The improvements meet or exceed Part L requirements.

3.3 Be Clean

As part of the Be Clean approach, the use of energy efficient equipment, heat networks and community heating have been considered.

District Energy Systems / Combined Heat and Power

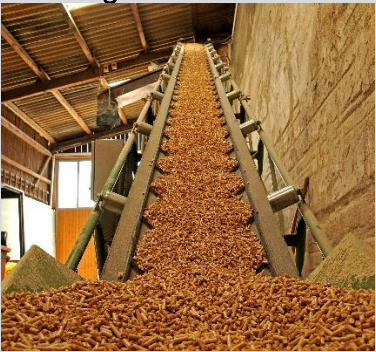
At the scale of this development, district heating or Combined Heat and Power (CHP) systems are not viable. CHP requires a high base energy demand load in order to operate efficiently and is usually more suited to hotel or hospital schemes which have a high hot water demand, or very large residential schemes incorporating hundreds of units.

Communal Heating

Communal heating strategies involve serving the majority of the space and water heating demand of the development from a centralised plant, making use of higher efficiencies available from larger systems. A communal ASHP is proposed, which is discussed in the next section.

3.4 Be Green

At the Be Green stage, renewable technologies are investigated. Table 3.4 considers the feasibility of renewable energy technologies for the scheme.

LZC Technologies	Description	Noise	Visual impact	Internal Space	External Space	Capital Cost	Maintenance	Feasibility	
Solar Thermal Collectors 	Solar thermal collectors can be used to provide hot water using the irradiation from the sun. They can generally provide approx. 50% of the hot water demand	●	●	●	●	●	●	There is available roof space that can support a solar thermal panel to boost hot water supply.	✓
Solar Photovoltaic Panels 	Solar PV panels generate electricity from the sun's energy. They should be installed within 90° of due south ideally at a 30° angle. The electricity can be used to supply the landlords load.	●	●	●	●	●	●	There are existing solar panels which will be retained for use for the new dwelling. Solar PV is ideal for making carbon savings while being a simple technology	✓
Biomass Heating 	Solid, liquid or gaseous fuels derived from plant material can provide boiler heat for space and water heating A biomass boiler would supplement a standard gas heating system so some of the cost may be offset through money saved on using smaller traditional boilers reliability of fuel access/supply can be a problem	●	●	●	●	●	●	Biomass is not considered feasible for this development due to issues with fuel storage, access for delivery vehicles and local NO _x emissions.	✗

Wind Turbines 	Vertical and horizontal axis wind turbines enable electricity to be generated using the power within the wind. Not suitable for urban environments due to low wind conditions and obstructions							Due to the requirement to reduce the visibility of the site given its location, wind turbines are not a suitable technology.	✗
Ground Source Heat Pumps (GSHP) 	Utilising horizontal loops or vertical boreholes, GSHP make use of the grounds almost constant temperature to provide heating and/or cooling using a heat exchanger connected to a space/water heating delivery system Optimum efficiency with underfloor heating systems							GSHP are not a feasible technology for the site since there is a limited external space available for installation of boreholes	✗
Air Source Heat Pumps (ASHP) 	Air Source Heat Pumps extract latent energy from the external air in a manner similar to ground source heat pumps Optimum efficiency with underfloor heating systems							Air source heat pumps are a feasible option for the project. The reduced carbon intensity of grid electricity means that ASHP technology can result in very low carbon heat. The unit can be sited internally so as to not cause any adverse impacts to neighbouring properties.	✓

Table 3.4 Feasibility of LZC technologies for the development

Renewable systems

The feasibility study has identified an air source heat pump as the most appropriate technology for the development alongside a 2m2 solar thermal panel and the existing PV panels. To further enhance the efficiency of the PV array, a 4kW battery will be installed to store excess energy generated by the array.

The ASHP system will be developed in more detail as the design progresses.

Table 3.9 below shows the updated services strategy proposed.

The services strategy is shown below in Table 3.5.

Services Component	Residential Specification
Space heating	Internal ASHP COP = 3.0 Underfloor heating
Hot water	Internal ASHP COP = 3.0 Hot water cylinder: 200l – measured loss 1.8 kWh/24h Recoup Propipe+ Waste Water Heat Recovery to be installed to all showers and baths 2m2 Solar thermal panel
Cooling	None
Heating controls	Room thermostats and programmer
Ventilation	Mechanical ventilation with heat recovery (MVHR) SFP = 0.9 Efficiency = 90% Level 1 rigid ductwork
Lighting & controls	100% low energy lighting 105 lm/W Presence, daylight and time controls where appropriate to external spaces
Solar PV Array	Total PV = 3.64 kWp As existing Export meter to be included 4kW PV battery storage

Table 3.5 Proposed energy efficient design measures

Carbon savings

Table 3.6 below details the energy and carbon breakdown of the baseline emission rate, based on the notional case.

Regulated Energy & CO2										
Type	Electricity Demand								Total Energy (kWh/yr)	Total CO ₂ (kg/yr)
	Space Heating (kWh/yr)	Hot Water (kWh/yr)	Cooling (kWh/yr)	Pumps & Fans (kWh/yr)	Lighting (kWh/yr)	PV (kWh/yr)	Total (kWh/yr)	Electricity CO ₂ (kgCO ₂ /yr)		
Notional	9,735	1,999	0	41	252	-2,997	9,030	1,228	9,030	1,228

Table 3.6 Target regulated energy demand and carbon emissions per energy source

Table 3.7 shows the breakdown of carbon and energy use once the strategies proposed in this report are incorporated.

Regulated Energy & CO2										
Type	Electricity Demand								Total Energy (kWh/yr)	Total CO ₂ (kg/yr)
	Space Heating (kWh/yr)	Hot Water (kWh/yr)	Cooling (kWh/yr)	Pumps & Fans (kWh/yr)	Lighting (kWh/yr)	PV (kWh/yr)	Total (kWh/yr)	Electricity CO ₂ (kgCO ₂ /yr)		
Proposed	6,007.38	872.91	0	923	252	-2,997	5,059.13	688	5,059	688

Table 3.7 Estimated regulated energy demand and carbon emissions per energy source

Table 3.8 demonstrates the percentage improvement over the baseline. The development demonstrates a 43.97% saving in CO2 emissions over the existing building case for the development.

	Residential		
	CO ₂ Emissions (tonnes /annum)	CO ₂ Savings (tonnes /annum)	% Saving
Notional existing baseline	1.23		
Proposed development	0.69	0.54	43.97%

Table 3.8 Development improvement over baseline scenario

3.5 Be Seen

A smart energy metering system will be installed to allow for monitoring and management of energy consumption.

3.6 Water efficiency

Water fittings will be specified with the following or similar flow rates to meet the target water consumption of 105 l/p/day:

- Wash basin taps – 5 l/min
- Showers – 7.5 l/min
- Bath – 120l to overflow
- Dishwasher - 1.2 l/place setting
- Washing machine - 9 l/kg load
- WC – 6/3 litre dual flush
- Kitchen taps – 6.5 l/min

A water meter will be installed to encourage building occupiers to limit their consumption.

3.7 Materials & embodied carbon

The proposed development comprises the conservation and change of use of an existing building on site, which will inherently reduce the overall embodied carbon of the scheme by minimising the need for new materials. This approach not only conserves resources but also limits the environmental impact associated with the production and transportation of new construction materials.

The majority of the façade and roofing materials will be retained. The design incorporates reclaimed bricks where possible as required for infill and detailing, in keeping with the character of the building and surrounding location.

For the new build elements, the use low embodied carbon products will be further investigated at detailed design. In particular, this will incorporate products with an Environmental Product Declaration (EPD).

Insulating materials will be specified to maximise thermal performance whilst still paying attention to the environmental impact of the materials used.

Responsible sourcing will also be pursued. All timber used on site during the construction phase and within the building will be from legal sources. FSC or equivalent timber will be used. Sourcing of other materials will include products where the manufacturer employs an environmental management system such as ISO 14001 or BES 6001. Where possible, materials will be sourced locally and with a high recycled content.

3.8 Circular economy & waste management

The Main contractor will be required to develop and operate a Site Waste Management Plan during construction in order to ensure that waste is managed and monitored in such a way to reduce the amount of waste produced as much as possible following the waste hierarchy. A target of at least 90% waste diverted from landfill through reuse or recycling using an external waste contractor will be set. This will encourage materials to be re-used on site or where this is not possible, salvage appropriate materials to enable use off-site.

Household waste will be recycled through the local authority collection scheme. Internal recycling bins will be provided in a kitchen to facilitate this. The development is provided with an accessible external bin store area.

3.9 Sustainable transport

The development is located in the rural village of Ardingly. It is well located with local and national transport networks nearby.

The site is located 170m from the nearest bus stop, which provides a link to the nearest larger town of Haywards Heath. Haywards Heath has a wide range of amenities and facilities and also a train station providing ongoing transportation into London and Brighton.

Ardingly itself is surrounded by woodland, countryside, and picturesque walks. The village contains a convenience store, bakery, public house, sports facilities, schools and a church.

3.10 Nature conservation & biodiversity

Existing features of ecological value on site will be adequately protected during construction.

3.11 Climate change adaptation

Tackling increased temperature and drought

In order to mitigate the effects of overheating, windows will incorporate low emissivity coatings to reduce solar gain.

A natural ventilation strategy will be available when preferred through openable windows. The dwelling benefits from dual aspect openings and a double height living space which will encourage cross and stack ventilation.

The dwelling will be fitted with low consumption rate sanitary ware in order to minimise water demands.

Flooding

The proposed development is the redevelopment of an existing building and does not present increase in impermeable area. The development will therefore not significantly affect surface water run-off rates.

With reference to the Environment Agency Flood Map the site is located in flood zone 1 with low risk of flooding to the building.

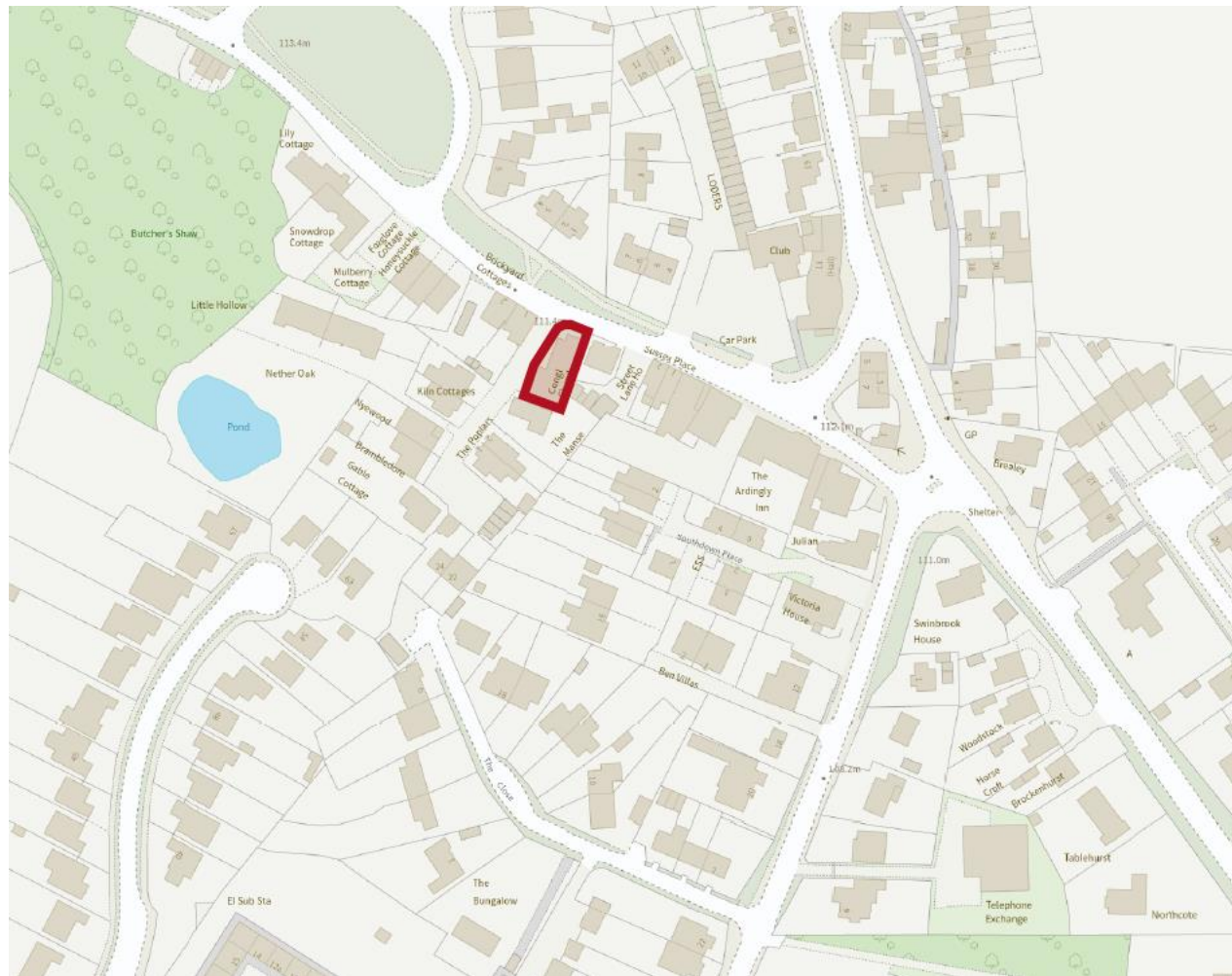


Figure 4.1 Former Congregational Church, Ardingly, Flood Risk Map
©Environment Agency

3.12 Pollution management

Air quality

The construction site will be managed in such a way that the environmental impact is minimised. This includes following best practice policies for dust pollution by using dust sheets, covering skips and damping down where appropriate.

Insulating materials and heating systems will be specified to keep pollutants to a minimum.

Non-toxic materials will be used wherever possible, including the specification of products with low VOC content in line with European testing standards. Insulation will have a low Global Warming Potential (GWP).

Noise

The dwellings will comply with Building Regulations Part E, providing a good level of sound insulation. All windows are to be specified as high efficiency double glazing to minimise the transmission of noise between the property and surrounding areas.

Plant and machinery

All plant and equipment installed in the development will be appropriately sized and selected for efficiency in order to reduce greenhouse gas emissions and located carefully in order to mitigate any potential noise impact on surrounding buildings.

Light pollution

100% of the proposed lighting will be provided by LEDs and low energy light fittings specified to have a luminous efficacy greater than 105 lm/W. All external lighting will be adequately controlled to ensure that spaces are only lit out of daylight hours and when the area is occupied.

4 Conclusion

The proposed development comprises the conversion and change of use of Former Congregational Church, Street Lane, Ardingly, West Sussex, RH17 6UB to a 3 bed family home with 1 no. associated on site parking space.

The development will include upgrades to the building fabric and some new efficient double glazing. An air source heat pump is proposed, providing heating and hot water to maximise carbon savings for the site, along with waste water heat recovery and a solar thermal panel to boost hot water efficiency, MVHR and the retention of the existing 3.64 kWp PV array along with a new 4kW storage battery, resulting in an improvement of 43.97% reduction in CO2 emissions for residential over the existing building case for the development.

Measures are proposed that follow sustainable design and construction guidelines and ensure that the development complies with sustainability policies of Mid Sussex District Council

The figures within this report are based on preliminary analysis only and further detailed studies will be required at the detailed design stage before specifying any of the proposed systems.