West Lothian Council

Local Heat and Energy Efficiency Strategy 2023-2028

West Lothian Council

Contents

1 Overview

1.1 Foreword

West Lothian Council is committed to improving the quality of life for everyone who lives, works, learns and does business in West Lothian. The world is in the midst of a Climate Emergency which requires urgent and meaningful action at an international, national and local level in order to safeguard our planet for future generations. In response to this, the council declared a Climate Emergency in September 2019 and published our Climate Change Strategy 2021-2028 in October 2021, committing to reducing council emissions to net-zero by 2045.

In addition to reducing the council's own emissions, we aim to encourage and support our partners, residents and businesses throughout West Lothian to reduce emissions across West Lothian in line with wider net-zero objectives. A significant step in achieving this will be the decarbonisation of heat in buildings. The Local Heat and Energy Efficiency Strategy (LHEES) aims to identify energy efficiency and decarbonisation measures that could be suitable to support the transition to net-zero for West Lothian's building stock.

The LHEES is published in a context of ongoing budget and financial pressures, which are expected to continue, leading to difficult decisions in order to prioritise the services that meet the needs of the most vulnerable in our community. The cost of living crisis, and energy costs impacted by Russia's invasion of Ukraine, mean that people in West Lothian are increasingly vulnerable to fuel poverty.

LHEES sets out the council's strategic approach to decarbonising heat in buildings in the context of this challenging financial landscape.

Lawrence Fitzpatrick,
Leader of the Council

Graham Hope,
Chief Executive

1.2 Context

The world is in the midst of a Climate Emergency which requires urgent and meaningful action at an international, national and local level in order to safeguard our planet for future generations. The International Panel on Climate Change (IPCC) global climate change report published in August 2021 has been seen as a "code red for humanity". The report makes it clear that human activities have unequivocally caused observed increases in greenhouse gas emissions and that we are perilously close to hitting the internationally agreed threshold of 1.5°C of warming, beyond which the impacts of climate change and the measures required to adapt become significantly more challenging.

Scotland has set a nationally binding target to be net-zero by 2045. Net-zero means achieving a balance between the carbon emitted into the atmosphere, and the carbon removed from it. West Lothian Council has been committed to taking action to mitigate and adapt to the impacts of climate change for some time. The council declared a Climate Emergency in September 2019 and declared a Nature Emergency in June 2023. Since our baseline year 2013/14, West Lothian Council has decreased our emissions by 49%.

Heat is the single largest source of emissions in Scotland, at around 41%. Decarbonising heating and increasing the energy efficiency of our buildings will be a significate step on the journey to keeping warming below 1.5°C. This is why the Scottish Government's Local Heat and Energy Efficiency Strategies (Scotland) Order 2022 (LHEES) came into force on 21st May 2022. LHEES aims to establish local authority area-wide plans and priorities for systematically improving the energy efficiency of buildings and decarbonising heat, to help reach our net-zero goal.

The commitment to develop an LHEES was set out in the council's Climate Change Strategy 2021-28 which was published in 2021. This report is the first iteration of West Lothian Council's LHEES. There is a statutory duty on the council to update our LHEES every five years, however given the evolving nature of the strategy, this first iteration will be updated again by 31st December 2024. This reflects the emerging nature of the issue and the large number of actions in our Delivery Plan due for completion within the first 12 months of the Strategy.

LHEES is being developed in a context of the cost of living crisis, where high and unstable energy costs are increasing the public's vulnerability to fuel poverty. The council's own budget is under significant financial pressures, with decreased funding and increased running costs. Delivering decarbonisation of heat across West Lothian will require significant financial support, staff resource and capital investment. The transition to zero emissions fuels is also likely to have a significant negative impact on West Lothian Council's revenue budgets. While funding for some projects and initiatives has been made available, the Scottish Government has not currently identified funding to fully deliver the level of capital investment or associated revenue consequences. Therefore, there is uncertainty on how this work will be undertaken at the scale and speed required to meet national targets of net-zero by 2045.

West Lothian Council will continue to progress projects identified in LHEES which are incorporated in the council's current five-year plan and will work with the Scottish Government and other partners to identify potential funding streams for future projects

1.3 Developing the Strategy

The Local Heat and Energy Efficiency Strategies (Scotland) Order 2022 came into force on the 21st May 2022. The Order defines a LHEES as long-term strategic framework for the improvement of the energy efficiency of buildings in the local authority's area, and the reduction of greenhouse gas emissions resulting from heating those buildings. The following duties are placed on local authorities:

- Local Authorities to publish their first LHEES and associated delivery plan on or before 31st December 2023;
- Local Authorities to publish an updated LHEES and associated delivery plan at intervals of no more than 5 years after the date of publication of the previous strategy, and;
- A local authority must have regard to the LHEES Guidance issued by the Scottish Government when preparing its local heat and energy efficiency strategy and its local heat and energy efficiency delivery plan.

The LHEES Guidance was published September 2022 and provides local authorities with a standardised approach to developing and delivering LHEES. The guidance states that a LHEES should include:

- Identification of indicative Heat Network Zones (this is also a requirement of the Heat Networks (Scotland) Act 2021);
- what work needs to be done to remove poor energy efficiency as a driver of fuel poverty;
- what work needs to be done in each segment of the buildings stock to increase building energy efficiency and decarbonise building heat, and;
- Prioritisation of areas for delivery, against national and local priorities, setting out the principal measures for reducing emissions from buildings within each zone.

1.3.1 Policy & Strategy Review

National		
Policy/Strategy	**Description**	**Actions and Targets**
Climate Change (Emissions Reduction Targets) (Scotland) Act 2019	Targets to reduce Scotland's emissions of all GHGs to net-zero. **LHEES will deliver decarbonation of heating sector.**	Net-zero by 2045
Heat in Buildings Strategy	Building on the policies and actions set out in the 2020 Climate Change Plan Update, this Strategy sets out a pathway to zero emissions buildings by 2045 and details a series of near-term actions, as well as a range of further, longer-term commitments to accelerate and further scale the transformation of the nation's building stock.	By 2030 over 1 million homes and 50,000 non-domestic buildings to convert to using zero or low emissions heating systems. **LHEES will identify the pathways to converting these buildings to zero or low emissions heating.**
Energy Efficient Scotland	Two main objectives. Remove poor energy efficiency as a driver for fuel poverty. Reduce greenhouse gas emissions through more energy efficient buildings and the decarbonisation of heat supply. **LHEES will identify the pathways to improving energy efficiency in all homes.**	By 2040 all Scottish homes achieve an EPC C, where technically and financially feasible. • EES Route Map (Domestic) - 15% heat demand reduction by 2032 • EES Route Map (Non-Domestic) - 20% heat demand reduction by 2032 • EES Route Map (Domestic) - 35% heat from low carbon sources by 2032 • EES Route Map (Non-Domestic) - 70% heat from low carbon sources by 2032
Heat Networks (Scotland) Act 2021	The Act aims to accelerate the deployment of heat networks in Scotland through the introduction of a regulatory system aimed at boosting consumer confidence in the sector and providing greater certainty for investors. **LHEES will identify potential heat network zones to enable the setting up of licenced heat network zones.**	The Act puts in place rules and regulations on heat networks, including: • making applications • identifying exemptions • granting licenses • setting up heat network zones
National Planning Framework 4	The National Planning Framework (NPF) sets the context for development planning in Scotland and provides a framework for the spatial development of Scotland as a whole.	NPF4 requires Local Development Plans (LDPs) to consider the area's LHEES. The spatial strategy of the LDP should also consider areas of heat network potential and any designated Heat Network Zones. NPF4 Policy 19 - Heat and Cooling, encourages LDPs to promote and facilitate development that supports decarbonised solutions to heat and cooling demand and ensure adaptation to more extreme temperatures. Additionally, the expected NPF4 policy outcome states that: "Development is

		connected to expanded heat networks which use and store heat from low or zero emission sources."
Tackling Child Poverty Delivery Plan 2022 - 2026	Sets out how Scotland will meet the interim targets set out in Keep the Promise. **Makes commitments which will affect delivery plans for retrofitting decarbonised heating.**	"We know that decarbonisation presents additional challenges for low income households, and have **committed to only take forward actions where they will have no detrimental impact on fuel poverty rates.** Zero emissions systems are often more expensive to run, and we are committed to taking these actions to ensure that our move to net zero does not disproportionately impact those least able to pay."
Local		
Policy/Strategy	**Description**	**Actions and Targets**
Climate Change Strategy	Sets out the strategy for reducing council emissions for the next eight years.	The council will develop a Local Heat & Energy Efficiency Strategy by 2023, building on the experiences from the work undertaken in the phase 2 pilot and in line with Scottish Government guidance.
Local Development Plan	Sets out policies and proposals for the future development and use of land. It seeks to identify the most appropriate locations for new development while at the same time protecting the places people value or which are environmentally sensitive. Once adopted it becomes the basis for assessing and determining applications for planning permission.	It is a requirement that LDPs are prepared to be consistent with National Planning Framework 4 (NPF4) which was adopted in February 2023. **See NPF4 for alignment with LHEES.**
Anti-Poverty Strategy	The Anti-Poverty Strategy was developed by the Community Planning Partnership and is a plan to address poverty, including fuel poverty.	Increase the number of warm affordable homes for people to live in.
Local Housing Strategy	The Housing (Scotland) Act 2001 places a statutory duty on local authorities to produce a Local Housing Strategy which sets out its strategy, priorities and plans for the delivery of housing and related services.	https://www.westlothian.gov.uk/media/57550/Local-Housing-Strategy-2023-2028/pdf/Local_Housing_Strategy_2023_-_2028.pdf?m=638228523869200000

Strategic Housing Investment Plan	The purpose of the SHIP is to set out how the investment in affordable housing will be directed over a five-year period, 2024/25 - 2028/29.	Funding will be used to improve the energy efficiency of affordable housing stock in West Lothian and help tackle fuel poverty. Particular focus will be on targeting areas with high levels of deprivation. The council seeks to ensure that all new build housing is energy efficient and 96% of West Lothian Council Housing stock currently meets the Energy Efficiency Standard for Social Housing (EESSH).
Corporate Asset Management Strategy	Outlines investment strategy in public sector buildings	Corporate Carbon Footprint – total carbon emissions (CO2 tonnes) - net zero by 2045. Number of properties with renewable energy generation installation Kilowatt hours (KWh) generated from renewable energy installation

Table 1 LHEES links to national and local policy

1.4 Ownership and Scope

Scope

LHEES will set out how each building type needs to change to meet national objectives, including achieving zero greenhouse gas emissions in the building sector, and the removal of poor energy efficiency as a driver of fuel poverty. It will do this by:

- Identifying indicative Heat Network Zones.
- Prioritising areas for delivery, against national and local priorities, setting out the principal measures for reducing emissions from buildings within each zone.

The LHEES Guidance outlines that the function and scope of local authorities LHEES should be framed around six 'LHEES Considerations', outlined in **Table 2**. For each Consideration, spatial zones are to be generated to visualise potential pathways to decarbonise the building stock at local authority level (Strategic Zones) and then at delivery level (Delivery Areas).

	LHEES Considerations	Description
Heat Decarbonisation	1. Off-gas grid buildings	Transitioning from heating oil and LPG in off-gas areas
	2. On-gas grid buildings	On-gas grid heat decarbonisation
	3. Heat networks	Decarbonisation with heat networks
Energy Efficiency	4. Poor building energy efficiency	Poor building energy efficiency
	5. Poor building energy efficiency as a driver of fuel poverty	Poor building energy efficiency as a driver of fuel poverty
	6. Mixed-tenure, mixed-use and historic buildings	Mixed-tenure, mixed-use buildings, listed buildings and buildings in conservation areas

Table 2: Six LHEES Considerations

Ownership

The Head of Finance and Property Services is the 'owner' of this Local Heat and Energy Efficiency Strategy and has responsibility for it's implementation at a corporate level. However many of the actions within the Delivery Plan will be carried out in other service areas. The Climate Change and Sustainablity Working Group will coordinate actions across the council. Heads of Service have ultimate responsibility for actions within their service areas.

2 Council Priorities

The Just Transition

According to the Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019, A household is in fuel poverty if:

- the fuel costs necessary for the home in which members of the household live are more than 10% of the household's adjusted net income, and;

- after deducting such fuel costs, benefits received for a care need or disability (if any) and the household's childcare costs (if any), the household's remaining adjusted net income is insufficient to maintain an acceptable standard of living for members of the household.

Targets for fuel poverty were set in 2019 as part of the above Act. The target is that by 2040, as far as reasonably possible no household in Scotland is in fuel poverty and, in any event:

- no more than 5% of households in Scotland are in fuel poverty,
- no more than 1% of households in Scotland are in extreme fuel poverty,
- the median fuel poverty gap of households in Scotland in fuel poverty is no more than £250 adjusted in accordance with section 5(5) to take account of changes in the value of money.

The Scottish House Condition Survey 2017-19 (published in 2021) estimated that 14,000 households in West Lothian were in fuel poverty, this is 18% of all households. This compares with 15,000 in 2016-2018. However, the recent rises in energy costs suggests that numbers of households currently in fuel poverty are likely to be considerably higher and the numbers will increase further without significant interventions.

Socio-economic factors play a key role in the individual experience of the cost of living crisis. Those groups that will be disproportionately affected includes:

Low income households – among the worst affected households are those on low incomes. Lower income households spend disproportionately on energy costs. The Institute of Fiscal Studies research indicates that the poorest tenth of households require 4.8% of their budget for gas, and the worst off tenth of this group spend an average of 12%, meaning the increase in energy prices will affect the lowest income groups substantially more than others.

Families - Research conducted by Loughborough University and funded by the Joseph Rowntree Foundation indicates that families are spending in the region of an extra £120 on energy bills each month.

People with a disability or long-term health condition who face higher energy bills. On average, the extra costs including food, energy and specialist items incurred by a disabled person is the equivalent of half their income.

Minority Ethnic Groups - The new Economics Foundation thinktank recently stated that people from Black, Asian and other ethnic minority households may feel the impact of the rising cost living more acutely than white households. This may be attributed to the fact that BAME households tend to be larger and with a higher proportion of younger household members, resulting in higher living costs.

Scotland cannot meet its legislated climate change targets unless virtually all emissions from heating (and cooling) buildings are eliminated. This means, in effect that by 2045, zero emissions heating will need to be deployed across Scotland's building stock. Under current plans gas boilers will stop being fitted in new build homes with Building Warrants approved from 2024. This means the majority of homes will move to electric heating. This is more energy efficient (in terms of Kilowatts used) and better for carbon emissions, however the costs are higher for electricity than gas. If decarbonation of domestic heating is not sensitive to the needs of the aforementioned groups then there is significant risk of equalities impacts.

Therefore, West Lothian Council's LHEES will only take forward actions which will have no detrimental impact on fuel poverty rates. This means that a 'fabric first approach' will be taken. Ensuring that the level of insulation within houses is sufficient to mitigate the higher costs of low carbon heating.

Emissions from domestic buildings are responsible for approximately 20% of Scotland's total greenhouse gas emissions. Energy efficient buildings reduce the demand for heat. Regardless of which system supplies a building's heating requirements, it is important that action is taken to limit the amount of energy that needs to be delivered to a new home to meet the heating demand to the best levels practicable.

Corporate Priorities & LHEES Considerations

West Lothian Council's Corporate Plan has five priorities:

1. Raising educational attainment
2. Strengthening care and support for children, adults and older people
3. Investing in skills and jobs
4. Helping to create strong and sustainable communities
5. Tackling homelessness, poverty and inequality

When prioritising the LHEES considerations for West Lothian Council, using the five corporate priorities, there is a clear theme of a Just Transition. Therefore, recommended interventions will be risk averse in terms of chance that intervention will increase energy costs.

The LHEES considerations aligned to match West Lothian's priorities are:

1. Poor building energy efficiency as a driver of fuel poverty
2. Poor building energy efficiency in general
3. Decarbonising off-gas grid buildings
4. Decarbonising on-gas grid buildings
5. Improving energy efficiency of mixed-tenure, mixed-use and historic buildings
6. Heat networks

3 Strategy Outcomes

The council's first LHEES aims to set the strategic direction for decarbonising domestic and non-domestic property in West Lothian. It identifies the council's priorities, sets the baseline for property stock and outlines the potential areas for heat networks. The Head of Finance and Property Services is responsible for the strategy at a corporate level, however actions towards the strategy will be carried out across council services. This is the council's first LHEES, and in line with the requirements of the Local Heat and Energy Efficiency Strategies (Scotland) Order 2022 the strategy will be reviewed, and delivery plan updated, every five years. As the LHEES is part of an evolving regulatory, information and funding landscape, West Lothian Council will continue to review its Delivery Plan through 2024 and will provide a fuller Strategy review after the first year. The LHEES should be considered a live document and will be regularly updated in line with changes to policies, targets, and actions, as well as incorporating any new information and data.

4 Baseline

West Lothian is situated in the middle of the central belt of Scotland, and has a population of 181,300[1] and 79,800 households. Within the population 23% are 0-19 years old, 59.6% are 19 - 64 years old and 17.5% are over 65. Within West Lothian there are significant areas and pockets of deprivation, with 35 data zones featuring the most deprived 20% areas in Scotland.

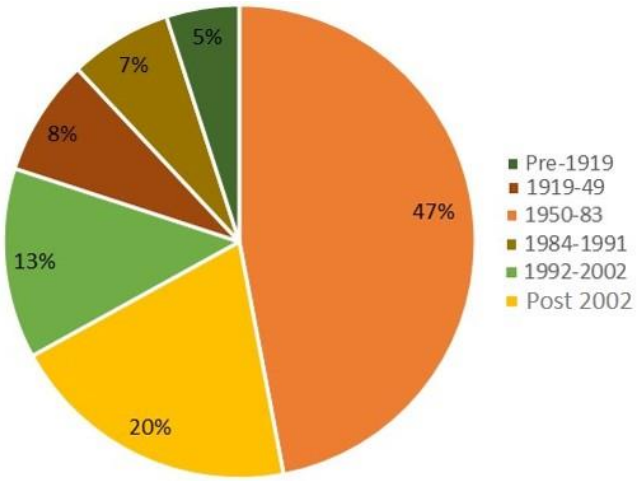

Figure 1: West Lothian Property Age

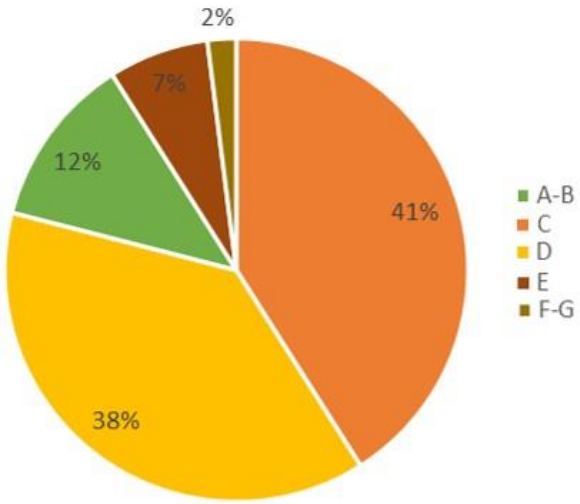

Figure 2: West Lothian Properties EPC Rating

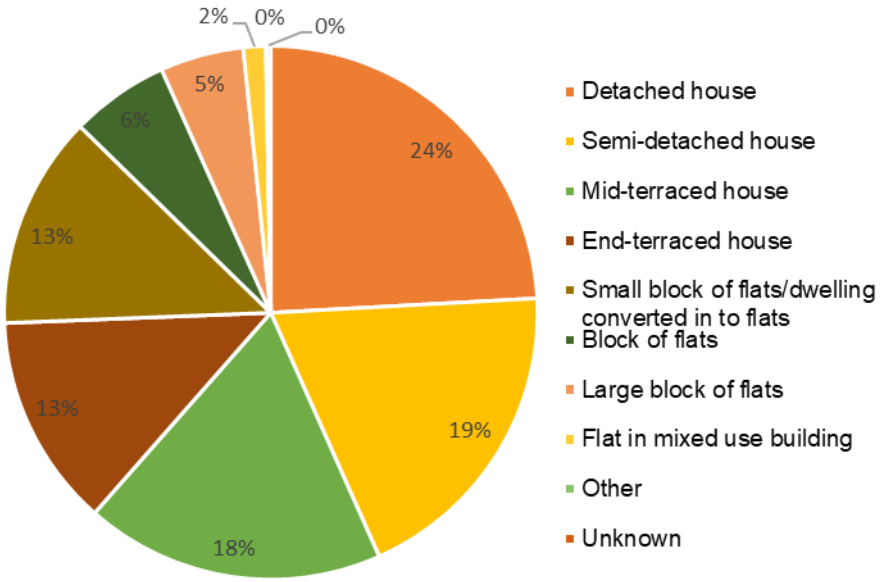

Figure 3: West Lothian Property Types

Data Source

[1] https://www.scotlandscensus.gov.uk/documents/scotland-s-census-2022-rounded-population-estimates-data/

Home Analytics Scotland is a dataset produced by the Energy Savings Trust and it provides essential data on the Scottish housing stock. The core datasets that make up Home Analytics Scotland are:

- Energy Performance Certificate data
- Home Energy Efficiency Database (HEED) data
- Energy Saving Trust Home Energy Check (HEC) data
- Ordnance Survey AddressBase, MasterMap Topography layer and StreetMap data
- Scotland Gas Networks data
- Scottish Census data
- Scottish Index of Multiple Deprivation (SIMD) data

Home Analytics Scotland contains elements of HEED but is designed to provide a more comprehensive profile of the housing stock, taking into account every address and systematically accounting for skews and biases in the underlying datasets.

The Non-Domestic Analytics Scotland database is derived from thousands of property records drawn from a variety of sources, such as Ordnance Survey, BEIS and the Scottish Assessors Association. EPCs represent the primary data source. However, unlike Home Analytics, less than 15% of non-domestic buildings in Scotland have an EPC record with a corresponding UPRN. To account for this the Energy Savings Trust modelled the predicted values for properties with missing data. The database is therefore a combination of known and modelled property records.

All of the following data in West Lothian's First LHEES are based on the Home Analytics Scotland and Non-Domestic Analytics datasets.

Energy Efficiency

	Uninsulated walls	Loft insulation 0-99mm	Single glazed windows
West Lothian	**30%** 25,547	**6%** 5,257	**3%** 2,555

Table 3 Indicators of poor energy efficiency: loft insulation less than 99mm thick, single glazed windows and uninsulated walls.

Lack of wall insulation is the most common contributor to energy inefficiency in West Lothian with 30% of West Lothian's domestic dwellings having uninsulated walls. Uninsulated cavity walls are the most common construction type with 25,547 domestic dwellings in West Lothian having uninsulated cavities (**Table 4**).

Uninsulated Walls - Construction Types	Cavity Construction	Timber Frame	Solid Brick or Stone	System Built
Domestic Properties in West Lothian	**15%** 13,167	**5%** 4,694	**5%** 4,626	**4%** 3,060

Table 4 Types of uninsulated walls

Domestic properties with uninsulated walls were most commonly owner occupied, Local Authority and Housing Association properties made up only 3% of properties with uninsulated walls (3,012 properties) (**Table 5**).

Uninsulated Walls - Tenure Types	Owner Occupied	Privately Rented	Local Authority	Housing Association
Domestic Properties in West Lothian	**22%** 18,905	**4%** 3,630	**2%** 1,999	**1%** 1,013

Table 5 Tenure of uninsulated properties

Single glazed windows were most commonly found in Linlithgow Bridge (195 properties), Linlithgow South (167), Winchburgh, Bridgend and Philpstoun (155). This correlates with the three areas with the highest number of listed buildings. In these instances, single glazing must be retained but there may be

potential to provide advice to these property owners about appropriate efficiency measures in listed buildings, such as shutters.

The areas with the most properties with uninsulated walls of all construction types were Mid Calder & Kirknewton (1,288), Bathgate East (1,188) and East Calder (1,133) (**Figure 4**).

Loft insulation less than 99mm thick was most common in Bellsquarry, Adambrae and Kirknewton (360 properties), East Calder (344) and Bathgate East (331) (**Figure 5**). However, it's worth noting that while these intermediate zones were the three highest, lack of sufficient loft insulation was quite consistent across the county (on average each intermediate zone had 171 properties with less than 99mm loft insulation).

Figure 4: Energy Efficiency by Zone

Intermediate Zone Properties which are Uninsulated (all construction types)

Property Count

- 89 - 346
- 346 - 605
- 605 - 861
- 861 - 1119
- 1119 - 1288

1 Armadale
2 Armadale South
3 Bankton and Murieston
4 Bathgate and Boghall
5 Bathgate East
6 Bathgate West
7 Bathgate, Wester Inch and Inchcross
8 Bellsquarry, Adambrae and Kirkton
9 Blackburn
10 Blackridge, Westfield and Torphichen
11 Blaeberry Hill and East Whitburn
12 Breich Valley
13 Broxburn East
14 Broxburn Kirkhill
15 Broxburn South
16 Carmondean and Eliburn North
17 Craigshill
18 Deans
19 Dedridge East
20 East Calder
21 Fauldhouse
22 Howden
23 Knightsridge
24 Knightsridge and Deans North
25 Ladywell
26 Linlithgow Bridge
27 Linlithgow North
28 Linlithgow South
29 Livingston Village and Eliburn South
30 Mid Calder and Kirknewton
31 Pumpherston and Uphall Station
32 Seafield
33 Uphall, Dechmont and Ecclesmachan
34 West Calder and Polbeth
35 Whitburn Central
36 Whitburn, Croftmalloch and Greenrigg
37 Winchburgh, Bridgend and Philpstoun

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N

0 2.5 5 km

Figure 5: Insulation by Zone

Intermediate Zones Properties with Insulation 0-99mm

Property Count

- 25 - 115
- 115 - 205
- 205 - 295
- 295 - 360

1 Armadale
2 Armadale South
3 Bankton and Murieston
4 Bathgate and Boghall
5 Bathgate East
6 Bathgate West
7 Bathgate, Wester Inch and Inchcross
8 Bellsquarry, Adambrae and Kirkton
9 Blackburn
10 Blackridge, Westfield and Torphichen
11 Blaeberry Hill and East Whitburn
12 Breich Valley
13 Broxburn East
14 Broxburn Kirkhill
15 Broxburn South
16 Carmondean and Eliburn North
17 Craigshill
18 Deans
19 Dedridge East
20 East Calder
21 Fauldhouse
22 Howden
23 Knightsridge
24 Knightsridge and Deans North
25 Ladywell
26 Linlithgow Bridge
27 Linlithgow North
28 Linlithgow South
29 Livingston Village and Eliburn South
30 Mid Calder and Kirknewton
31 Pumpherston and Uphall Station
32 Seafield
33 Uphall, Dechmont and Ecclesmachan
34 West Calder and Polbeth
35 Whitburn Central
36 Whitburn, Croftmalloch and Greenrigg
37 Winchburgh, Bridgend and Philpstoun

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0 2.5 5 km

Energy Efficiency as a Driver of Fuel Poverty

Craigshill, Ladywell and Fauldhouse have the highest rates of fuel poverty (>10% of household income is spent on fuel) (27%, 25% and 23%). Craigshill, Fauldhouse and Ladywell also have the highest percentage of households in extreme fuel poverty (>20% of household income is spent on fuel) (20%, 9.6%, 9.1%). Interventions in these areas should consider the vulnerabilities of these customers. Interventions that increase energy efficiency maybe the most appropriate. Craigshill, Ladywell and Fauldhouse have on average 35% of properties with uninsulated walls, 924 properties in Craigshill, 774 properties in Ladywell and 742 properties in Fauldhouse. Additionally, there is a higher proportion of Local Authority and Housing Association owned properties in these intermediate zones which will allow for direct interventions.

Interventions in areas with high fuel poverty rates must ensure that there is adequate data and modelling to ensure that actions identified will not have a future detrimental impact. Low risk actions may include:

- Building level energy efficiency projects
- Advocating and promotion of further funding and support
- Awareness raising and behaviour change campaigns to ensure maximum energy efficiency

5 Decarbonising Properties

5.1 Decarbonising On-Gas Grid Properties

93% of West Lothian's domestic properties are on gas grid, only 0.6% of on-gas domestic properties already have low or zero emissions heating systems. The majority of already existing low/zero emissions heating systems are in Local Authority or Housing Association properties with only 39 such systems in private rented sector and 141 in owner occupied homes.

The majority of on-gas domestic properties in West Lothian are in Category 1 (**Table 8**). Category 1 properties are those considered highly suited for heat pump retrofit due to being well insulated properties with a wet heating system. However, it should be noted that this initial stage of categorising properties excludes any consideration of electricity network capacity or costs implications. 60% of West Lothian domestic properties potentially have good suitability of heat pumps, the majority of these properties are owner occupied (39%). Encouraging heat pump installation in owner occupied properties will be challenging without mechanisms to encourage changes and providing financial support. There are 12,611 properties that are Local Authority or Housing Association owned which would allow for direct interventions. The areas with the largest number of Category 1 properties are Bathgate, Wester Inch & Inchcross (2,786), East Calder (2,413) and Whitburn, Croftmalloch & Greenrigg (2,009).

18% of West Lothian domestic properties are on-gas Category 2. Category 2 properties are those with secondary potential for heat pump retrofit; they will be suitable for retrofit after moderate fabric upgrade and / or addition of wet distribution system. Category 2 properties are mostly owner occupied but there are 2,693 Local Authority and Housing Association properties that could be made suitable for heat pumps. The need for fabric upgrades to be suitable for heat pump installation ties into the need to improve energy efficiency of housing stock in general, particularly uninsulated cavity walls as identified in the energy efficiency category.

15% of West Lothian domestic properties are on-gas Category 3. Category 3 properties are the 'hard to treat' properties, those which will need significant fabric upgrade to be heat pump ready and therefore maybe considered unsuited to heat pump technology, with electric (storage or direct) or biomass likely to be the most viable decarbonisation technology. These are most common in owner occupier and privately rented sectors; however, 1,743 Category 3 properties are Local Authority and Housing Association owned. The areas with the most Category 3 properties are Bathgate East (682), Craigshill (661) and Mid Calder & Kirknewton (644).

- **Total number of domestic properties in LA** 86,107
- **Total number of domestic properties in LA which are on-gas grid** 80,384

Category 0	Count in category	Tenure types			
		Housing Association	Local Authority	Owner Occupied	Privately Rented
Number of domestic properties	1,242	254	808	141	39
Percentage of Local Authority domestic properties	1.4%	0.3%	0.9%	0.2%	0.05%

Table 6 numbers of Category 0 properties (properties that currently have a low or zero emissions heating system)

Category 1	Count in category	Tenure types			
		Housing Association	Local Authority	Owner Occupied	Privately Rented
Number of domestic properties	50,672	4,497	8,114	33,735	4,333
Percentage of Local Authority domestic properties	60%	5%	10%	39%	5%

Table 7 numbers of Category 1 properties (those considered highly suited for heat pump retrofit (i.e. well insulated properties with a wet heating system, excluding any consideration of electricity network impacts or costs of any network upgrades))

Category 2	Count in category	Tenure types			
		Housing Association	Local Authority	Owner Occupied	Privately Rented
Number of domestic properties	15,389	448	2,245	10,664	2,032
Percentage of Local Authority domestic properties	18%	1%	3%	12%	2%

Table 8 numbers of Category 2 properties (those with secondary potential for heat pump retrofit (i.e. properties in need of moderate fabric upgrade and / or addition of wet distribution system to be heat pump ready))

Category 3	Count in category	Tenure types			
		Housing Association	Local Authority	Owner Occupied	Privately Rented
Number of domestic properties	13,062	698	1,045	9,647	1,672
Percentage of Local Authority domestic properties	15%	1%	1%	11%	2%

Table 9 numbers of Category 3 properties (those with tertiary potential for heat pump retrofit (i.e. properties in need of significant fabric upgrade to be heat pump ready) or those less suited to heat pump technology, with electric (storage or direct) or biomass likely to be the most viable decarbonisation technology)

5.1.1 Network Capacity

How the just transition towards decarbonising heat will interact with the wider energy system is still not fully known, most notably the use of current electricity infrastructure, impacts on future grid capacity, and the transition from natural gas to other fuels. To help understand these changes West Lothian Council commits to engaging with SPEN and using their Portal tool to forward plan heat decarbonisation measures for buildings.

5.2 Decarbonising Off-Gas Grid Properties

- **Category 0** properties already using low/zero emissions heating systems
- **Category 1** properties considered highly suited for heat pump retrofit due to being well insulated properties with a wet heating system.
- **Category 2** properties with secondary potential for heat pump retrofit; they will be suitable for retrofit after moderate fabric upgrade and / or addition of wet distribution system.
- **Category 3** properties are the 'hard to treat', such as those which will need significant fabric upgrade to be heat pump ready and therefore maybe considered unsuited to heat pump technology, with electric (storage or direct) or biomass likely to be the most viable decarbonisation technology.

6.5% of West Lothian's domestic properties are off gas and, of these 8.5% are already on low or zero emissions heating systems. Properties with zero emissions heating are most common in Local Authority properties, many of which are communal heating systems. Zero emissions heating systems are less common in Housing Association properties (86) and privately rented properties (56).

1% of West Lothian's domestic properties are 'off-gas' Category 1 i.e. considered highly suitable for immediate heat pump retrofitting being well insulated properties with a wet heating system - not considering network capacity. The majority of these are owner occupied (625), however 162 are Local Authority and Housing Association properties which would allow easier direct interventions.

3% of West Lothian domestic properties are on-gas Category 2 i.e. those with secondary potential for heat pump retrofit after a moderate fabric upgrade and/or addition of wet distribution system. The majority of these 1,694 are owner occupied, however 583 are Local Authority and Housing Association and could be suitable for direct intervention for fabric upgrades.

2% of West Lothian domestic properties are on-gas Category 3 i.e. those which will need significant fabric upgrade to be heat pump ready and therefore maybe considered unsuited to heat pump technology, with electric (storage or direct) or biomass likely to be the most viable decarbonisation technology. These are most common in owner occupier and privately rented sectors; however, 121 Category 3 properties are Local Authority and Housing Association owned.

The areas of West Lothian with the highest proportion of Category 3 are: Winchburgh, Bridgend and Philpstoun (94); Howden (76); Blackridge, Westfield and Torphichen (75) (**Table 10**). The most common solution for Category 3 properties is significant fabric upgrade then heat pump fitting, this is the suggested solution for 619 properties. 600 properties are considered more suitable for electric heating and 102 properties are considered most suitable for biomass. The areas with the highest number of properties suitable for heat pumps are Winchburgh, Bridgend & Philpstoun (115), Blackridge, Westfield & Torphichen (95) and Linlithgow South (79). The areas with the highest number of properties suitable for electric heating are: Howden (88), Mid Calder & Kirknewton (67) and Bathgate East (44). The areas with the highest number of properties suitable for biomass are: Blackridge, Westfield & Torphichen (19), Mid Calder & Kirknewton (13) and Pumpherston & Uphall Station (13).

Intermediate Zone	Total no. of properties in IZ	Total number of Cat 3 Properties	Number of Cat 3 properties - Heat Pumps	Number of Cat 3 properties - Biomass	Number of Cat 3 properties - Electric
Blackburn	2,412	17	5	3	9
Fauldhouse	2,244	10	4	2	4
Bathgate East	3,324	45	0	2	43
Carmondean and Eliburn North	2,670	51	7	4	40
Armadale South	2,614	2	0	1	1
Knightsridge	2,346	13	1	0	12
East Calder	4,341	78	45	1	32
Craigshill	2,659	28	0	0	28
Ladywell	2,170	4	0	0	4
Whitburn Central	2,511	5	0	1	4
Armadale	2,734	29	17	2	10
Bathgate and Boghall	1,967	2	1	0	1
Winchburgh, Bridgend and Philpstoun	3,092	155	115	4	36
Uphall, Dechmont and Ecclesmachan	2,585	50	32	5	13
West Calder and Polbeth	2,595	33	4	0	29
Broxburn East	1,530	15	8	3	4
Blackridge, Westfield and Torphichen	1,712	135	95	19	21
Howden	2,113	88	0	0	88
Breich Valley	2,198	92	65	8	19
Linlithgow Bridge	2,050	11	0	1	10
Bathgate West	2,561	23	5	2	16
Pumpherston and Uphall Station	1,630	62	34	13	15
Blaeberry Hill and East Whitburn	2,888	7	1	0	6
Broxburn South	1,529	11	6	1	4
Broxburn Kirkhill	2,048	7	1	1	5
Deans	1,319	14	0	0	14
Mid Calder and Kirknewton	2,784	128	48	13	67
Dedridge East	2,594	4	0	1	3
Linlithgow North	1,580	41	18	1	22

Seafield	986	2	0	0	2
Linlithgow South	2,480	109	79	11	19
Whitburn, Croftmalloch and Greenrigg	2,591	9	7	1	1
Bathgate, Wester Inch and Inchcross	2,936	6	5	0	1
Livingston Village and Eliburn South	2,167	7	0	1	6
Bellsquarry, Adambrae and Kirkton	2,623	20	13	4	3
Knightsridge and Deans North	1,586	6	0	0	6
Bankton and Murieston	1,927	1	1	0	0

Table 10 areas of West Lothian with the highest proportion of Category 3 properties

- **Total number of domestic properties in Local Authority** 86,107
- **Total number of domestic properties in Local Authority which are off-gas grid** 5,579

Category 0	Count in Category	Tenure types				Category 0 breakdown	
		Housing Association	Local Authority	Owner Occupied	Privately Rented	Heat Pump	Communal
Number of domestic properties	473	86	186	145	56	261	212
Percentage of Local Authority domestic properties	0.55%	0.11%	0.22%	0.17%	0.07%	0.30%	0.25%

Table 11 numbers of Category 0 properties

Category 1	Count in Category	Tenure types			
		Housing Association	Local Authority	Owner Occupied	Privately Rented
Number of domestic properties	890	77	85	625	103
Percentage of Local Authority domestic properties	1%	0%	0%	1%	0%

Table 12 numbers of Category 1 properties

Category 2	Count in Category	Tenure types			
		Housing Association	Local Authority	Owner Occupied	Privately Rented
Number of domestic properties	2,802	365	218	1,694	525
Percentage of Local Authority domestic properties	3%	0%	0%	2%	1%

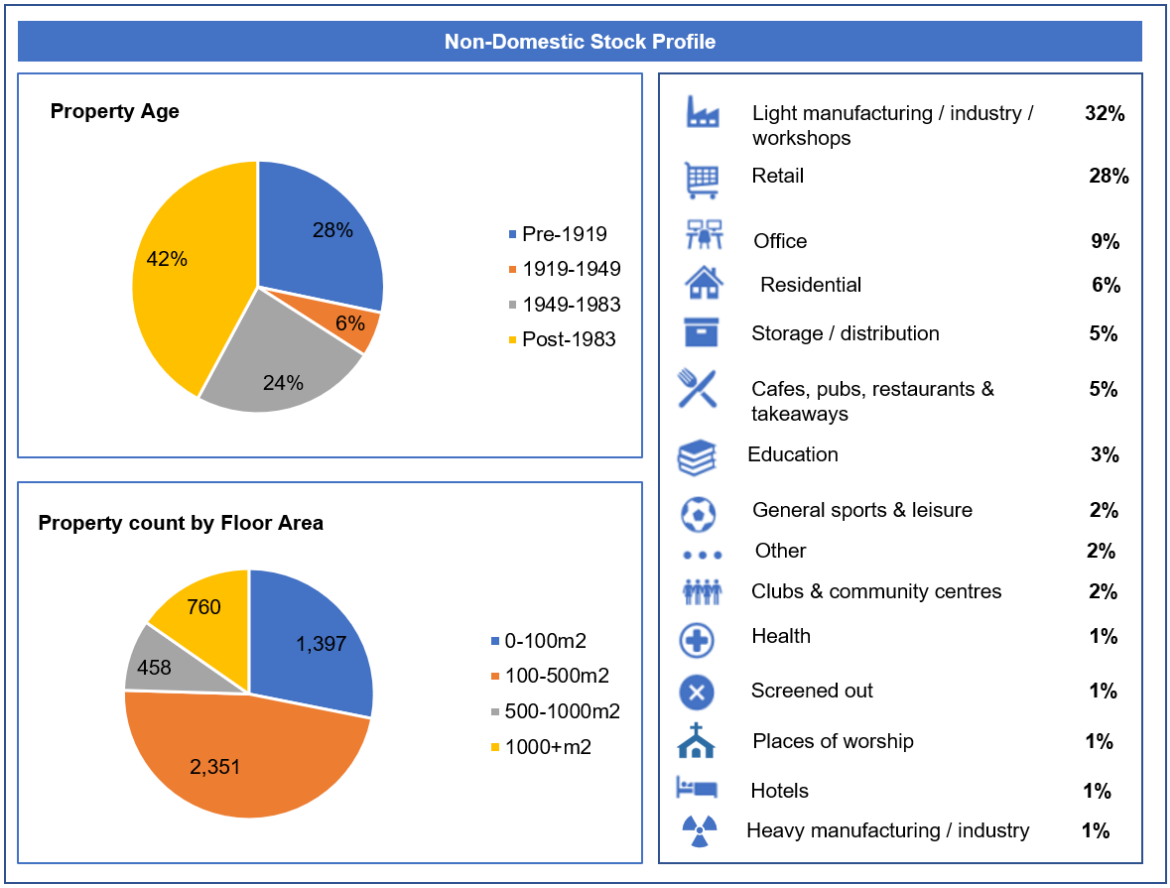
Table 13 numbers of Category 2 properties

Category 3	Count in Category	Tenure types				Category 3 breakdown		
		Housing Association	Local Authority	Owner Occupied	Privately Rented	Heat pump	Biomass	Electrification
Number of domestic properties	1,324	26	95	942	261	619	102	600
Percentage of Local Authority domestic properties	2%	0%	0%	1%	0%	1%	0%	1%

Table 14 numbers of Category 3 properties

5.3 Decarbonising Non-Domestic Buildings

There are 4,970 non-domestic buildings in West Lothian[2]. The majority of West Lothian's non-domestic buildings were built post 1983, reflecting the growth of new town, Livingston. The rest of West Lothian non-domestic buildings are evenly split between pre-1919 buildings (28%) and buildings built between 1949 and 1983 (24%). The remaining 6% were built between 1919 and 1949. The most common types of non-domestic buildings are light manufacturing (32%) and retail (28%), the remaining types offices, storage, restaurants etc make up less than 10% each of non-domestic stock. Most properties (47%) have a floor area size 100-500m^2. The main fuel type for non-domestic buildings is electricity (51%), then gas (31%) and then oil (17%). However, non-domestic buildings with higher heat demand tend to use gas as their fuel type, with gas being most common in the light manufacturing / industry / workshop category.



Of West Lothian's 4,970 non-domestic buildings, 2,621 (53%) have uninsulated walls. The most common type of uninsulated walls are solid brick or stone and uninsulated cavities.

Uninsulated Walls - Construction Types	Solid Brick or Stone	Cavity Construction	Timber Frame	Systems Built
Non-Domestic Properties in West Lothian	**27%** 1,472	**17%** 833	**5%** 258	**1%** 58

Table 15 Non-Domestic buildings with uninsulated walls - construction types

[2] Based on the Non-Domestic Analytics dataset which accounts for an estimated 15% of Scottish non-domestic buildings.

6 Heat Networks

First National Assessment of Potential Heat Network

The First National Assessment of Potential Heat Network (FNA) was carried out by the Scottish Government and published in April 2022. It aimed to provide potential zone identification through assessment of demand density, providing an initial, automated assessment using national datasets of the areas that are most suited to heat networks from a demand density perspective. The analysis does not consider local development plan sites, existing heat networks and sources of waste or surplus or low carbon heat. Additionally, the analysis does not consider the economic viability or the detailed technical or stakeholder related aspects of project opportunities within potential zones.

The FNA produced two maps, one using two screening criteria: a baseline 4,000 kWh/m/yr and two anchor loads and a second with more stringent criteria using 8,000 kWh/m/yr and five anchor loads. 4,000 kWh is the standard baseline suggested by the LHEES methodology, however it should be noted that this is not as stringent as industry benchmarks.

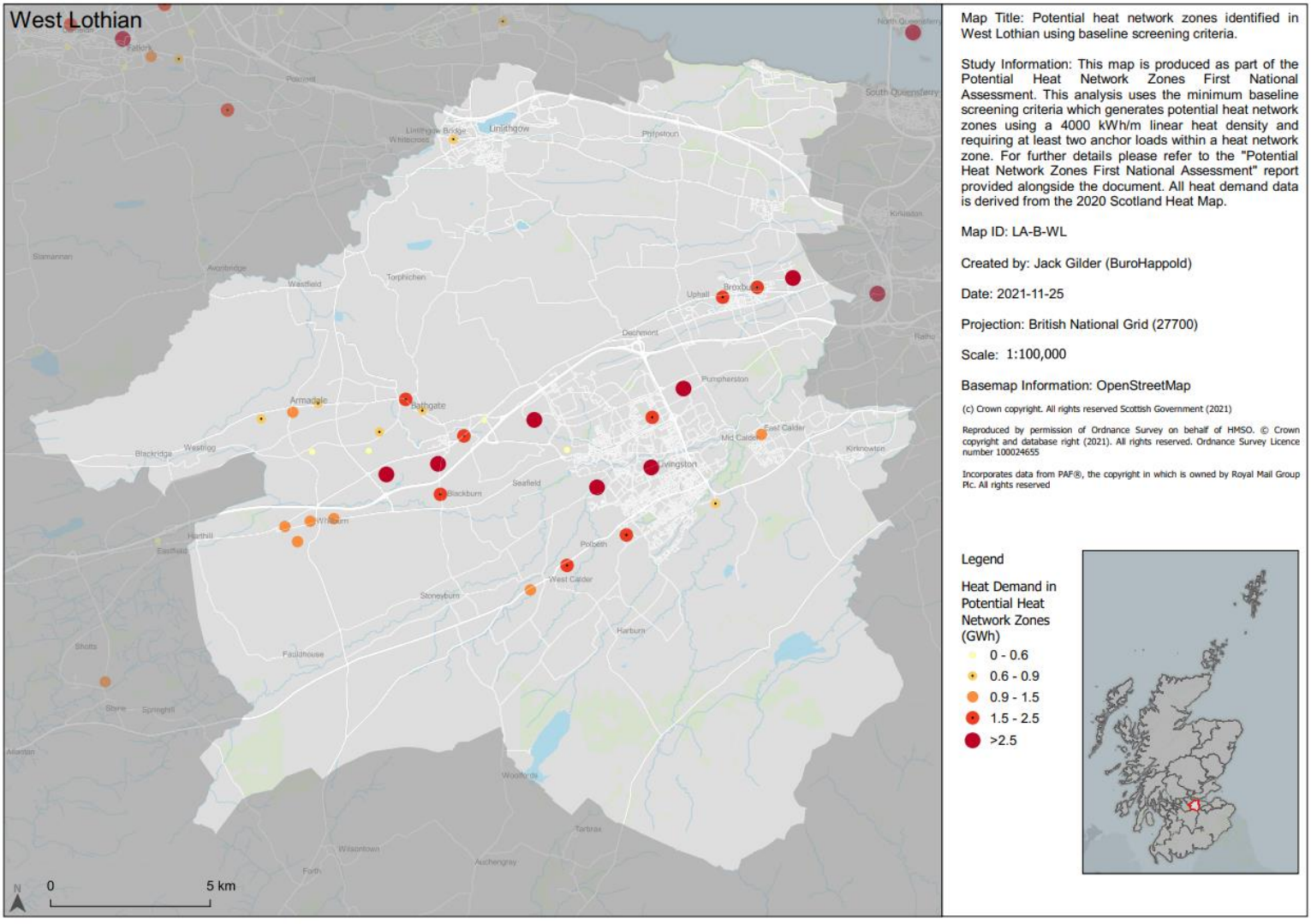
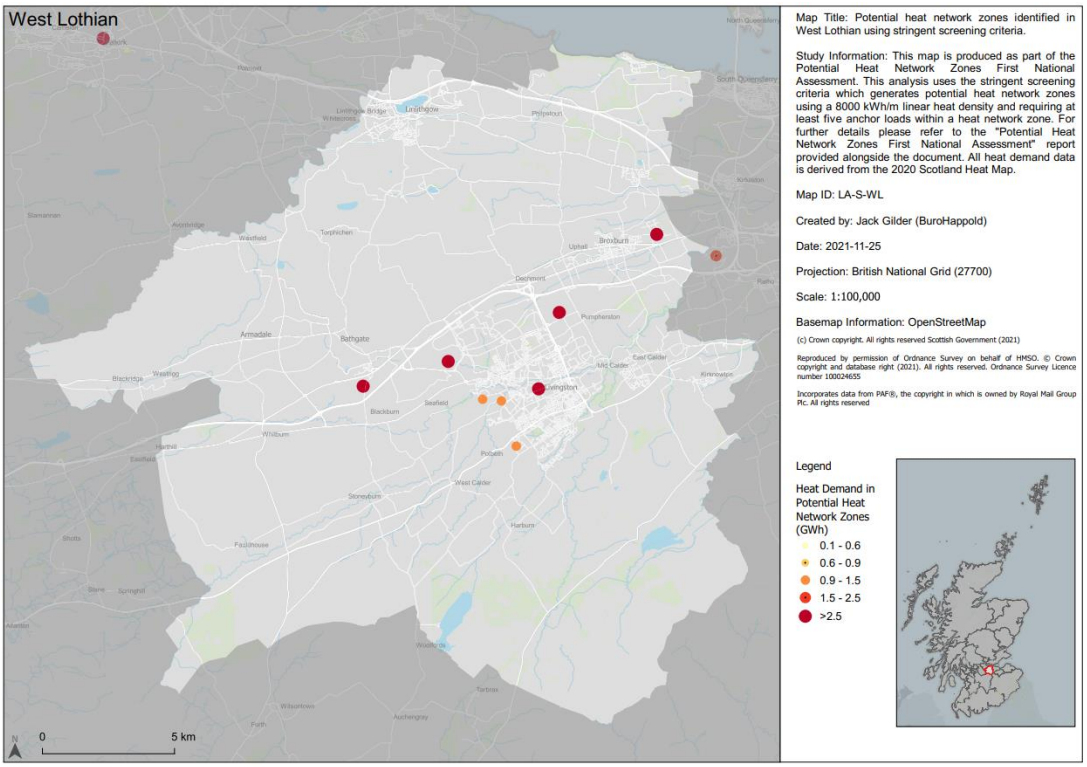


Figure 6: First National Assessment (baseline screening criteria)

Figure 7: First National Assessment (stringent screening criteria)



A review was carried out following the methodology set out in LHEES - Methodology - Stage 4 - Generation of Potential Zones - Detailed Practitioner Approach using the baseline criteria (4,000 kWh/m/yr and two anchor loads). This initial assessment produced 25 clusters, this was then screened and 14 zones identified. Potential zones were then scoped out due to, for example, overestimation of anchor load heat demand due to large square footage; businesses having closed; demolished buildings etc. All 14 screen zones were also identified in the First National Assessment.

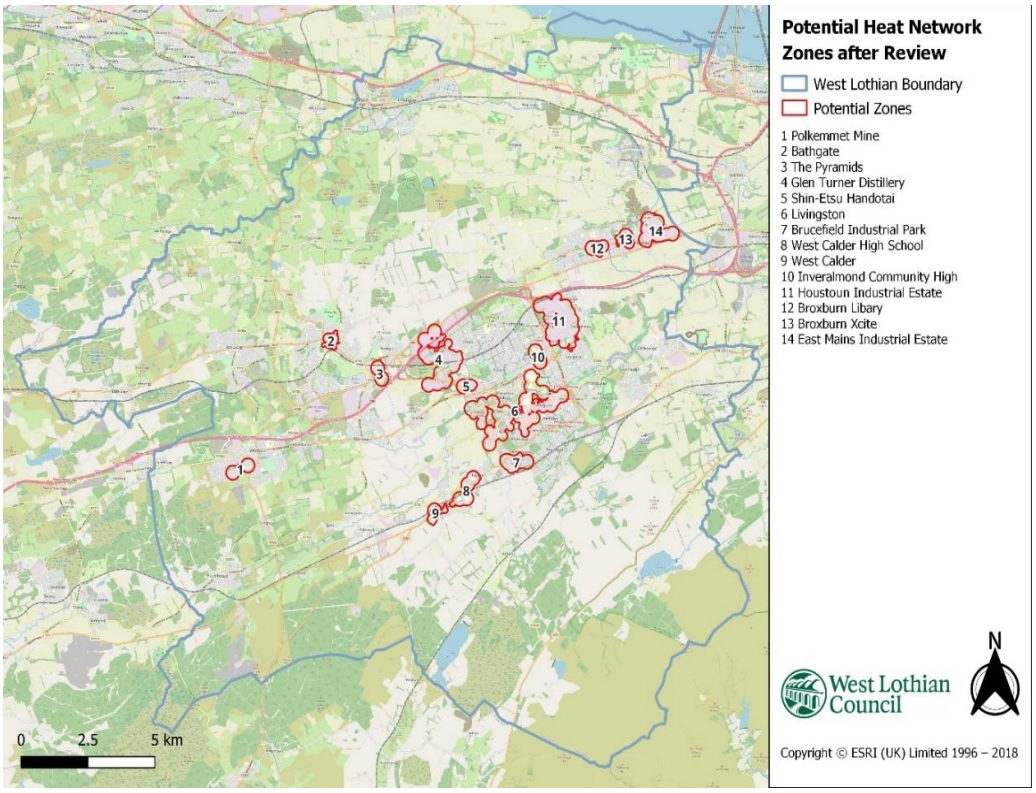


Figure 8: Screened Potential Zones

Zone 1

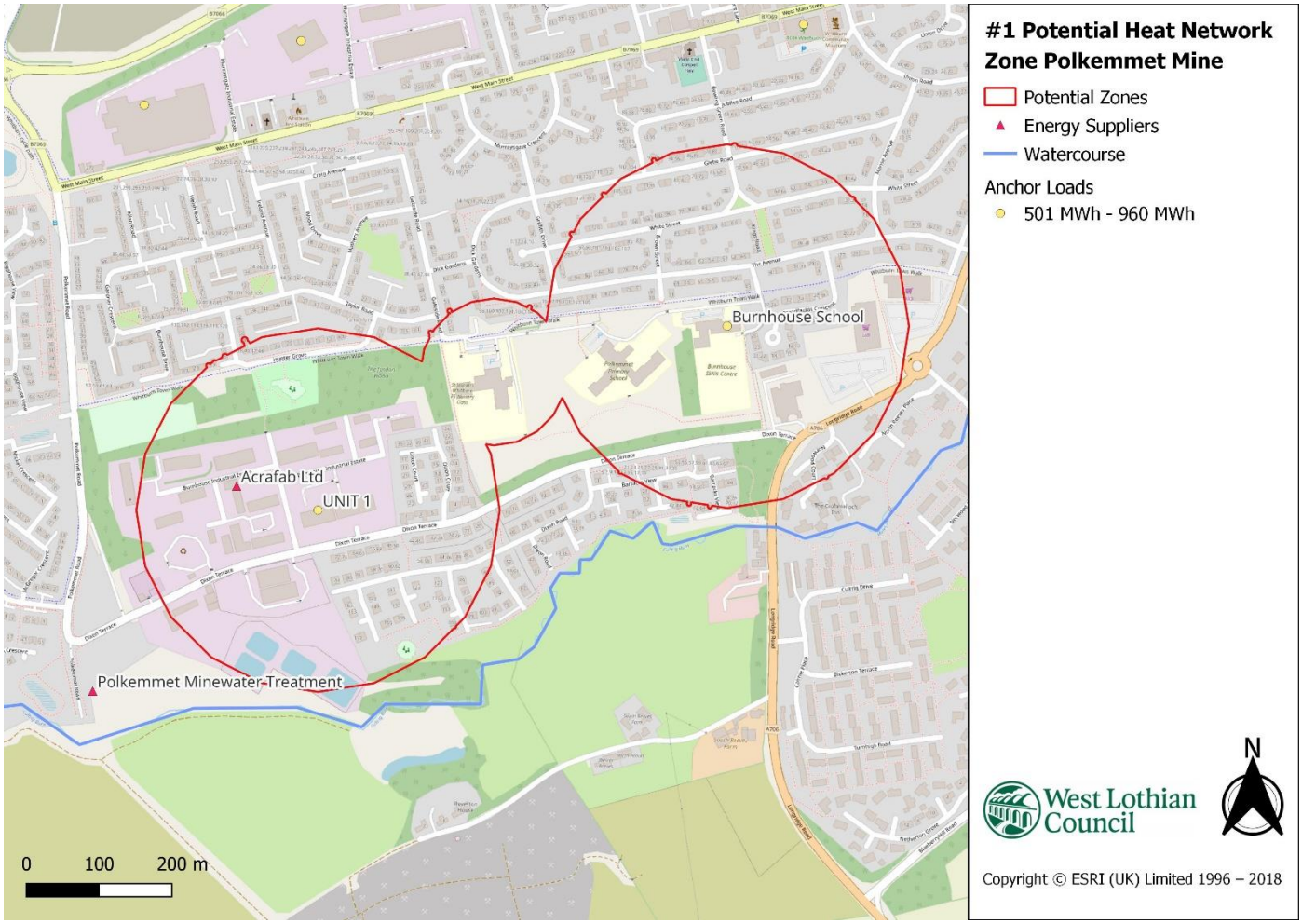


Figure 9: Zone 1

Zone Area: 412,914 m	**Total Anchor Loads:** 2
Zone Heat Demand: 8.11 GWh/year	**Anchor Load Heat Demand:** GWh/year
Cat 1 On-gas domestic property count: 416	**Cat 2 On-gas domestic property count:** 85
Head Demand Confidence: 3.3	

Zone 1 is on the edge of Polkemmet Minewater Treatment Works, West Lothian Council will continue to engage with the Coal Authority to establish if the treatment works could be a suitable heat source for a heat network.

Zone 2

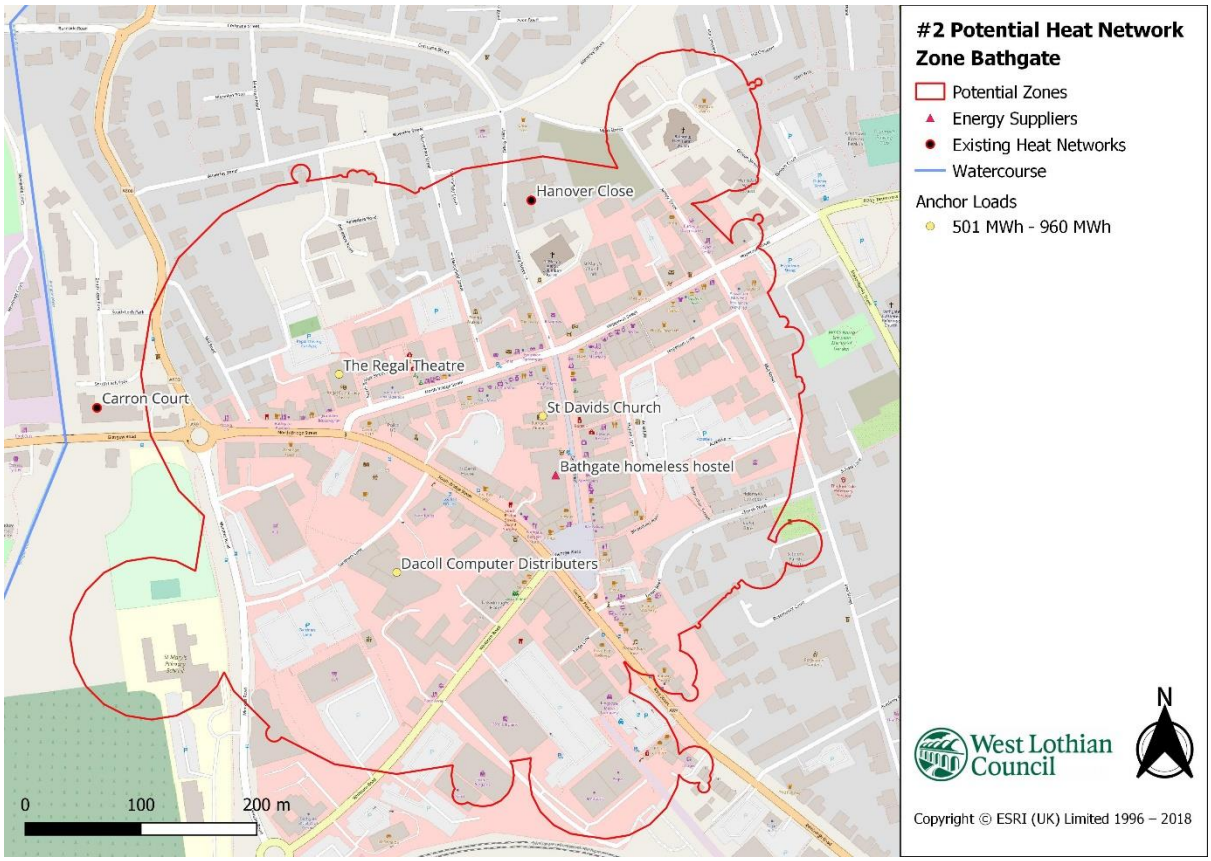


Figure 10: Zone 2

Zone Area: 280,763 m	**Total Anchor Loads:** 3
Zone Heat Demand: 16.51 GWh/year	**Anchor Load Heat Demand: GWh/year**
Cat 1 On-gas domestic property count: 162	**Cat 2 On-gas property count:** 59
Head Demand Confidence: 3.1	

Three anchor loads: The Regal Theatre, computer distribution and St David's church. Near three existing heath networks - Carron Court, Hanover Close and Royal Scot Court. Past Shallow Mine Workings and Development High Risk in cluster. Hot Aquafer present

Zone 3

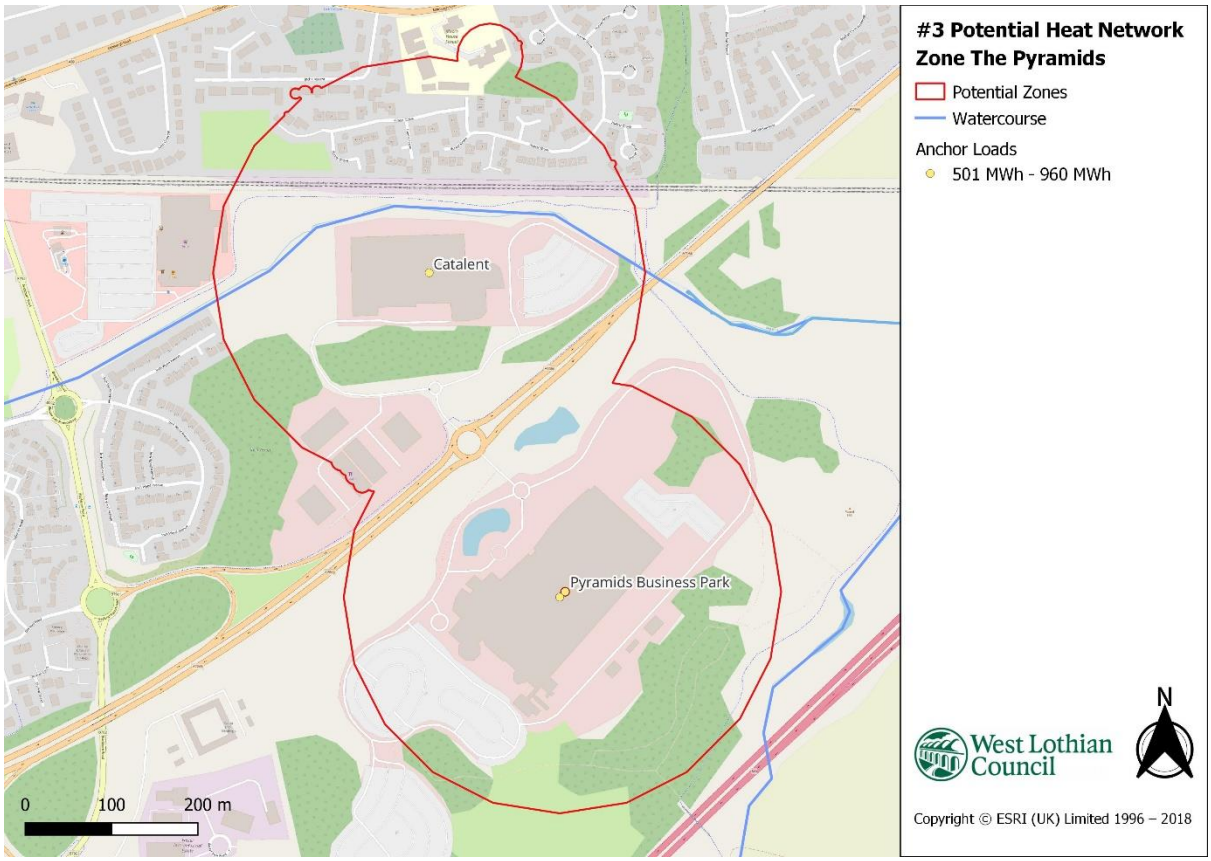


Figure 11: Zone 3

Zone Area: 376,061 m	**Total Anchor Loads:** 2
Zone Heat Demand: 8.38 GWh/year	**Anchor Load Heat Demand: GWh/year**
Cat 1 On-gas domestic property count: 62	**Cat 2 On-gas domestic property count:** 1
Heat Demand Confidence: 2.9	

Two anchor loads The Pyramids Business Park and Inchwood Industrial Estate. No residential area within this heat network and rail line between anchor loads and any residential area.

Zone 4

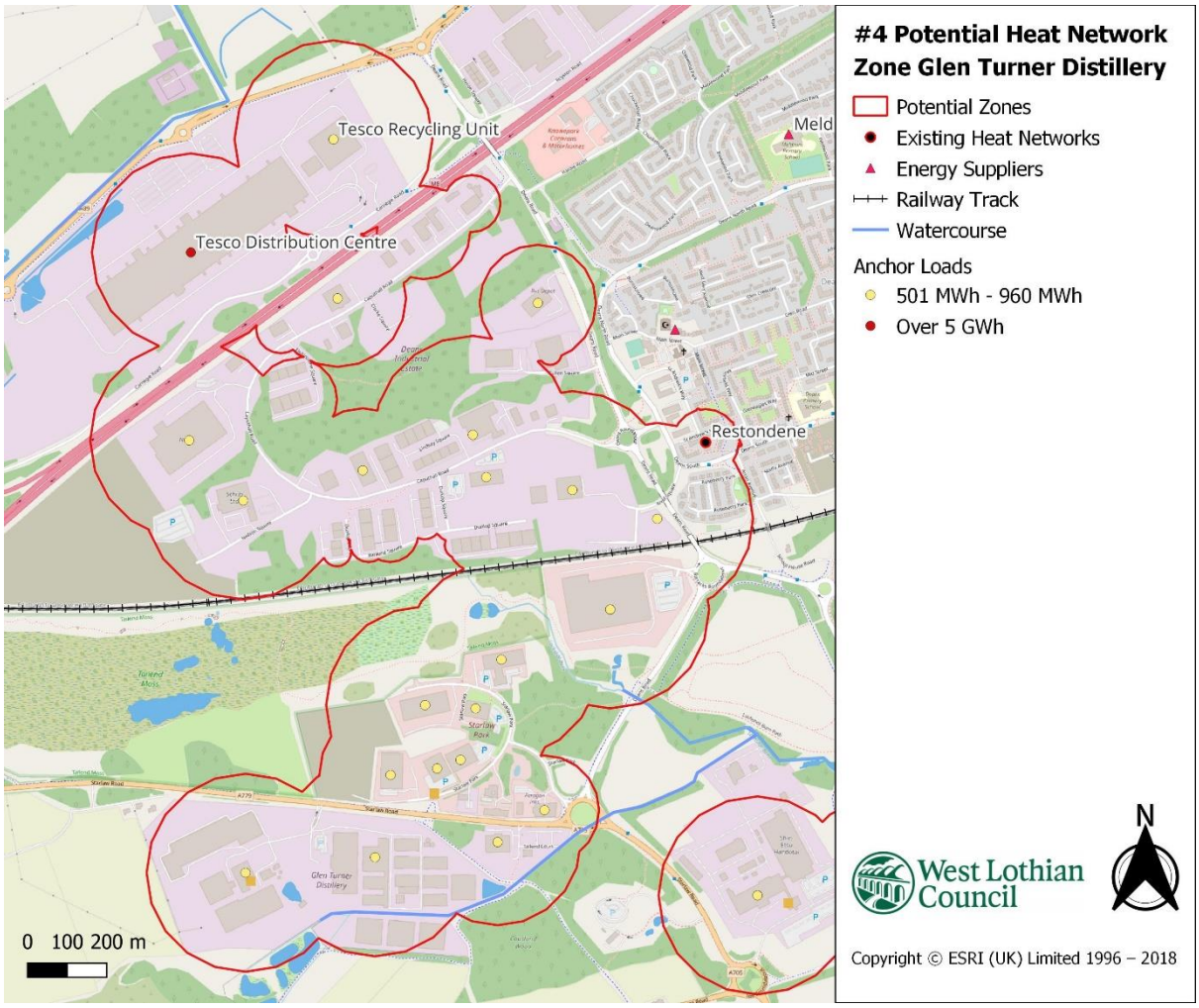


Figure 12: Zone 4

Zone Area: 2,210,575 m	**Total Anchor Loads:** 22
Zone Heat Demand: 66.21 GWh/year	**Anchor Load Heat Demand: GWh/year**
Cat 1 On-gas domestic property count: 73	**Cat 2 On-gas domestic property count:** 16
Heat Demand Confidence: 2.5	

One existing heat network Restondene, natural gas boiler. Anchor load with highest heat demand is cut off from the rest of the cluster by the M8 and the cluster is also intersected by railway line. National Atmospheric Emissions Inventory (NAEI) large point emitters: West Lothian Crematorium and Glen Turner Distillery. Mine Entrance, Development High Risk, Past Shallow Mine Working.

Zone 5

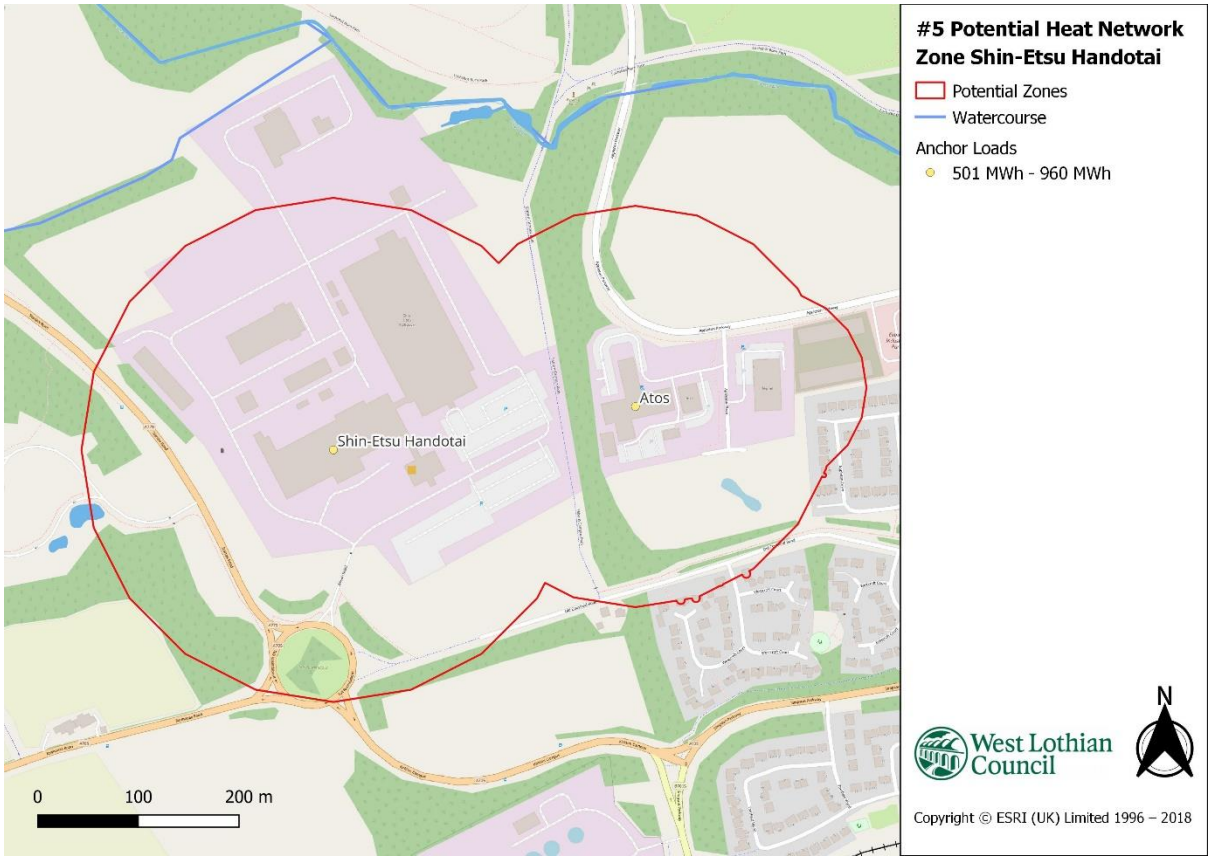


Figure 13: Zone 5

Zone Area: 288,060 m	**Total Anchor Loads:** 2
Zone Heat Demand: 1.62 GWh/year	**Anchor Load Heat Demand: GWh/year**
Cat 1 On-gas domestic property count: 11	**Cat 2 On-gas domestic property count:** 0
Head Demand Confidence: 1.7	

Potential to include West Lothian Crematorium which is near zone 5.

Zone 6

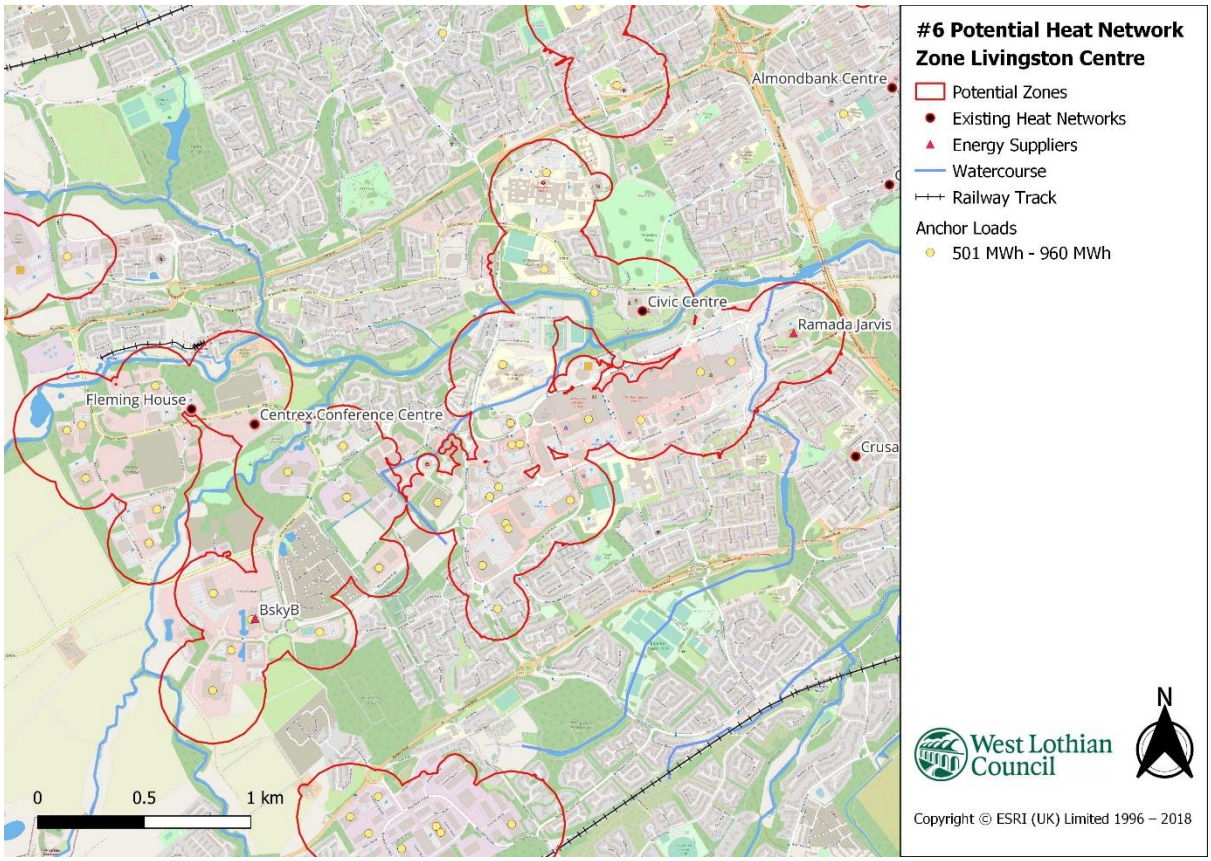


Figure 14: Zone 6

Zone Area: 3,849,981 m	**Total Anchor Loads:** 41
Zone Heat Demand: 6.37 GWh/year	**Anchor Load Heat Demand: GWh/year**
Cat 1 On-gas domestic property count: 908	**Cat 2 On-gas domestic property count:** 410
Heat Demand Confidence: 3.3	

Zone 6 is too large for one heat network. Stakeholder engagement should be carried out to identify how best to divide up the zone.

Zone 7

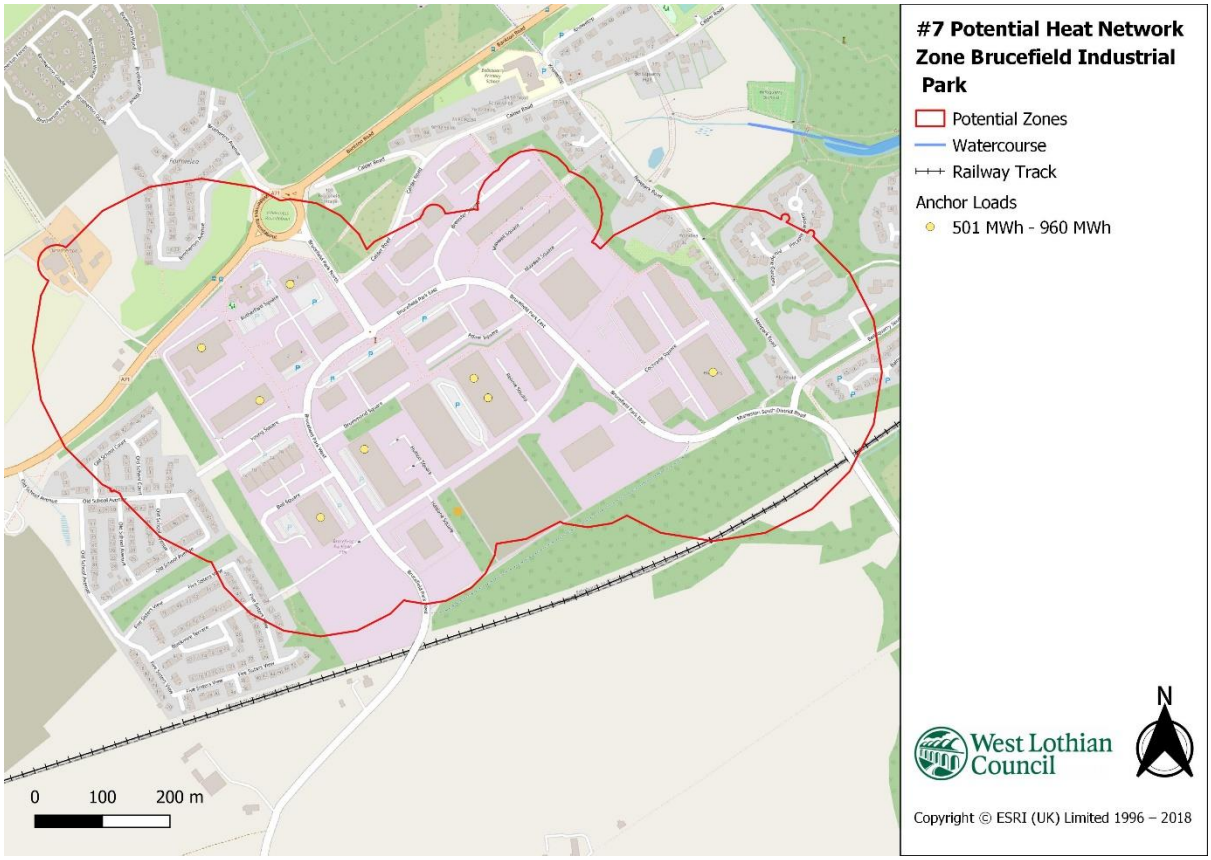


Figure 15: Zone 7

Zone Area: 619,239 m	**Total Anchor Loads:** 8
Zone Heat Demand: 9.29 GWh/year	**Anchor Load Heat Demand: GWh/year**
Cat 1 On-gas domestic property count: 147	**Cat 2 On-gas domestic property count:** 1
Head Demand Confidence: 3.1	

There is potential that anchor loads in this zone have been incorrectly flagged due to their large floor area, rather than heat demand. Further work is needed to clarify heat demand.

Zone 8

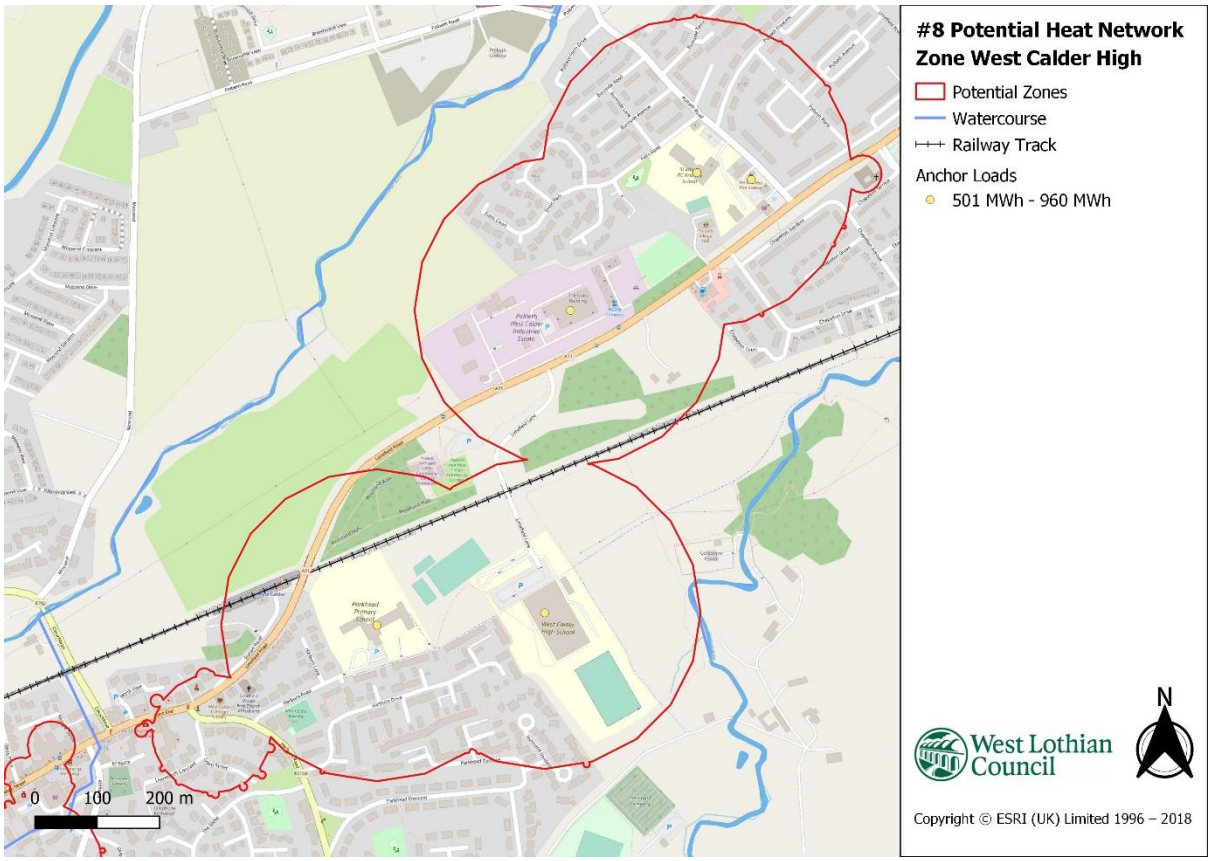


Figure 16: Zone 8

Zone Area: 682,166 m	**Total Anchor Loads:** 5
Zone Heat Demand: 9.19 GWh/year	**Anchor Load Heat Demand: GWh/year**
Cat 1 On-gas domestic property count: 393	**Cat 2 On-gas domestic property count:** 83
Head Demand Confidence: 3.3	

Five anchors - West Calder High School, Parkhead Primary, Daks Buildings, St Mary's Primary, Polbeth Fire station. Lots of residential areas within this zone. Rail line divides the site in two.

Zone 9

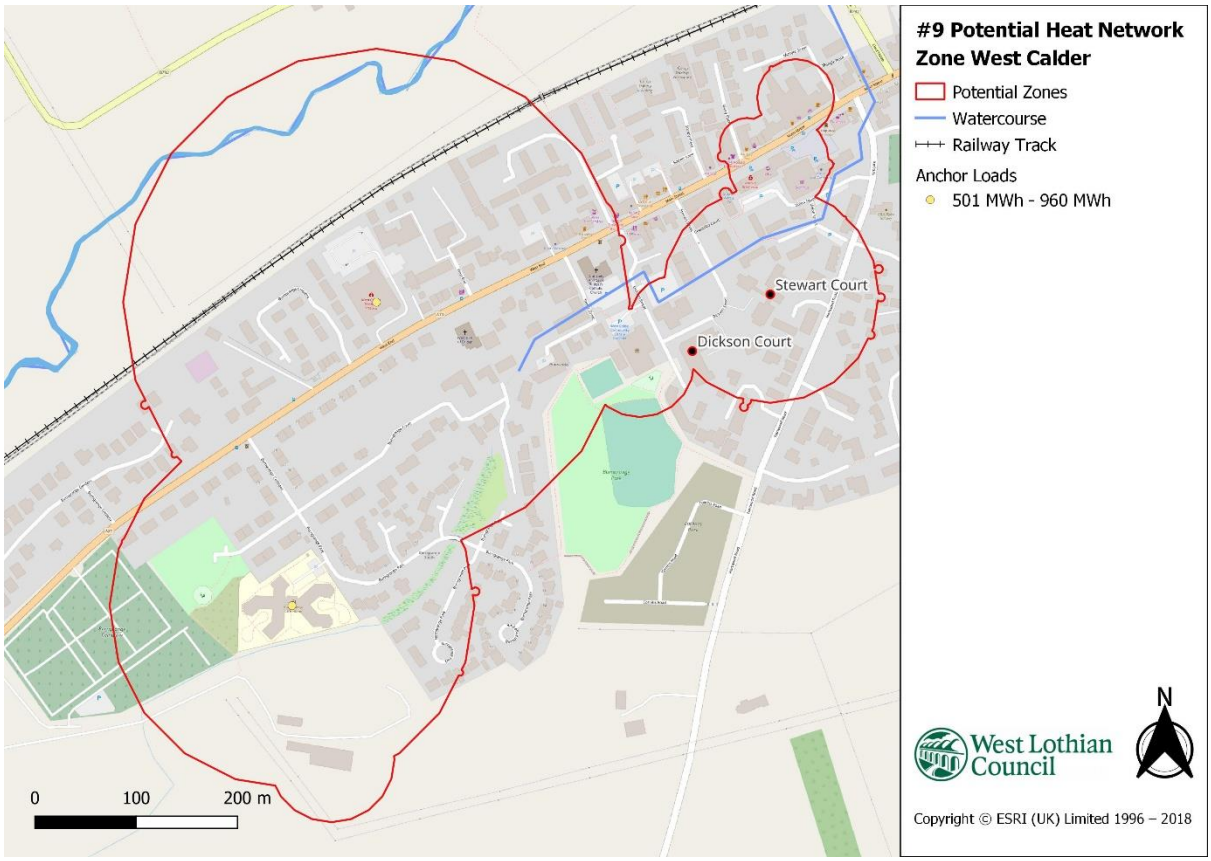


Figure 17: Zone 9

Zone Area: 327,469 m	**Total Anchor Loads:** 3
Zone Heat Demand: 9.6 GWh/year	**Anchor Load Heat Demand: GWh/year**
Cat 1 On-gas domestic property count: 242	**Cat 2 On-gas domestic property count:** 43
Head Demand Confidence: 3.4	

Three anchor loads Medical Centre, Stewart Court, Dickson Court and Burngrange Nursing Home. Two existing communal heating systems - Dickson court and Stewart Court. Lots of residential within the zone.

Zone 10

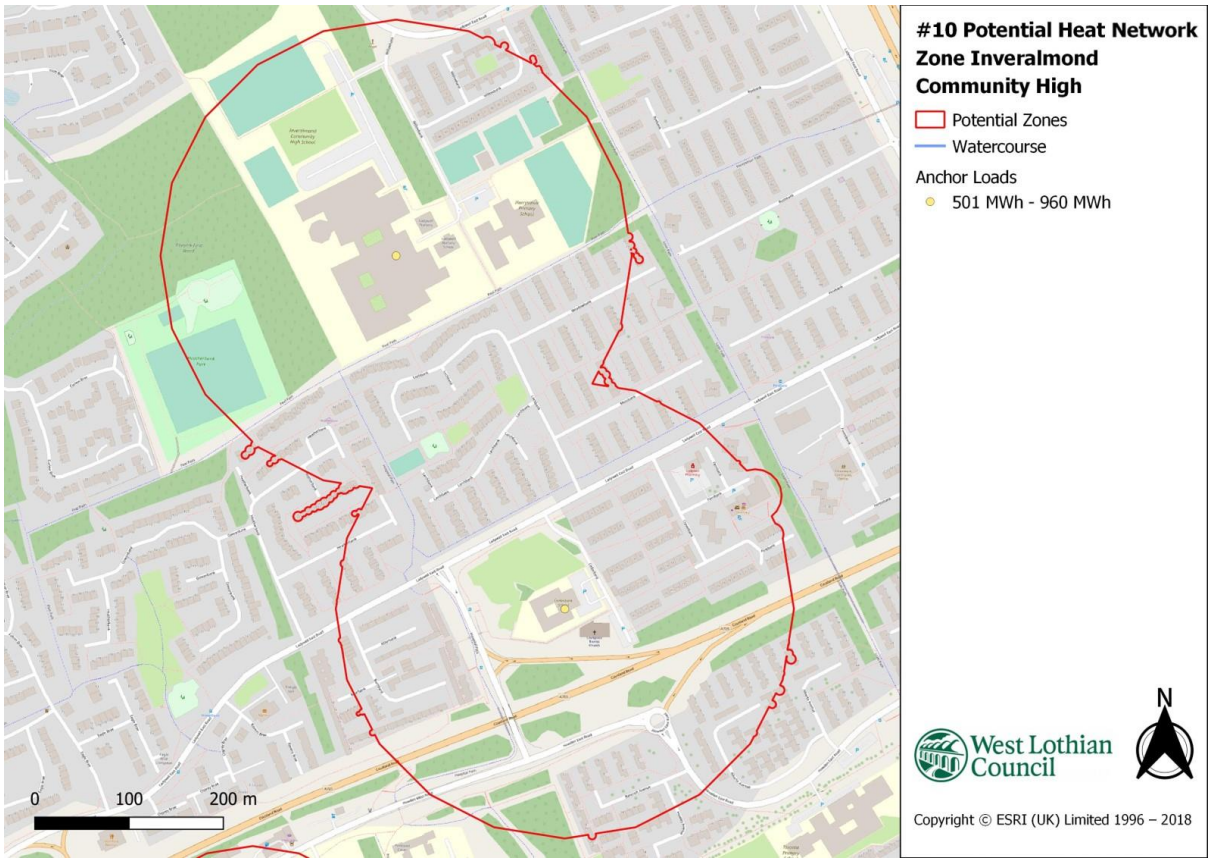


Figure 18: Zone 10

Zone Area: 365,348 m	**Total Anchor Loads:** 2
Zone Heat Demand: 14.57 GWh/year	**Anchor Load Heat Demand: GWh/year**
Cat 1 On-gas domestic property count: 323	**Cat 2 On-gas domestic property count:** 204
Head Demand Confidence: 3.5	

Two anchors - Inveralmond High School and Cedarbank school. Lots of residential within zone.

Zone 11

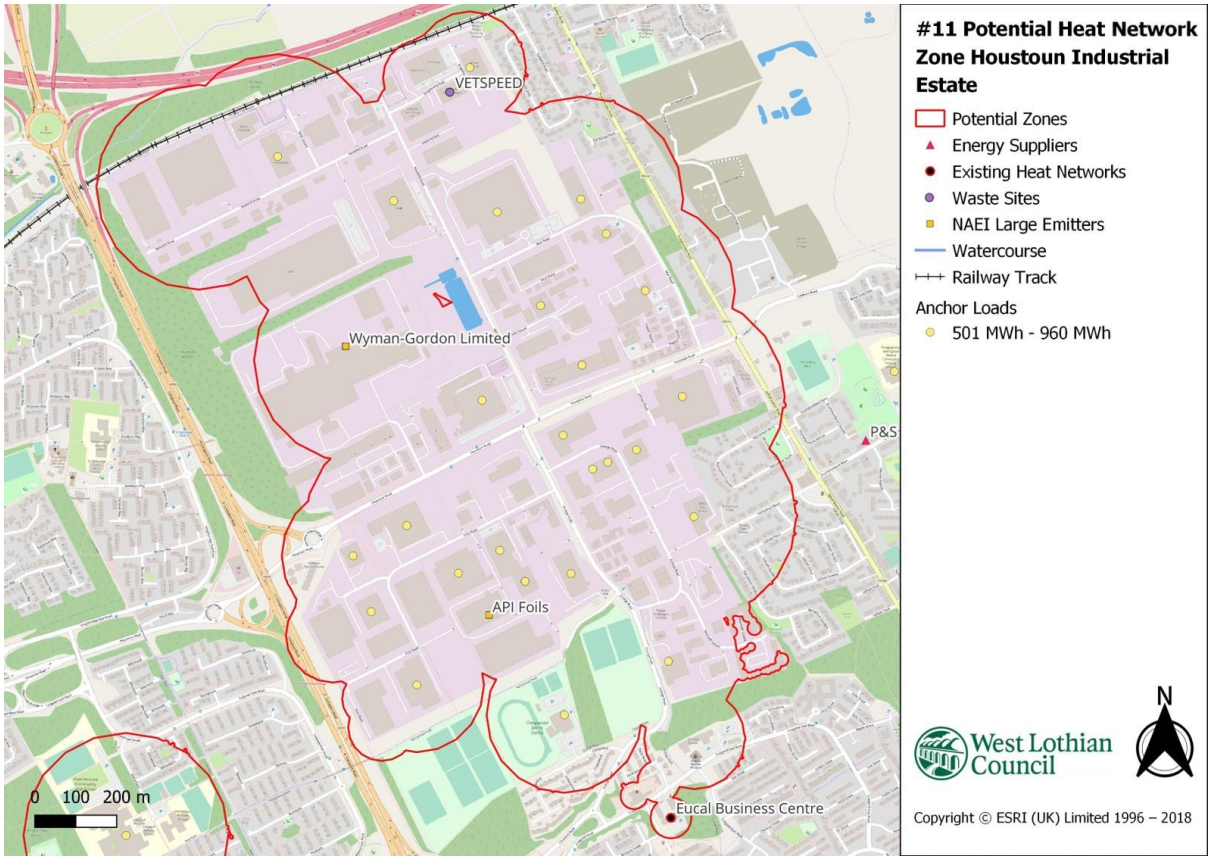


Figure 19: Zone 11

Zone Area: 2,084,957 m	**Total Anchor Loads:** 32
Zone Heat Demand: 14.71 GWh/year	**Anchor Load Heat Demand: GWh/year**
Cat 1 On-gas domestic property count: 224	**Cat 2 On-gas domestic property count:** 88
Heat Demand Confidence: 2.6	

NAEI large emitters - Wyman-Gordon iron & steel industries and API Foils chemical industry. 32 anchor loads - Craigwood sports centre, Mitsubishi, Paterson Arran, Iceland regional distribution centre. No residential within the zone.

Zone 12

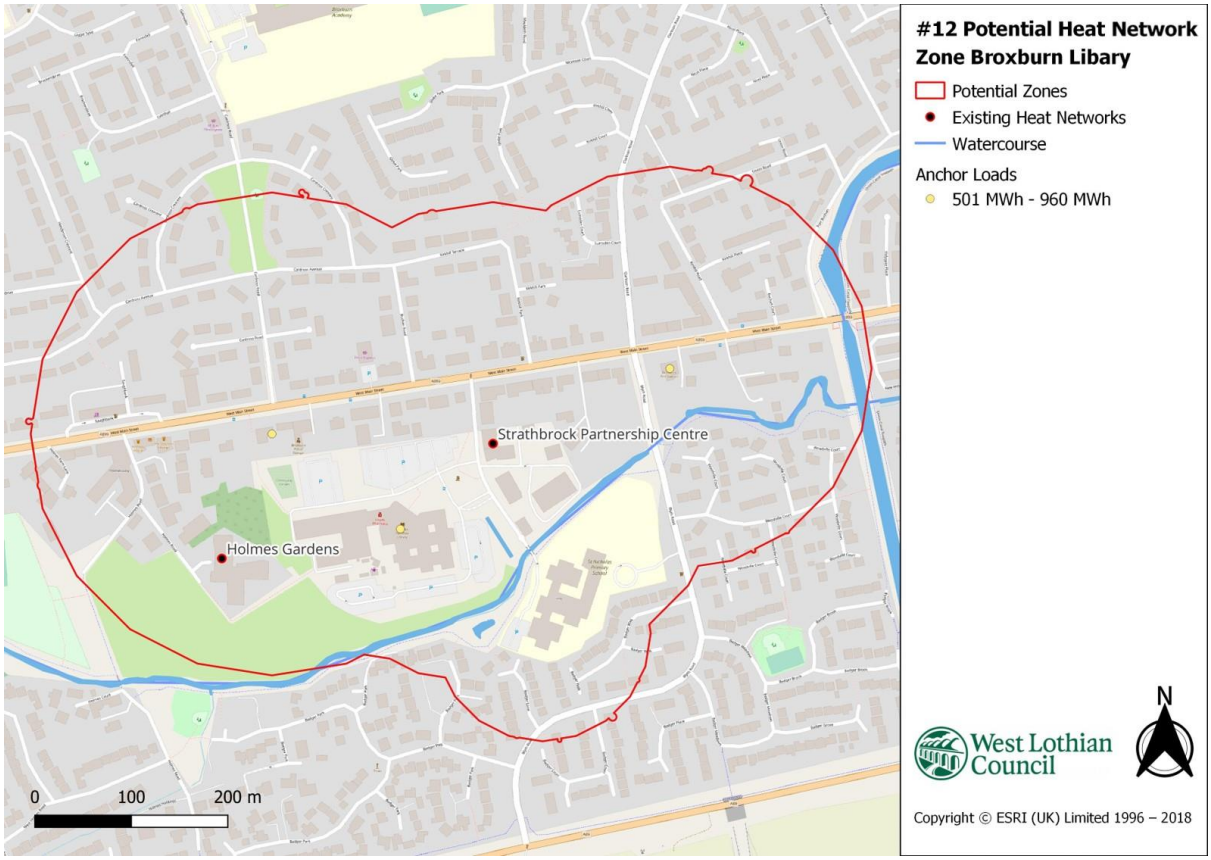


Figure 20: Zone 12

Zone Area: 375,178 m	**Total Anchor Loads:** 3
Zone Heat Demand: 11.33 GWh/year	**Anchor Load Heat Demand: GWh/year**
Cat 1 On-gas domestic property count: 350	**Cat 2 On-gas domestic property count:** 83
Head Demand Confidence: 3.4	

Zone 13

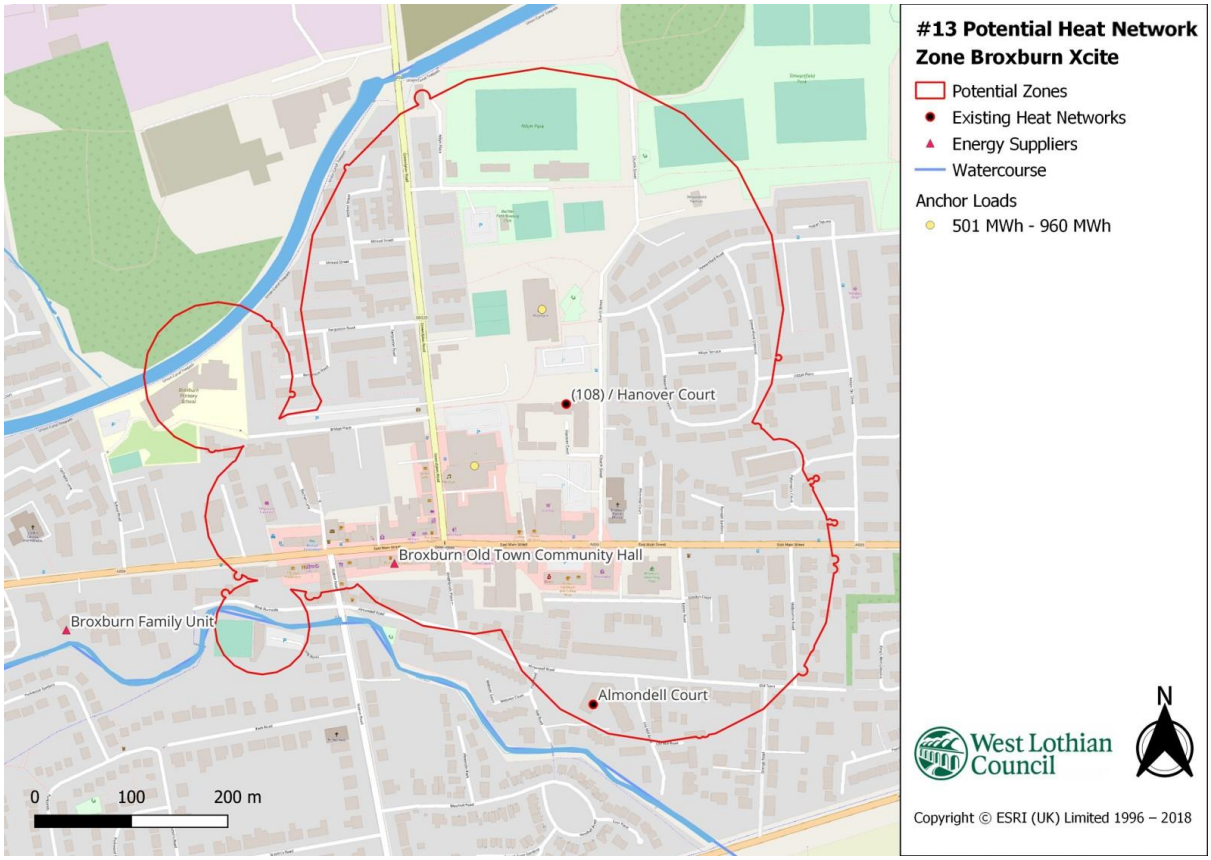


Figure 21: Zone 13

Zone Area: 331,087 m	**Total Anchor Loads:** 2
Zone Heat Demand: 9.13 GWh/year	**Anchor Load Heat Demand: GWh/year**
Cat 1 On-gas domestic property count: 374	**Cat 2 On-gas domestic property count:** 127
Head Demand Confidence: 3.3	

Two anchor loads - Broxburn excite and The Club. Two existing communal heating systems: Hanover Court and Almondell Court

Zone 14

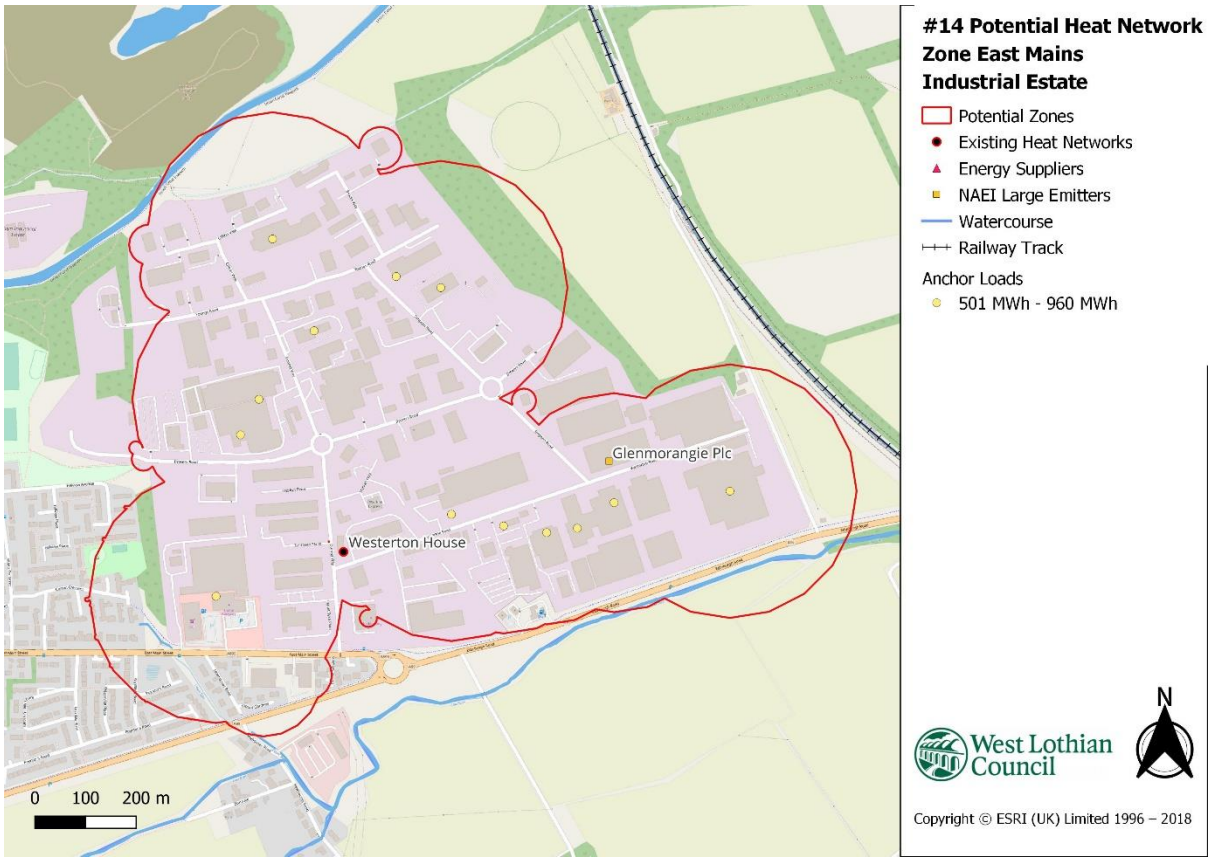


Figure 22: Zone 14

Zone Area: 1,110,906 m	**Total Anchor Loads:** 14
Zone Heat Demand: 6.89 GWh/year	**Anchor Load Heat Demand: GWh/year**
Cat 1 On-gas domestic property count: 91	**Cat 2 On-gas domestic property count:** 9
Head Demand Confidence: 3	

14 anchor loads including: a distillery and recycling centre. Existing communal heating system Westerton House

7 Summary

There are opportunities for improving the energy efficiency of domestic properties, the most common type of intervention needed is wall insulation. West Lothian's non-domestic buildings were also identified as lacking wall insulation with solid brick or stone being the most common construction type with uninsulated walls.

There is potential to decarbonise heating in West Lothian's domestic properties with 61% of domestic properties were identified as suitable for heat pump retrofit. It should be noted that these figures are based on EPCs which maybe out of date or missing. Additionally, a properties potential for heat pump retrofit does not account for the tenant or householder's ability to afford to run zero emissions heating systems. Nor does it account for electric grid capacity or lack of funding available for energy efficiency and retro-fit schemes on the scale necessary to act on the properties identified in LHEES. Work will be undertaken throughout the lifespan of the First LHEES to ensure the initial properties identified are fully suitable for heat pump retrofit.

This First LHEES provides greater details on the domestic, rather than the non-domestic property stock, this is due to the Home Analytics Dataset having fuller coverage than the Non-Domestic Analytics Dataset. Further work is needed to ensure the accuracy of the data used to identify energy efficiency and decarbonisation measures. The Building Assessment Reports (BARs) will contribute to this for non-domestic buildings. Initially it was hoped that BARs would inform the LHEES process, however the deadline of BARs was set as 31st Dec 2023, the date that LHEES is due to be delivered. While BARs have not fed into this First LHEES, officers will continue to work with the Scottish Government to incorporate BARs into the Non-Domestic Analytics Dataset, with the intention that the this will inform future updates of the LHEES Strategy.

The initial Heat Network Zones assessment produced 25 potential HNZ, this was then screened and 14 zones identified. Potential zones were then scoped out due to, for example, overestimation of anchor load heat demand due to large square footage; businesses having closed; demolished buildings etc. These 14 potential HNZ will be further screened over the coming year using information gained in the BARs for identified anchor loads and through stakeholder engagement.

The LHEES process has begun the process of identifying energy efficiency and decarbonisation measures that could be suitable to transition West Lothian's building stock to net-zero. However, in the context of significant constraints on council budgets and a cost of living crisis, there is uncertainty on how this work will be undertaken.

8 Delivery Plan

Priority	Action	Responsible Officers	Timescale
Governance	Establish internal oversight of LHEES delivery, building on already established LHEES Officers Group.	Energy & Climate Manager	Q1 2024
	Agree internal resourcing necessary of LHEES delivery, i.e. potential recruitment.	Head of Finance and Property Services	Q1 2024
	Work with Zero Waste Scotland and Scottish Government to finalise data to complete Delivery Areas.	Climate Change Officer	Q2 2024
	Public consultation on LHEES Strategy & Delivery Plan.	Energy & Climate Manager	Q2 2024
	Interim update to LHEES Strategy & Delivery Plan.	Energy & Climate Manager	Q3 2024
Decarbonisation	Engaging with SPEN using their Portal tool to assess current network capacity to take forward Category 1 properties and to identify the measures and costs of upgrading network capacity to meet heat pump need.	Energy & Climate Manager LHEES Officer	Dec 2024
Heat Networks	Building Assessment Reports (BARs) to be produced for all West Lothian Council non-domestic buildings with an annual heat demand of 73 megawatt-hours per year or more.	Energy & Climate Manager	Dec 2023
	Stakeholder engagement with anchor load organisations to assess potential for heat networks and interest in heat network connection.	LHEES Officer	Dec 2025
Energy Efficiency	Meet route map to EESSH2 for Council Housing	Head of Housing, Customer and Building Services	March 2032* *subject to EESSH review outcome
	Householders and tenants are aware of how to improve energy efficiency, decarbonise heat, and access support programmes.	Energy & Climate Manger Advice Shop	Ongoing

Energy Efficiency	Implement and build upon Historic Environment Scotland guidance focussing on Local Heat and Energy Efficiency Strategies and historic buildings	Head of Planning, Economic Development and Regeneration	Ongoing

Asks for Scottish Government are shared across Regional Local Authorities	
Funding	Scottish Government to give long-term certainty over funding streams to provide reassurance to local authorities for major capital projects. As well as significantly increasing funding amounts to support energy efficiency, and supporting activities (fuel poverty; data collection, modelling, and analysis; funding for community organisations).
	Provide significant funding for research institutions, Local Authorities, social landlords, and others to develop studies and Building Information Modelling for archetypes.
Knowledge & Awareness	Produce a national communications toolkit to raise awareness of Local Heat and Energy Efficiency Strategies; energy efficiency and heat decarbonisation measures; support and advisory services
	Deliver "a public communications programme to raise awareness of the support and advisory services available and to encourage home upgrades, in order to maximise uptake of these schemes."
Research / Data	Encourage use of Building Energy Management Systems and sub-metering by building owners, and sharing of data
	Develop a sustainable data sharing model and platform.
	Research the density of new housing/building developments required to support a new heat network
	Research how indoor air quality is impacted/improved by energy efficiency/heat decarbonisation measures by: • Ensuring indoor air quality and retrofitting buildings are fully considered in the Clean Air Strategy 2 review. • Agreeing standard methodology for monitoring indoor air quality pre- and post-retrofit – including pilot projects. • Developing a framework model to identify how factors impact indoor air quality (e.g. insulation type, air tightness). • Convening a task group to identify what actions can be undertaken to address issues associated with indoor air pollution.
	Model heat efficiency in the context of changing workstyles now and moving forward.
Policy	Map policies/targets to evidence and tools to provide a timeline of anticipated improvements.
	Increase the number of green jobs (and supporting roles) to close the skills gap.
	Work with the Building Research Establishment on EPC reform to develop an improved metric
	Develop policy levers to support short-term mitigation to alleviate current grid capacity pressures. For example: revise battery storage definition; private wire for heat networks; surplus from private grids/renewables to power local buildings
	Continue to support NPF4 Policy 19: Development proposals within or adjacent to a Heat Network Zone identified in a LDP will only be supported where they are designed and constructed to connect to the existing heat network.