

DILAND LTD

Energy and Climate Change Adaption Statement

104a Durham Street

Revision 00

Date: 1 November 2024

Revision History

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This report has been produced based on information supplied to Diland LTD by the Client and the Design Team. Any alterations to the technical specification on which this report is based will invalidate its findings.

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This Energy and Climate Change Adaption Statement summarises how a development specification can be improved over the minimum standards of Building Regulations to enhance energy performance and reduce regulated carbon emissions from the site.

The Local Planning Authority has requested this document be produced to satisfy a planning condition.

1. EXECUTIVE SUMMARY

1.1 Purpose of this document

Diland LTD has been appointed by the Applicant to create this [This Energy and Climate Change Adaptation Statement](#) for the proposed development at 104a Durham Street in support of the planning application reference.

This document outlines a specification of measures which demonstrates how the Applicant will meet compliance at the proposed development for reducing annual, regulated (in-use) carbon emissions from the buildings in line with:

- i) Location of New development
- ii) Layout and Orientation
- iii) Materials, Structure, and Construction
- iv) Environmental Performance (Buildings)

Building Regulations volume [Approved Document Part L](#) (2021)

Use SAP10 to show full building compliance with the Target Emission Rate, Target Primary Energy Rate, Target Fabric Energy Efficiency, maximum U-Value thresholds, and minimum efficiencies for building services.

- v) Green Roofs and Walls
- vi) Water Efficiency
- vii) Local planning policy of [Rochdale Council](#)

Address the impacts of climate change by incorporating comprehensive adaptation measures in line with the Climate Change Adaptation SPD.

2. LOCATION OF NEW DEVELOPEMENT

2.1 Description and location

This Energy and Climate Change Adaptation Statement concerns the development at 104a Durham Street.

The area falls under the jurisdiction of Rochdale Borough Council.

The site is located in a predominantly heavy residential setting.

The new development is strategically located to maximize sustainability benefits:

- **Avoidance of Flood-Prone Areas:** The site has been strategically chosen to avoid locations with the highest flood risk, in line with the sequential approach established by PPS 25 (or equivalent guidance, should it be updated). This sequential approach informed every stage of the development, from site selection to design and management planning.
- **Flood Resilience and Adaptive Measures:** The development incorporates flood resilience measures, to mitigate surface water runoff effectively. Green spaces, permeable surfaces, and retention basins help absorb and divert water away from critical infrastructure.
- **Minimizing Environmental Impact:** The chosen site avoids areas of high ecological sensitivity or significant flood risk, ensuring the development does not negatively impact critical habitats or watercourses.
- **Type and Vulnerability of Use:** Consideration has been given to the type of use and its vulnerability to the type and scale of flood risks affecting this site. Specific design and layout choices were made to protect vulnerable uses and infrastructure from potential flood hazards.
- **Ensuring Flood Safety:** The development is designed to be safe from flood risks and to prevent any increase in flood risk on-site, in adjacent areas, or downstream. Measures are in place to ensure that the development does not exacerbate flood risks in surrounding communities.

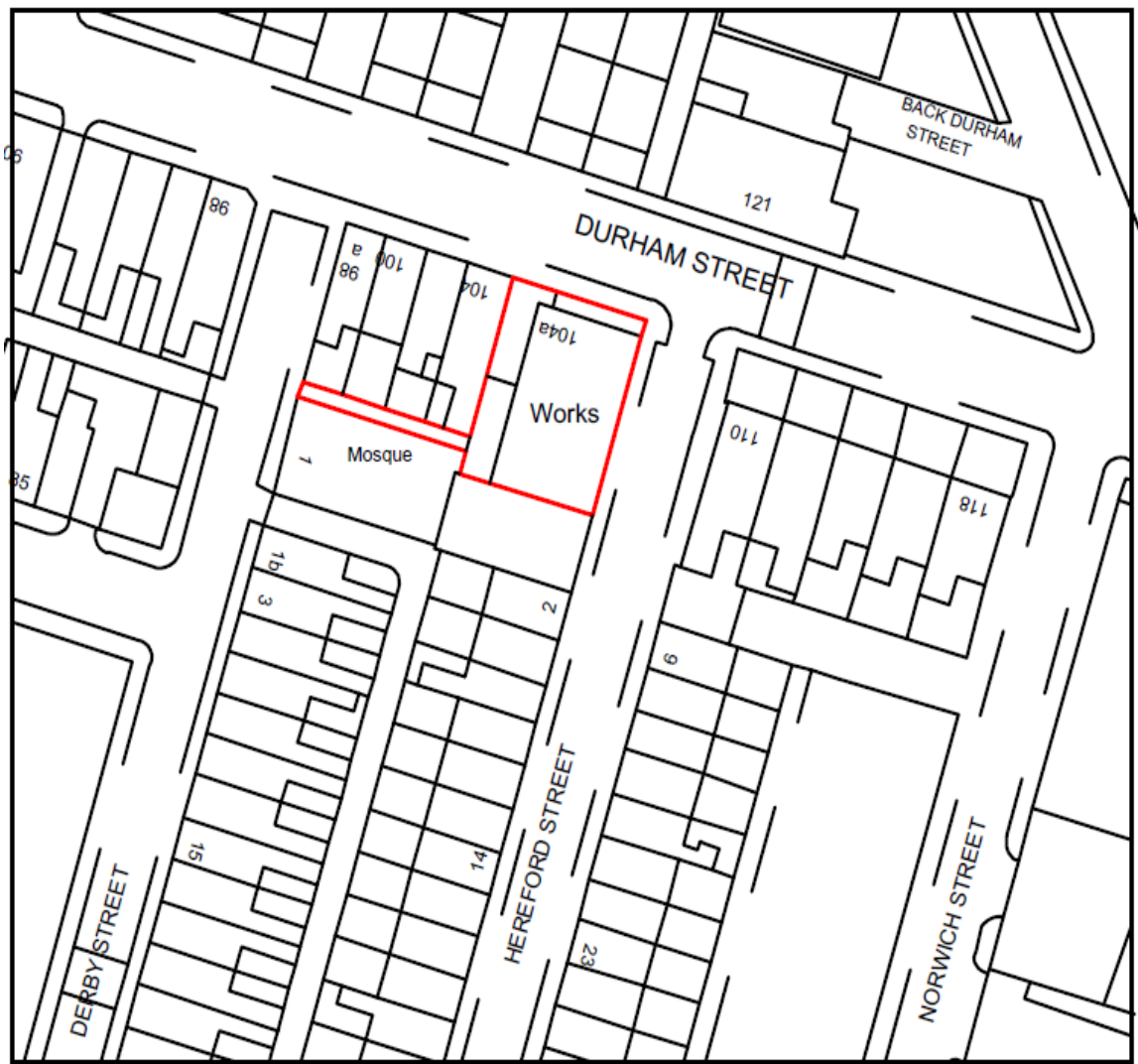


Image 1: Site location

3. LAYOUT AND ORIENTATION

The development design incorporates sustainable principles to optimize energy use, reduce environmental impact, and enhance climate resilience:

- **Flood Risk Management:** The layout minimizes flood risk by positioning buildings in less flood-prone areas and integrating SuDS, permeable surfaces, swales, and retention basins to manage surface water runoff.
- **Utilization of Passive Systems:** Passive design principles control building temperatures, including optimizing orientation for solar gain in winter and incorporating shading and vegetation to reduce summer heat.
- **Climate-Responsive Street and Open Space Design:** Streets and open spaces are designed to promote shading, natural breezes, and avoid wind tunnels, maximizing comfort and resilience to climate impacts.
- **Maximizing Natural Ventilation:** Buildings are designed to allow cross-ventilation, enhancing air quality and reducing mechanical cooling needs.
- **Designing Around Green Space and Natural Features:** The layout prioritizes existing green spaces and natural vegetation, adapting the development to preserve these features.
- **Addressing Increased Risk of Subsidence:** Foundation designs and ground stabilization measures address subsidence risks due to climate change and soil conditions.

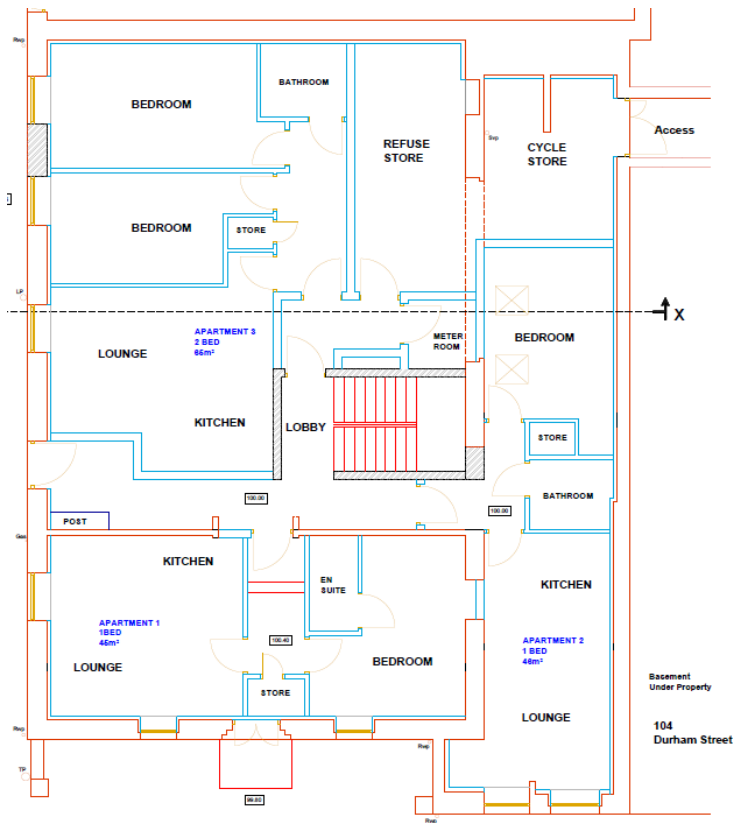


Image 2: Typical Ground floor plan

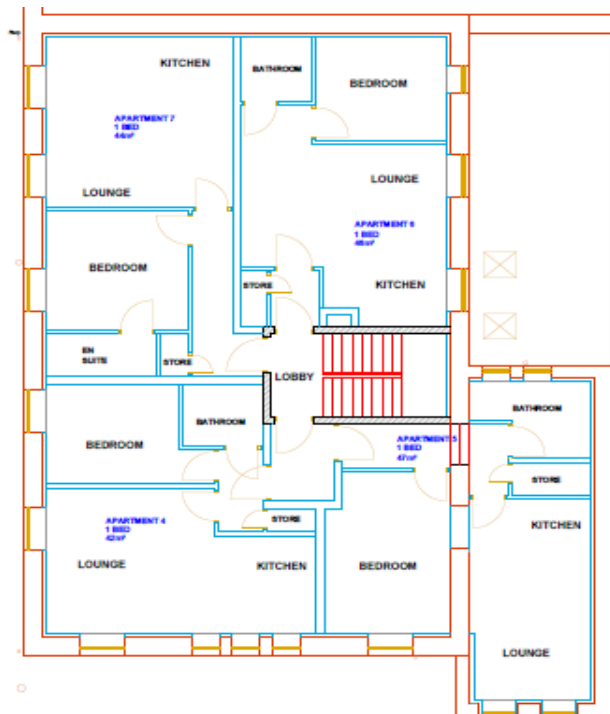


Image 2: Typical First floor plan

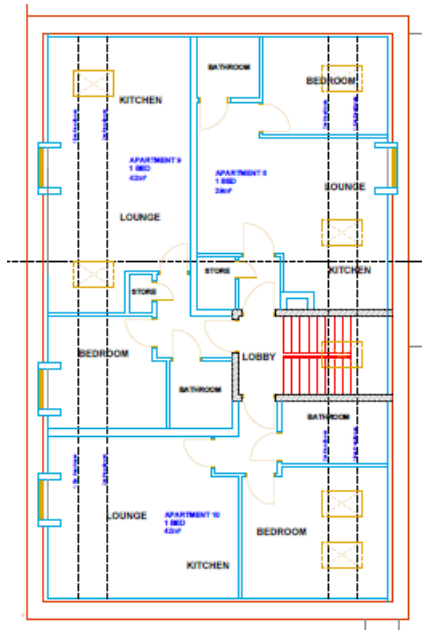


Image 3: Typical Second floor plan



Image 4: Typical elevation

4. MATERIALS, STRUCTURE & CONSTRUCTION

Sustainable construction materials and methods will minimize environmental impact while ensuring climate resilience:

- **Cool and Reflective Materials:** Roofs and facades will use cool or reflective materials to reduce heat absorption during summer, helping to maintain comfortable indoor temperatures.
- **Thermal Mass Considerations:** The development will ensure an appropriate thermal mass for the intended use and occupancy. Large areas of exposed thermal mass, such as blockwork walls and ceilings, will help maintain comfortable indoor conditions by absorbing heat during the day and releasing it at night.
- **Foundation and Structural Resilience:** The development will use foundations and structures capable of coping with increased subsidence risks associated with shrinking and swelling soils, especially in proximity to vegetation.
- **Resilient External Envelope:** The building envelope will be designed to withstand increased driving rain and wind speeds, using durable cladding materials. Drainage systems and entrance thresholds will be equipped to manage more intense rainfall events.
- **Ventilation and Cooling Mechanisms:** The buildings will incorporate suitable ventilation and cooling techniques to ensure indoor comfort during heatwaves, including mechanical ventilation if necessary.
- **Insulation and Air Tightness:** High levels of insulation and airtightness will be achieved throughout the building envelope, minimizing heat loss in winter and heat gain in summer.

5. ENVIRONMENTAL PERFORMANCE (Buildings)

5.1 The Notional

The following specification summary has been used to create the [Baseline target](#).

This is a notional specification and does not reflect the true proposals for this development.

The contents of this notional specification are used to calculate the [Target Emission Rate](#) under Approved Document Part L (2021).

Element	Specification (Residential)
Ground floor U-Value	0.13 W/m ² K
External walls U-Value	0.18 W/m ² K
Walls to corridors / core U-Value	0.18 W/m ² K
Party walls Between dwellings	Fully insulated and suitably sealed
Roof U-Value	0.11 W/m ² K
Glazing U-Value g-value	1.20 W/m ² K 0.63 % Maximum 25% glazing ratio
External Doors U-Value	1.00 W/m ² K
Thermal bridging Description	Notional psi-values SAP Appendix R
Air permeability 100% blower door testing	5.0
Ventilation system	System 1 Intermittent extraction fans to all wet rooms
Heating system	Gas boiler 89.5% boiler, feeding radiators

Hot water system	Gas boiler From main heating system
Showers	Unvented system From main heating system
Waste Water Heat Recovery	Applied to all showers 36% recovery efficiency
Lighting	LED 80 lumens per watt
Photovoltaic (PV) panels	South east orientation Array size = 40% of building footprint

5.2 Baseline Results

When the above specification is applied to the sample SAP , the generated results provide the sitewide Baseline, or Notional, target.

All improvements listed in the following section are measured against this Baseline to show how the true specification will perform better, requiring lower energy use and therefore generate a lower amount of carbon emissions annually.

Baseline Emissions	2,540 kgCO ₂ per annum
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5.3 What Is Fabric First

The first step to improving the energy performance of a building design is to look at the [specification of the fabric](#).

A highly insulated building with minimum air leakage will have a far lower heating demand, requiring less energy to run. This has the added benefit of lower fuel bills and a lower carbon footprint.

This meets the [first principle of The Energy Hierarchy](#) – to use less energy.

There are also several key advantages to adopting a [Fabric First](#) approach:

- It does not require behavioural changes from the occupants
- There are no additional maintenance costs
- There is nothing mechanical that can break down or require replacing

There are several elements of a building specification which can be considered for Fabric First improvements:

- U-Values of the ground floor, external walls, roofs and other heat loss elements
- U-Values of windows, external doors and rooflights
- Thermal bridging: The design of junctions to minimise heat loss
- Air permeability targets
- Reducing the number of open flues and vents.

5.4 Proposed Fabric

The Applicant will integrate the following design measures to reduce energy demand using the Fabric First approach.

Although some individual elements in the proposed specification are higher than those shown on the Baseline, overall, these changes amount to a reduction in energy demand.

Element	Fabric First Specification
Ground floor U-Value	0.13 W/m ² K
External walls U-Value	0.16 W/m ² K
Walls to corridors / core U-Value	N/A
Party walls Between dwellings	Fully insulated and suitably sealed
Roof U-Value	0.11 W/m ² K
Glazing U-Value g-value	1.20 W/m ² K 0.63 % Maximum 25% glazing ratio
External Doors U-Value	1.00 W/m ² K
Thermal bridging Description	Independently calculated psi-values SAP Appendix R

Air permeability 100% blower door testing	5.0
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5.5 Proposed Results

The Developer has adopted the following measures to ensure a [suitable improvement in energy performance](#) over the Baseline:

- Energy efficient building fabric and insulation to all heat loss floors, walls and roofs.
- High efficiency double glazed windows throughout.
- Quality of build will be confirmed by achieving good air tightness results throughout.

5.6 What Is LZO

Low and Zero Carbon devices (LZO) can be used to improve the energy performance of a building.

Six LZO technologies are typically considered, although the suitability of each option needs to be assessed on an individual basis.

If a system is considered viable for this development, this can be used to further improve the energy performance on top of the fabric changes, which means an even greater reduction in carbon emissions against the Baseline.

Using LZO meets the second and third principles of The Energy Hierarchy – to supply energy efficiently and to use renewable energy.

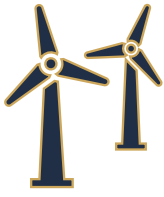
There are also several key advantages to using LZO technology:

- Onsite generation of electricity means less reliance on the National Grid
- Enhancements to a boiler heating system will lead to a lower demand on fossil fuels such as gas and oil
- Using heat pumps will futureproof the development in readiness for zero carbon energy supplies.

There are several elements of a building specification which can be considered for Low and Zero Carbon improvements:

- Heating and hot water systems
- Heating controls and supplementary heat recovery aids
- Onsite renewable installations

5.7 Viability options – Wind turbines



The ability to generate electricity via a turbine or similar device which harnesses natural wind energy.

This could be considered as an onsite solution to reducing carbon emissions (the turbine is included within the development), or offsite (investing financially in a nearby wind farm).

Advantages

- Turbines generate clean electricity.
- The UK Government is aiming to generate the majority of the nation's electricity supply through wind turbines.
- Spare electricity can be exported to the National Grid, or fed into a battery store on site to assist with charging electric vehicles.

Disadvantages

- Currently, UK planning policy makes it extremely difficult to install wind turbines on land. The priority of the Government is to encourage offshore turbines only.
- There is a high installation cost associated with wind turbines, as well as annual maintenance costs.
- Turbines work best in windier locations, free from surrounding obstructions. Efficiency is greatly reduced when installed in unideal positions.

Development feasibility

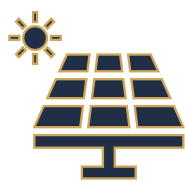
Economical: With limited Government support to install turbines on land, this option is not considered to be economically viable.

Technical: It is technically possible to install a wind turbine in this location.

Practical: Installing a wind turbine is not considered practical. It is not an ideal location to benefit from high efficiencies. The surrounding residents are likely to raise concerns should a turbine be proposed.

Overall: This option is not considered viable.

5.8 Viability options – Photovoltaic panels



The ability to generate electricity through harnessing natural solar energy.

Photovoltaic (PV) panels can be located on buildings to feed into the supply directly, or larger solar farms can be positioned on unused land to produce energy to feed local communities.

Advantages

- PV panels generate clean electricity.
- This is a commonly used technology. National planning policies suggest local authorities should only object to their use on heritage grounds.
- Spare electricity can be exported to the National Grid, or fed into a battery store on site to assist with charging electric vehicles.

Disadvantages

- Efficiency drops up significantly if positioned in a shaded location.
- Less appropriate on high-rise buildings, as roof area is limited.
- Efficiency is reduced when positioned on east or north roofs.

Development feasibility

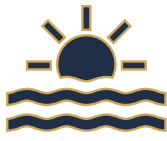
Economical: Although there is limited Government support, the installation costs of PV panels are more viable than other LZC options.

Technical: It is technically possible to install PV panels in this location.

Practical: There are no practical reasons why PV panels cannot be installed in this location.

Overall: This option is viable.

5.9 Viability options – Solar thermal panels



Using energy from the sun to pre-heat the water supply being fed into the building.

Solar thermal panels are usually located on a south facing roof close to the building's water storage cylinder.

Advantages

- Solar thermal panels provide free hot water, reducing reliance on the heating system.
- National planning policies suggest local authorities should only object to their use on heritage grounds.
- Especially beneficial for buildings with a high water use, such as sports clubs and gyms.

Disadvantages

- Efficiency drops up significantly if positioned in a shaded location.
- Less appropriate on high-rise buildings, as roof area is limited.
- Unlike PV panels, solar thermal relies on solar rays, meaning they are far less efficient on cloudy days.

Development feasibility

Economical: This system should be viable to install from a financial point of view, however PV panels are expected to be cheaper and more effective.

Technical: It is technically possible to install solar thermal panels in this location.

Practical: There are no practical reasons why solar thermal panels cannot be installed in this location.

Overall: This option is viable.

5.10 Viability options – Heat pumps



Compressing latent heat in the atmosphere with a refrigerant gas to warm water in a closed circuit.

Heat pumps are able to capture heat from the air, ground or nearby watercourses and use this energy to provide heating and hot water.

Advantages

- The UK Government considers heat pumps to be an essential technology for reducing the energy demand of our buildings and cutting our reliance on fossil fuels for heating our homes.
- On average, modern systems will generate 3 – 4 kilowatts of heat for every kilowatt of electricity used.
- Heat pumps can provide heating via underfloor systems, radiators or air conditioning vents. Some systems also provide cooling and ventilation.

Disadvantages

- Behaviour of occupants needs to adapt, as using a heat pump as if it were a boiler will significantly reduce efficiency and performance.
- Heat pumps require an external fan or underground coils, as well as an internal unit about the size of a full height fridge freezer.
- Heat pumps are better suited to well insulated buildings with low levels of heat loss.

Development feasibility

Economical: The cost of installing heat pumps should be considered an economically viable option.

Technical: It is technically possible to install heat pumps in this location.

Practical: There are no practical reasons why solar thermal panels cannot be installed in this location.

Overall: This option is viable.

5.11 Viability options – Biomass boilers



A boiler system which burns plant based materials such as wood pellets, crops or food waste instead of fossil fuels.

Biomass boilers come in a wide range of sizes, and can provide heating and hot water to a single dwelling, or as part of a heat network.

Advantages

- Inside the dwelling, the heating system and controls are identical to a conventional gas or oil boiler.
- Biomass is a low carbon fuel source when sourced in the UK. Sites with woodland can use their own supply of biomass.
- No fossil fuels are used.

Disadvantages

- A reliable supply of biomass is required, and the fuel to feed the system must be kept on site.
- Some urban areas do not allow biomass boilers due to concerns over air quality.
- Installation costs of biomass boilers are generally much higher than a conventional gas or oil boiler.

Development feasibility

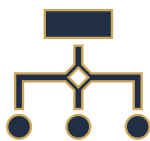
Economical: The cost of installing a biomass boiler and storage in this location is prohibitive.

Technical: It would be technically possible to install a biomass boiler, however site layout changes will be required to accommodate the fuel store.

Practical: Biomass is not considered practical. The storage of fuel on site will require a redesign of the site layout. The local authority is unlikely to approve a solid fuel heating system on grounds of impacting local air quality.

Overall: This option is not considered viable.

5.12 Viability options – Combined heat and power



A Combined Heat and Power (CHP) system works in a similar way to a generator, but on a much larger scale.

A gas fired turbine generates electricity for the building. The bi-product is used to supply heating and hot water.

Advantages

- The CHP unit generates free heat while producing onsite electricity.
- A single CHP plant can be used to provide heat to hundreds of dwellings.
- Excess electricity can be exported to the National Grid, or stored in batteries to assist with electric vehicle charging.

Disadvantages

- CHP systems are powered by gas which is a fossil fuel. This is not in line with the UK Government's futureproofing policy for net zero.
- The system works at its most efficient on a larger scale. Single dwelling CHP boilers are available, but do not show efficiency gains compared to a conventional boiler.
- CHP is unable to provide 100% of the heating demand all of the time, so a back up system, usually a gas boiler, will also need to be installed.

Development feasibility

Economical: Installing a district CHP system for this development is not believed to be financially viable.

Technical: It would not be viable to install this type of system without making significant design changes to accommodate the plant room and pipework.

Practical: CHP is not considered practical. The size of the development does not lean itself towards using CHP, and the Local Authority are unlikely to approve this installation of a fossil fuel led heat network.

Overall: This option is not considered viable.

5.13 Viability options – Waste water heat recovery



Waste water heat recovery systems (WWHRS) reduce demand on the hot water supply by capturing wasted energy from baths and showers.

A specially designed pipe transfers heat from the draining water to pre-heat the cold water entering the supply.

Advantages

- The system is reasonably cheap and does not require maintenance or energy to operate.
- No behavioural changes are required from the occupier. In most cases, the building owner will not know WWHRS has been installed.
- WWHRS reduces demand on the hot water supply, cutting the building's reliance on fossil fuels.

Disadvantages

- WWHRS works best when the pipework is fitted vertically below the shower. Horizontal installations are not as efficient.
- Is not recommended for use with some power showers, as the incoming water temperature can increase quicker than the shower thermostat can adjust.
- Energy savings by using WWHRS are low, and will need to be combined with other options.

Development feasibility

Economical: Installing WWHRS is considered economically viable.

Technical: It is technically feasible to install WWHRS on most house types, but consideration should be given to its appropriateness in bungalows.

Practical: There are no practical reasons why WWHRS cannot be installed in this location.

Overall: This option is viable.

5.14 Viability options – Batteries and storage



Homes which are able to generate more electricity than they need at that time, can store excess power for later use instead of instantly exporting power to the National Grid.

Common methods are battery banks, or immersion diverters which heat the dwelling's hot water cylinder.

Advantages

- Less reliance on buying in power from the National Grid.
- Occupants can benefit from free hot water with an immersion diverter.
- Battery banks can be used during power-cuts.

Disadvantages

- A method of generating electricity is required (PV / turbine)
- Benefit depends on the building occupant using saved energy at the best time of day.
- Immersion diverters not viable for combi cylinders or homes with low hot water demand.

Development feasibility

Economical: The cost of installing batteries or immersion diverters is considered to be a viable option.

Technical: It is technically viable to install a battery bank in the garage. It is not viable to use immersion diverters as the dwelling does not include a large hot water cylinder.

Practical: It is practical to consider the installation of a battery bank, as this will work alongside the PV array to further reduce reliance on the National Grid.

Overall: This option is viable.

5.15 Proposed LZC approach

The Applicant will integrate the following additional design measures to reduce energy demand using low and zero carbon technologies.

Element	Fabric First Specification
Wind turbines	No
Photovoltaic panels	Yes
Solar thermal panels	No
Heat pumps	No
Biomass boilers	No
Combined Heat & Power	No
Waste Water Heat Recovery	No
Energy Storage	No

6. GREEN ROOF

Green infrastructure will support biodiversity and improve environmental performance:

- **Green Roof Requirements:** Rochdale Borough Council presumes that roofs on buildings over 500 m² for non-domestic use or on developments with five or more residential houses should be green roofs.
- **Green Roof Compliance:** The proposed building for this development does not require green roofs, The proposed development comprises of one residential building and has a roof space of 165m² thus it does not meet the threshold criteria specified by Rochdale Borough Council.

7. WATER MANAGEMENT

Sustainable water management mitigates flood risk and ensures water quality:

- **Sustainable Drainage Systems (SuDS):** SuDS, including permeable paving and swales, manage surface water and promote groundwater recharge. Due to restriction on boundaries this will not be feasible for this project.
- **Flood Resilience Measures:** Raised thresholds and landscape grading help direct water away from buildings, reducing flood risk.
- **Part G Compliance** – Water calculation is to be carried out to ensure that the proposed development compliance with Building Regulation Part G.

8. GREEN AND BLUE INFRASTRUCTURE

The development will enhance ecological value through green and blue infrastructure:

- **Green Infrastructure:** Not sever or fragment the existing Green Infrastructure
- **Connections to Surrounding Green Spaces:** The development will link to nearby parks, forming a cohesive green network that enriches the urban environment.

See Appendix for G1 table

9. CONCLUSIONS

9.1 Final results

The Applicant demonstrates commitment to meeting the required energy standard targets at 104a Durham Street, Rochdale by implementing by addressing requirements for location, layout, materials, environmental performance, and water management, the project aligns with Rochdale's climate goals and provides a sustainable living environment for residents.

10. PLANNING POLICY LINKS

10.1 The Climate Change Act (2021 amendments)

This legal documents establishes a framework for the United Kingdom to become net zero carbon by 2050.

Climate Change Act (2008) – 80% reduction by 2050
With 2021 amendments – 100% reduction by 2050

10.2 Approved Document AD-L (2021 amendments)

This Building Regulation targets the Conservation of Fuel and Power on all new construction projects in England.

Latest versions of AD-L

10.3 National Planning Policy Framework (2021 amendments)

This document offers guidance to Local Planning Authorities to assist in developing Local Plans to support the transition to a low carbon future.

Latest version of the NPPF

10.4 Local Authority Policy

Rochdale Borough Council. This Energy Statement has been produced based on the guidance written in this local policy document.

[LINK HERE](#)

1a GI score (built)

1

2

3

4

5

6

Non-overlapping surface types		GI Factor	Area Pre Planned development (m ²)	Area Pre Planned development x GI Factor	Area For Planned development (m ²)	Area for Planned development x GI Factor
A1	Buildings (without green roofs)	0.0	275	0	275	0
A2	Buildings (with green roofs). (N.B. please only include the area of the roof that is covered by vegetation here, if part of the roof is not vegetated include it in A1)	0.7	0	0	0	0
B1	Non-permeable road surfaces	0.0	0	0	0	0
B2	Non-permeable footpath surfaces	0.0	0	0	0	0
B3	Non-permeable parking / driveway surfaces	0.0	0	0	0	0
B4	Semi-permeable surfaces such as stone paving with joints (where water can infiltrate)	0.2	0	0	0	0
B5	Semi-permeable surfaces such as gravel	0.4	0	0	0	0
C1	Vegetated or open soil surfaces (where plants have direct contact with deeper soil)	1.0				
C2	Vegetated or open soil surfaces (where soil depth is more than 60 cm but there is no direct contact with deeper soil; e.g. roof of underground parking). N.B. Please do not use this for green roofs on buildings – use A2 instead.	0.6	0	0	0	0
C3	Vegetated or open soil surfaces (where soil depth is less than 60 cm and there is no contact with deeper	0.4	0	0	0	0

	soil; e.g. roof of underground parking). N.B. Please do not use this for green roofs on buildings – use A2 instead.					
D	Open water sources (including ponds and swales covered by water for at least 6 months of the year)	1.0	0	0	0	0
	Total area entered (m ²)		CHECK: is total area entered equal to total development site	X	CHECK: is total area entered equal to total development site	Y

Overlapping surface types		GI Factor	Area Pre Planned Development (m ²)	Area Pre Planned Development x GI Factor	Area For Planned Development (m ²)	Area for Planned Development x GI Factor
E	Shrubs and hedges. N.B. Should not exceed development site area. Can overlap surfaces A1-D and F.	0.3	0	0	0	0
F	Trees (canopy cover area). N.B. should not exceed development site area. Can overlap surfaces A1-D and E.	0.4	0	0	0	0
G	Green walls (area up to a height limit of 10 m)	0.6	0	0	0	0
				X1		Y1

				Pre planned development	Planned development	
GI Score				1	1	