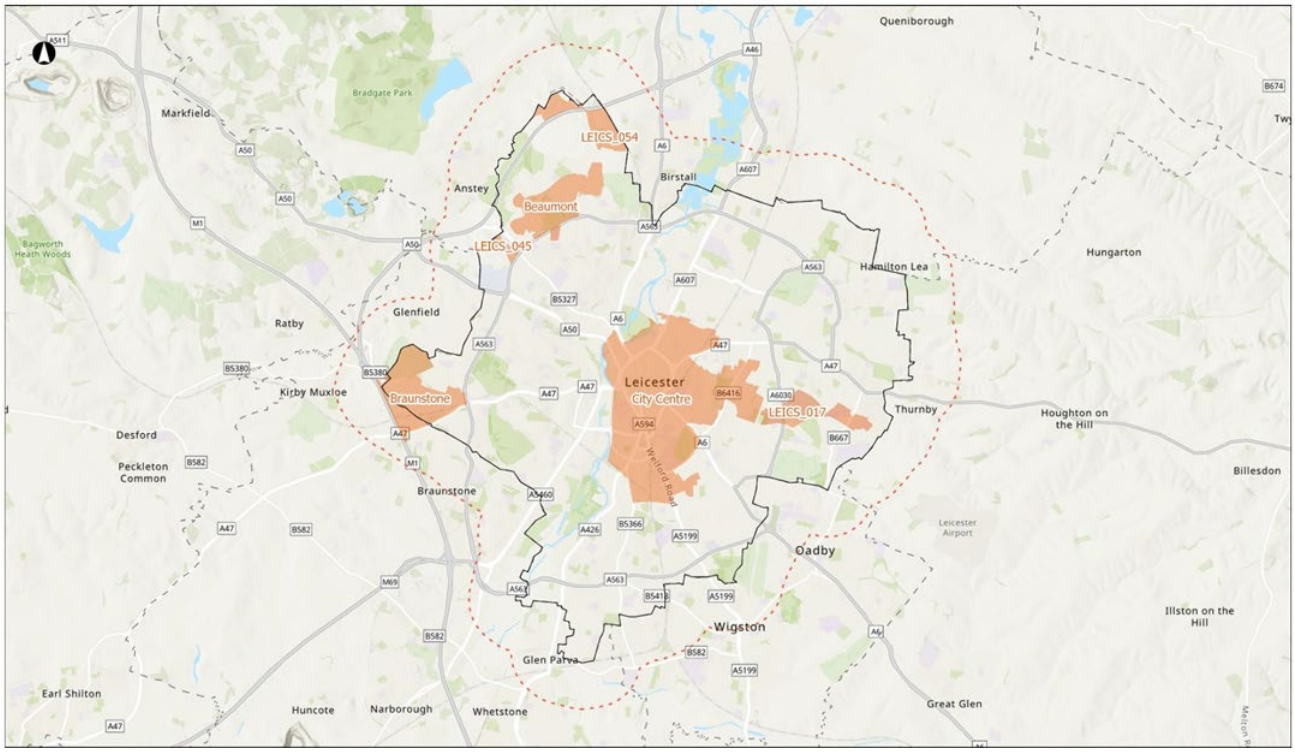
Department for
Energy Security
& Net Zero

Leicester

Heat Network Zoning

Zone Opportunity Report



June 2025

Disclaimer

Please read the following licence conditions thoroughly to understand your responsibility for use of this report and data presented within it.

This report contains outputs from the Heat Network Zoning Pilot Programme. The Pilot was undertaken prior to full details of the Heat Network Zoning policy being available. Therefore, the contents, including data shown in maps, technical and economic data within the report, are likely to change and potentially sensitive information is withheld. No part of this report shall be relied upon for any business decisions.

Acknowledgements

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Contents

Executive Summary

About Leicester: Leicester is a city in Leicestershire, East Midlands, with a population of 368,600 and an area of 73km². It lies on the River Soar and is largely flat and low-lying.

Local Energy Policy: Leicester City Council declared a Climate Emergency in February 2019. City wide carbon emissions have halved since 1990 due to schemes such as LED street lighting and new low carbon heat networks.

Existing heat networks: Leicester has four existing heat networks managed by Bring Energy. These serve 3,000 dwellings and public buildings with future opportunities to decarbonise and expand.

Zones identified: Six potential heat network zones were identified in Leicester, with a total annual heat demand of 500GWh/yr for all buildings potentially required to connect within these zones.

Strategic heat network zones: Three strategic heat network zones were identified with a total heat demand of 450GWh/yr for buildings potentially required to connect. These zones are called City Centre, Beaumont, and Braunstone.

Key heat demands: The total annual heat demand for buildings connected to the initial zone opportunities is 300GWh/yr. Key buildings include Leicester Royal Infirmary, De Montfort University, and Highcross Shopping Centre.

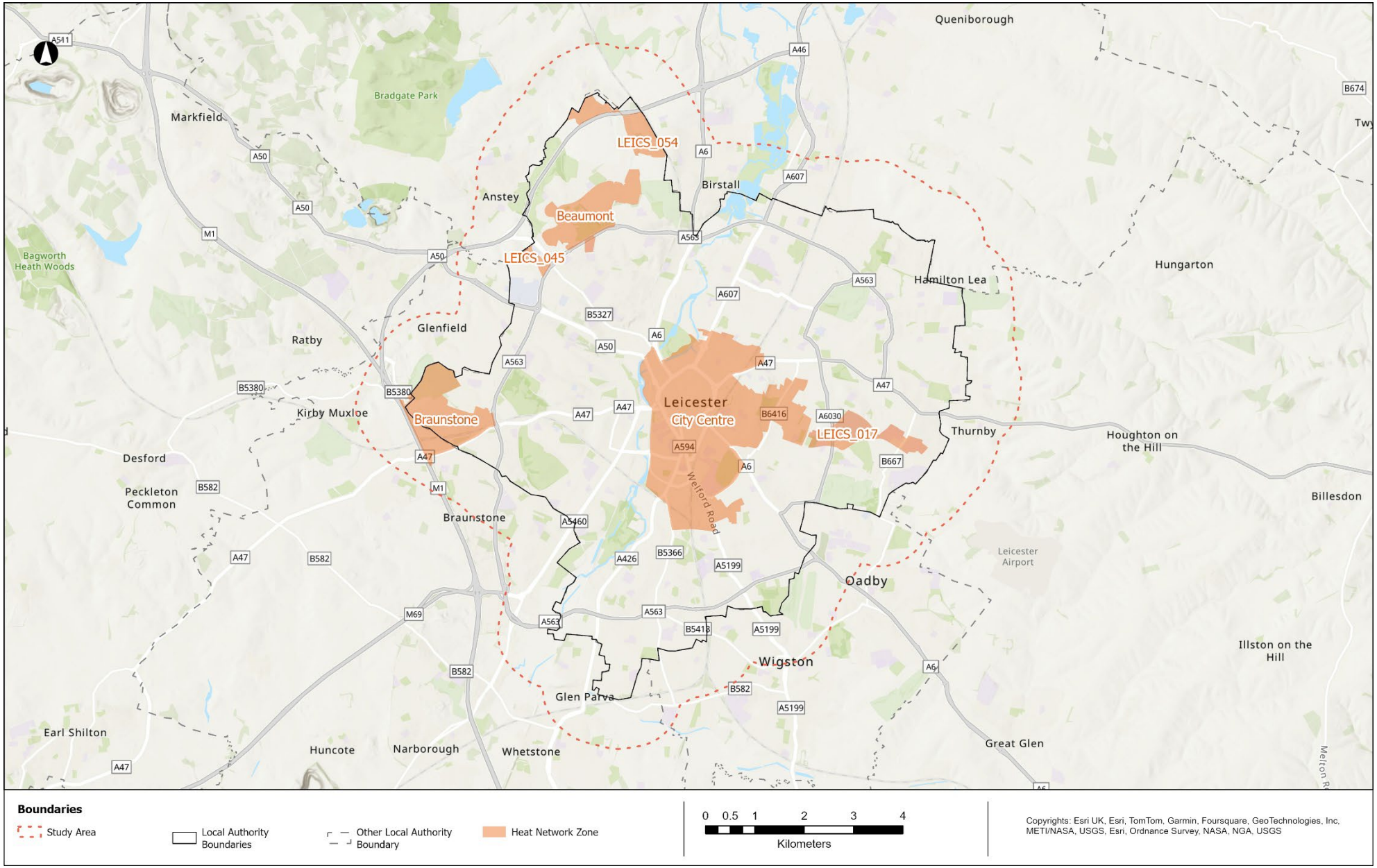
Key heat sources: Potential heat sources include water source heat pumps (WSHPs) from the River Soar, air source heat pumps (ASHPs), and waste heat recovery from industrial processes.

Estimated CapEx: The estimated capital expenditure for the full rollout of heat networks within identified zones is up to £575m, of which the initial zone opportunities amount to over £350m.

Other heat network zones: Other heat network zones identified are situated in the suburban areas, and include educational buildings, a hospital and large new developments.

Carbon savings: The initial zone opportunities identified could deliver carbon savings of more than 50ktCO_{2e} annually

Figure 1: Overview of Heat Network Zones in Leicester



1) Introduction

Heat networks will play a crucial role in decarbonising heat in buildings. Heat networks take heating, cooling or hot water from a central source(s) and deliver it to a variety of premises such as public buildings, shops, offices, hospitals, universities, and homes. They are also an important part of securing the UK's energy independence through local, low carbon heat sources and reducing the cost of living through efficient, affordable heating in densely populated areas. Our analysis shows that heat networks could provide about 20% of total heat by 2050. They currently provide about 3%.

The Department for Energy Security and Net Zero (DESNZ) is enabling the development of heat network infrastructure through a range of targeted funding, policy and legislative support to de-risk projects and attract investment. The Energy Act 2023 establishes the regulatory framework for heat networks in Great Britain and provides powers to introduce heat network zoning in England through secondary legislation. A heat network zone (HNZ) is a formally designated geographical area in England where heat networks are expected to provide the lowest-cost solution for decarbonising heating.

Under heat network zoning, central and local government will work with industry and local stakeholders to identify and designate areas of England where heat networks are expected to be the lowest-cost solution to decarbonising heat. Heat network zoning will be essential to speeding up the development of new heat networks and we hope to catalyse growth where it's most needed.

Heat network zoning will significantly increase private sector investment in the sector by removing the barriers which currently limit the pace of developing large scale heat networks. It will also give local communities the tools to accelerate the development of heat networks in their own areas and ensure that more homes and businesses can have access to greener, cheaper heat. It also has the potential to create tens of thousands of jobs across the country.

This report shows the Pilot programme outputs for Leicester and is intended to showcase potential heat network zones in the city. The report indicates the heat network investment opportunity at a city scale, the potential location of heat network zones, and key opportunities for initial heat network development within those potential zones

Please note that all information presented in this report, including the location of identified heat network zones, is subject to change. These are the findings of Pilot programme that were developed alongside the emerging Heat Network Zoning policy and therefore reflect our understanding at a moment in time. As the methodology improves, we will update these reports to improve our understanding of how heat network zoning may be rolled out in each area. Any potential zones that are identified fully, or partly, in an adjacent local authority area will need to be discussed further once local zone co-ordinators are established.

Heat Network Zoning Pilot Methodology

Heat network zones will be identified using a standardised national zoning methodology[1]. The Heat Network Zoning Pilot Programme (hereafter Pilot programme) set out to develop a process to identify potential zones in a consistent and standardised manner across a range of towns and cities in England. The programme was fully funded and led by DESNZ, working alongside 28 Local Authorities, and multiple consultancy firms, to develop and test this approach at a local level. As such the final outputs are supported by each Local Authority but do not reflect an approved, endorsed, or adopted position on how zones may be delivered.

Lessons from the Pilot have been used to inform the development of the Heat Network Zoning policy. This includes improvements to the identification approach itself, but also wider policy design relating to the number and size of potential zones; existing heat networks; and the impacts of the policy on a range of stakeholders. Once the response to the heat network zoning consultation is published, we will update the methodology to reflect the final policy position.

The key concepts, definitions and complementary workstreams relevant to this report are introduced below. For a fuller description of the Heat Network Zoning policy, and up to date information regarding its implementation, please visit https://www.gov.uk/government/collections/heat-network-zoning.

Heat Network Zone Identification

Heat network zones will be identified using a standardised national zoning methodology. The December 2023 consultation on Heat Network Zoning proposes that the methodology will consist of two stages:

1. a national mapping exercise (using a data-led spatial energy model – the National Zoning Model, (or NZM), to identify indicative heat network zones across England;
2. a refinement stage where relevant local stakeholders will input to the review and refinement of potential heat network zones prior to formal designation.

For the purposes of this study, indicative heat network zones have been identified using a prototype version of the NZM. These indicative zones were then refined by technical consultants with input from local stakeholders. The NZM outputs are already of considerably higher quality than those shared for this work and therefore these reports will improve over time.

This study split heat network zones into two different categories. These are **'strategic'** zones – the largest zones which are generally seen as strategically significant to developing heat networks in an area; and **'other'** zones – which are generally smaller and discrete. These are terms specific to the Pilot programme and the report focuses primarily on the strategic zones.

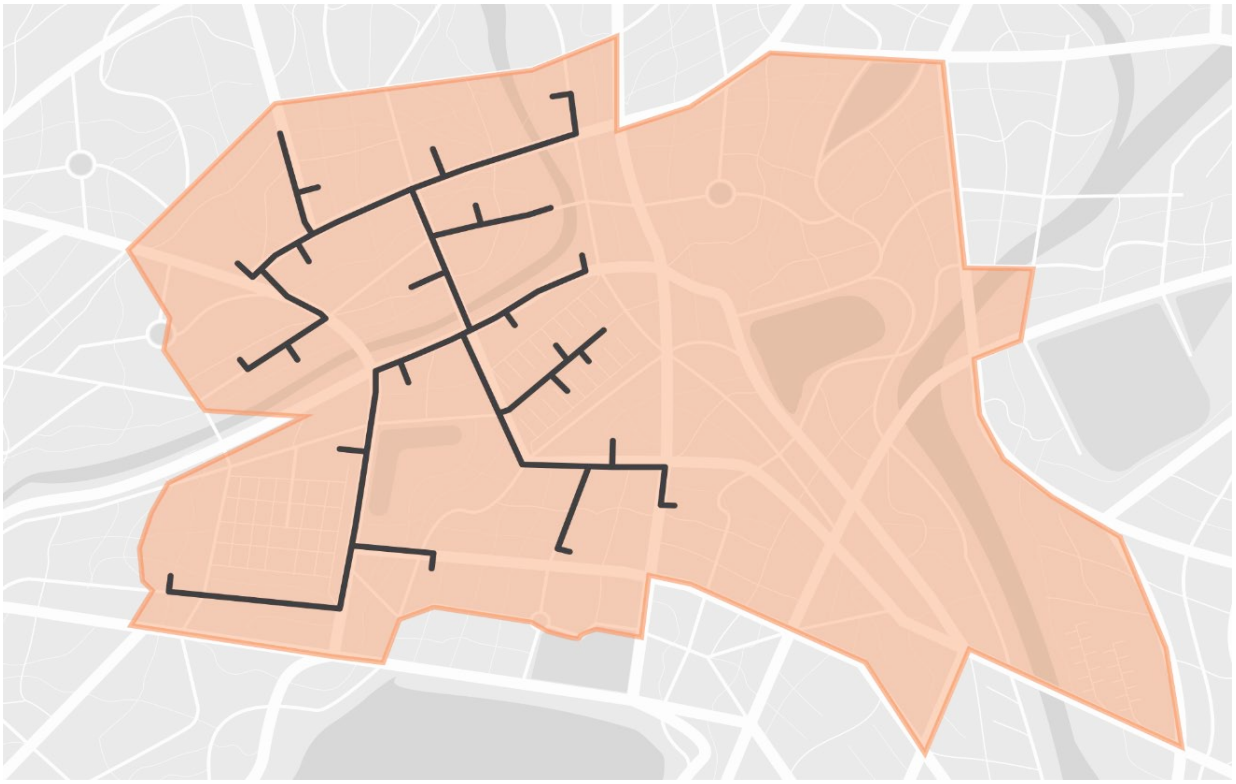
[1] More information can be found in the Heat Network Zoning Methodology Statements (Appendix 3, 4 & 5)

Initial Zone Opportunities

Alongside the identification of potential heat network zones, the Pilot programme has attempted to define areas within zones where the most attractive heat network development opportunities might exist. For the purposes of this programme *only* these are called an "initial zone opportunity" (or IZO). The approach considered economic viability, investment scale and returns, decarbonisation impact and deliverability. They were developed solely around buildings which could be potentially required to connect[2] under the proposed Heat Network Zoning policy and did not consider potential voluntary connections.

Initial zone opportunity design targeted a linear heat density (LHD) of 4MWh/m/yr, for the existing built environment. This is considered a relatively low proxy for economic viability with the heat network sector in England. A more flexible approach was used for new development sites, where different economic success criteria are likely to be applied. To standardise the way opportunities were assessed, the IZOs presented in this report may differ from, or overlap with, existing or planned heat network infrastructure. Campus style heat networks (e.g. in hospitals or university campuses) were considered as potential heat loads with a single point connection. Figure 2 below shows an example of a heat network zone and an IZO.

Figure 2: Illustration of a Heat Network Zone (HNZ) and an Initial Zone Opportunity (IZO)



[2] The building categories being considered as potentially required to connect include new developments, large non-domestic buildings, and communally heated residential blocks as described in Heat Network Zoning Consultation (2023)

Study Scope

This document is presented as a zone opportunity report as it was developed in advance of the final policy design. As such, the report does not include:

- references to the **central authority** or **zoning co-ordinator** roles;
- assumptions about rights of **existing heat networks,** or **zone delivery areas**;
- an options appraisal on which **routes to market** may be taken;
- calculations on the **cost of heat** (connection/tariffs) to specific buildings**;**
- any inferences as the suitability for **public/private sector delivery** unless it's matter of fact (existing network or Heat Network Investment Project/Green Heat Network Fund project);
- references to **local community benefit** or **consumer protection** (subject to a live consultation).

In the future, it is intended that a document, similar in style, will be produced to incorporate these policy design aspects and be used as a Zone Market Prospectus (ZMP) to market heat network zoning opportunities in an area. Further detail on the methodology and initial zone opportunity criteria is provided in Appendix 4 and Appendix 5.

2) Leicester Heat Networks Context

2.1) Leicester City Overview

Leicester is a city within the county of Leicestershire and is the largest settlement in the East Midlands of England. Leicester City Council (LCC) is the unitary authority responsible for local government within the city which holds a population of 368,600 over an area of approximately 73 square kilometres[3]. The city lies on the River Soar which is a major tributary of the River Trent, flowing north through Leicester before joining the Grand Union Canal. Leicester is largely flat and low lying, with numerous parks and nature reserves in and around the city.

With regards to domestic properties, social housing tenants account for 23% of all households, whilst 47% of households are owner occupied, (the remaining 30% accounts for privately rented and shared ownership homes). LCC own 19,775 properties, the remaining 11,451 are owned by various private registered providers[4].

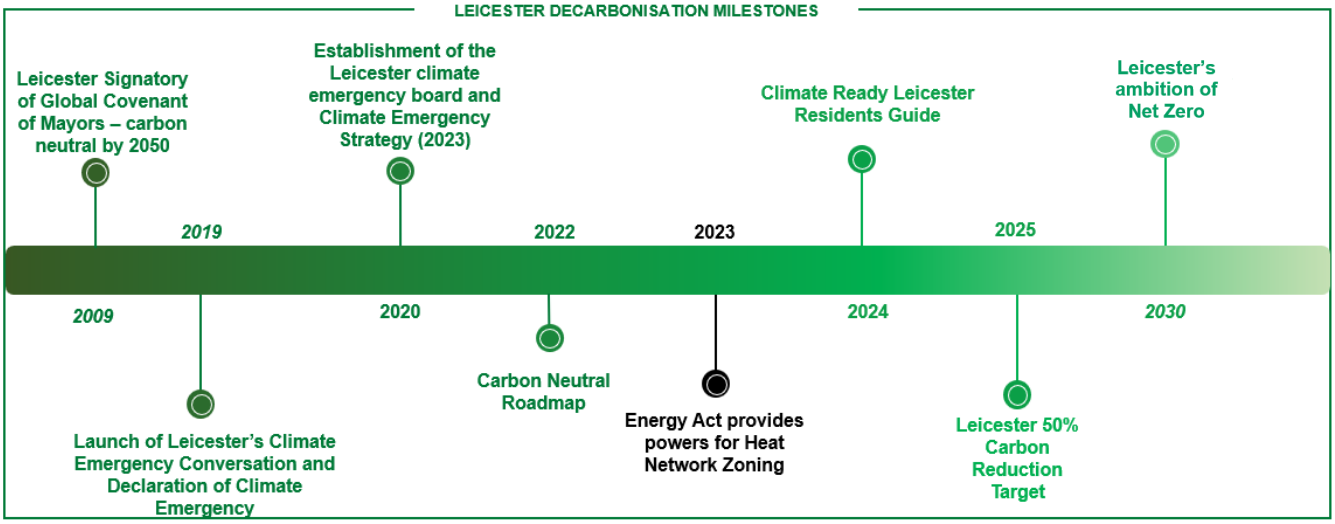
2.2) Leicester Net Zero Targets and Commitments

LCC declared a Climate Emergency in February 2019 and sees climate change as a critical threat to the people in Leicester and is committed to the climate goals agreed by world leaders in the Paris Agreement. LCC set ambitious net zero targets as part of their Climate Ready Leicester Plan (2020-2023), aiming to reduce the city's carbon emissions to zero by 20305. This plan was updated by the Climate Ready Leicester Plan (2023 – 2028) which noted that the 2030 net zero emissions target date was unlikely to be achieved and further work was required to review and update the target date[6].

City wide carbon emissions have already halved from their 1990 levels with successful schemes such as LED street lighting and connecting main city centre office buildings to new low carbon heat networks contributing to the reduction. LCC is continuing to invest in energy efficiency improvements such as low carbon heating systems to council houses and delivering programmes to tackle fuel poverty. Decarbonising heat demand is an essential part of their route to net zero with decarbonised heat networks listed within the plan. Figure 3 summarises key dates in the Council's plans for decarbonisation and demonstrates their progress towards decarbonisation targets.

[3] Office of National Statistics (2021). Population and household estimates England and Wales, Population and household estimates, England and Wales: Census 2021 - Office for National Statistics (ons.gov.uk)
[4] GOV.UK (2022), Registered provider social stock and rents in England 2021 to 2022 look-up, (Registered provider social housing stock and rents in England 2021 to 2022 - GOV.UK (www.gov.uk)
[5] Leicester City Council (2021). Leicester Climate Change Emergency Strategy 2020-2023
[6] Leicester City Council Climate Ready Leicester Plan (2023 – 2028) https://www.leicester.gov.uk/media/jtzb0omp/climate-ready-leicester-plan-2023-28.pdf

Figure 3: Leicester Decarbonisation Milestones



2.3) Delivering Heat Networks in Leicester

There are four existing heat networks within Leicester; City Centre, Leicester North, Beatty Avenue and Aikman Avenue[7]. These are managed by Bring Energy who adopted the original schemes in 2011. LCC has signed a 25-year contract with Bring Energy who established a special purpose vehicle – the Leicester District Energy Company (LDEC) – responsible for designing, building, financing and operating the schemes. LDEC is responsible for primary heat production with the Council retaining responsibility for the secondary systems. The delivery of heat through the LDEC network has been reliable and any issues have been dealt with within contracted timescales.

A HNDU assessment was undertaken in 2017 which reviewed the potential for new or expansion of the existing heat networks in three regeneration areas: Cultural Quarter, Waterside and Pioneer Park/Abbey Meadows. The report concluded that the Waterside area was the most likely area for a future heat network and outlined activities to support the development of this network alongside the potential for development in the other regeneration areas.

Please refer to Appendix 2 for further information about the evidence compiled during the Pilot programme and held by DESNZ for Leicester. This includes a fully populated stakeholder directory and records of interactions with those stakeholders as well key studies and reports shared with DESNZ.

2.4) Leicester Heat Network Zones

A total of six potential HNZs were identified in Leicester, with three considered Strategic HNZs. Figure 4 shows the study area boundary as well as the boundaries of all HNZs identified within

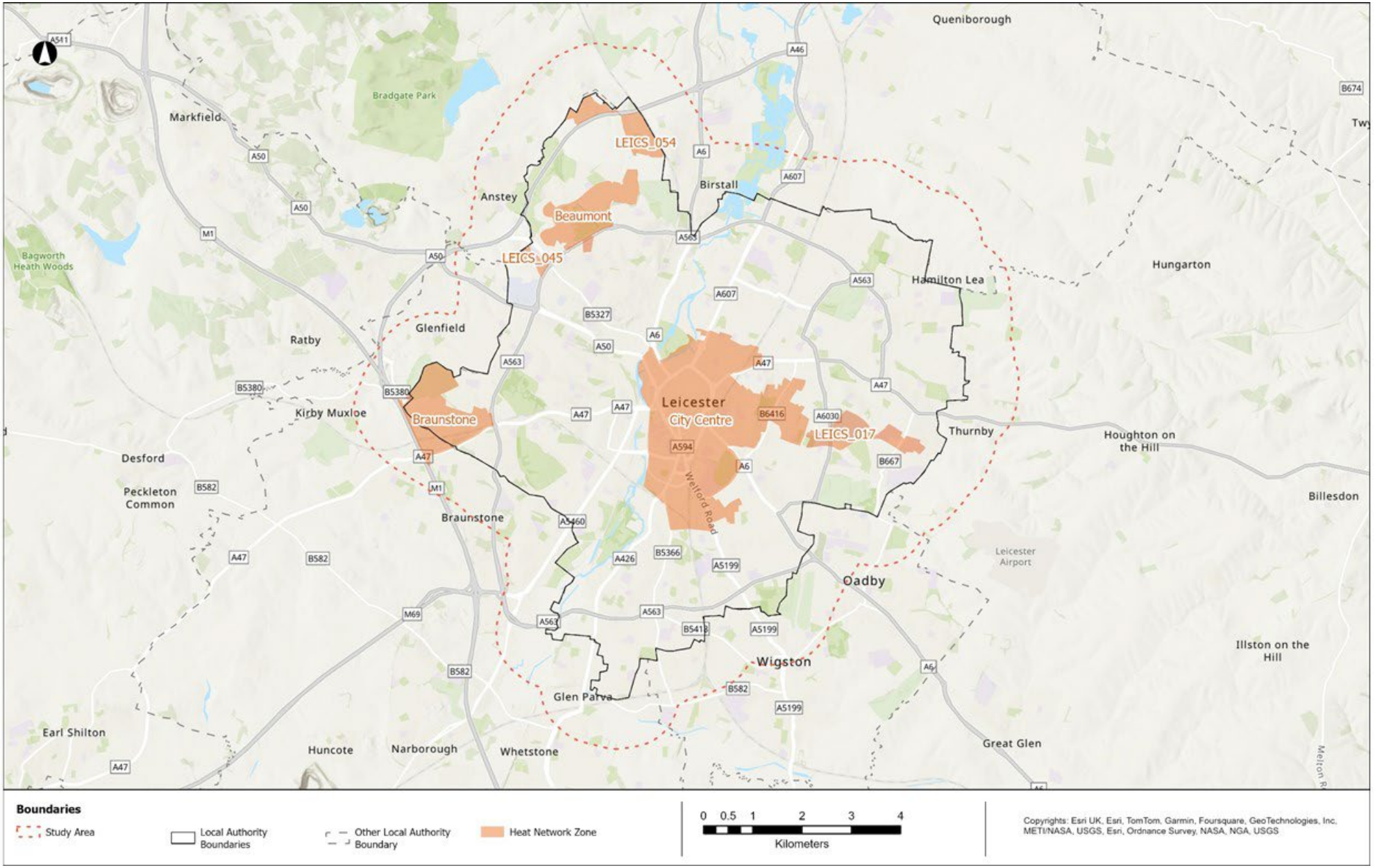
[7] Please note that the Aikman Avenue is technically not adopted by LDEC

Leicester. Strategic HNZs have been allocated a meaningful name agreed as relevant from a local perspective whilst Other HNZs have a reference number allocated instead. In both cases, these names are shown on the map.

Please see Appendix 1 for the following maps giving more detail:

- A: City Typology Map – shows building typologies which dominate by area.
- B: Key Heat Loads Map – highlights key buildings required to connect by heat demand.
- C: Key Heat Sources Map – highlights key heat sources by type and potential energy centre locations as well as any existing district heat network energy centres.
- D: Existing / Planned Heat Networks Map – shows existing heat networks, planned extensions, and planned networks at an advanced development stage.
- E: Key Constraints Map – shows key topographical constraints identified.
- F: Off-gas Grid Areas – presents areas with differing levels of properties off the gas grid within the study area.

Figure 4: Heat Network Zones Identified within the Leicester Study Area



3) Strategic Heat Network Zones

Strategic HNZs in Leicester

This section examines the strategic HNZs and IZOs identified within them. This covers the key heat demands, heat sources, energy centre locations and potential constraints. Heat network distribution routes are conceptual and designed to illustrate the potential size and scale of the heat network opportunity that may be realised as part of the upcoming Heat Network Zoning policy. Other heat network zones are listed in Section 4.

Table 1 below presents a high-level estimate of the scale of opportunities across Leicester. Please refer to Appendix 4 for more detail.

Table 1: Annual Heat Demand for Buildings in All Zones, Strategic Zones and IZOs

Scope	Annual heat demand (GWh/yr)
All buildings within zones[8]	500
All buildings within strategic zones	450
All buildings connected to the IZOs	300

Existing/planned heat networks that overlap with IZOs are described, though their locations may vary due to different approaches. The Pilot programme applied a standard set of technical and economic assumptions across each of the 28 areas that participated in the programme and uses a proxy for economic viability, see Section 1 and Appendix 4 for more detail. Existing and planned networks will often be based on more detailed design work and have taken account of strategic and commercial considerations that were relevant at the time of their development. Future iterations of this report will consider how to better align local studies whilst retaining a nationally consistent approach.

The strategic zones are summarised below. Figure 5 illustrates their size, alongside the key potential heat sources and the proportion of buildings that may be required to connect.

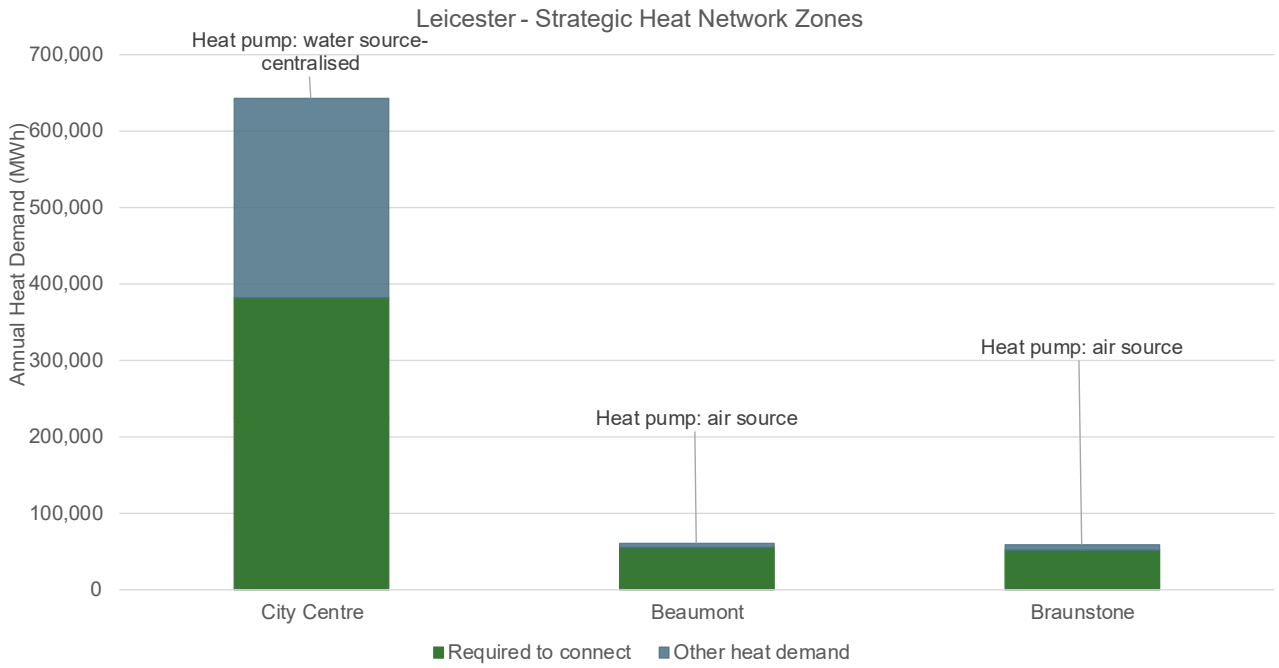
The **City Centre** is the largest zone identified by area, covering the centre of Leicester and many buildings potentially required to connect, a large proportion of which are industrial, office and retail properties. The zone contains several existing heat networks, and the River Soar could be a potential low carbon heat source. For more information, please see Section 3.1

[8] Row 1 is an estimate of heat demand across buildings potentially required to connect in all zones identified. Row 2 is as per row 1, but only within strategic zones. Row 3 includes buildings connected to the IZOs described and largely comprise of buildings potentially required to connect. Figures are generally rounded up to the nearest 25 or 50GWh/yr.

The **Beaumont** zone encompasses several industrial estates including Gorse Hill, Barrington Park, Ashton Business Park and Beaumont Shopping Centre, each of which contain buildings which may be required to connect to a heat network. Potential low carbon heat sources identified include recovery of waste heat from Walkers Snack Foods. For more information, please see Section 3.2.

The **Braunstone** zone surrounds Braunstone Frith Industrial Estate and includes several distribution centres, warehouses and manufacturing plants, some of which may be potential sources of waste heat. An area of new development has been identified from the Local Plan north of Scudamore Road which could potentially accommodate a new energy centre to serve this zone. For more information, please see Section 3.3.

Figure 5: Summary of Heat Demands in the Strategic HNZs Identified



3.1) City Centre

3.1.1) City Centre – HNZ Summary

Leicester City Centre is the largest heat network zone in the study area identified by area (see Figure 4). It covers most of the city centre within the A598 ring road, stretching from the River Soar in the west to North Evington in the east, and from Cossington Recreational Ground in the north to Saffron Lane Stadium in the south. A railway line bisects the zone, to the west of which is a large concentration of commercial retail and industrial properties while in the east, the Highfields area is dominated by low density residential properties. The River Soar, to the west, presents a potential opportunity to install a water source heat pump (WSHP). The estimated total annual heat demand in this zone is 650GWh/yr.

3.1.2) City Centre - Existing Heat Networks

The existing and planned heat networks are described below and shown in Appendix 1: Map D.

Operational Heat Networks and Planned Expansions

LDEC Heat Networks

There are currently four district heat network schemes deployed across the City of Leicester using five different energy centres which serve 3,000 dwellings across six housing estates, as well as the University of Leicester and numerous public buildings.

These heat networks are managed by Bring Energy who adopted the original schemes in early 2011. A 25-year contract has been signed by Bring Energy with LCC to deliver the low carbon district energy scheme in Leicester. The LDEC is a wholly owned special purpose vehicle of Bring Energy which has been set up for the delivery of heat networks in Leicester.

The existing four heat network schemes in Leicester are:

The **City Centre Scheme** which has 14km of insulated pipework, supplied by 3.2MWe of gas-fired combined heat and power (CHP) engines. The network was constructed in October 2012 and links the St Peters and St Andrews housing estates with Leicester University. It also connects numerous council buildings and four schools.

The **Leicester North Scheme** which consists of St Marks and St Matthews housing estates, where LDEC installed 1,000kWe of CHP at St Marks Estate and linked the two existing estate boiler houses.

The **Beatty Avenue Scheme** which consists of a biomass boiler to supply heat to a number of domestic properties on this housing estate.

The **Aikman Avenue Scheme**[9] which mainly serves the local housing estate, a swimming pool, New College and Forest Lodge School.

LDEC has an ambition to decarbonise all assets by 2035 and is planning to develop a roadmap towards this goal, based mainly on asset replacement. This roadmap will be based on three pillars, to:

- optimise current operation
- undertake assessment of heat decarbonisation options
- develop a strategy for the implementation of decarbonisation options

De Montfort University Scheme: At the time of writing the University is considering the feasibility of the installation of a 2.5MW air source heat pump heat network to service the University's campus buildings at De Montfort University. These proposals will continue to be studied as one of the options to decarbonise the campus.

3.1.3) City Centre - Initial Zone Opportunities

A single IZO was identified in the City Centre zone. Potential routing[10] is shown in Figure 6 and summary statistics provided in Table 2.

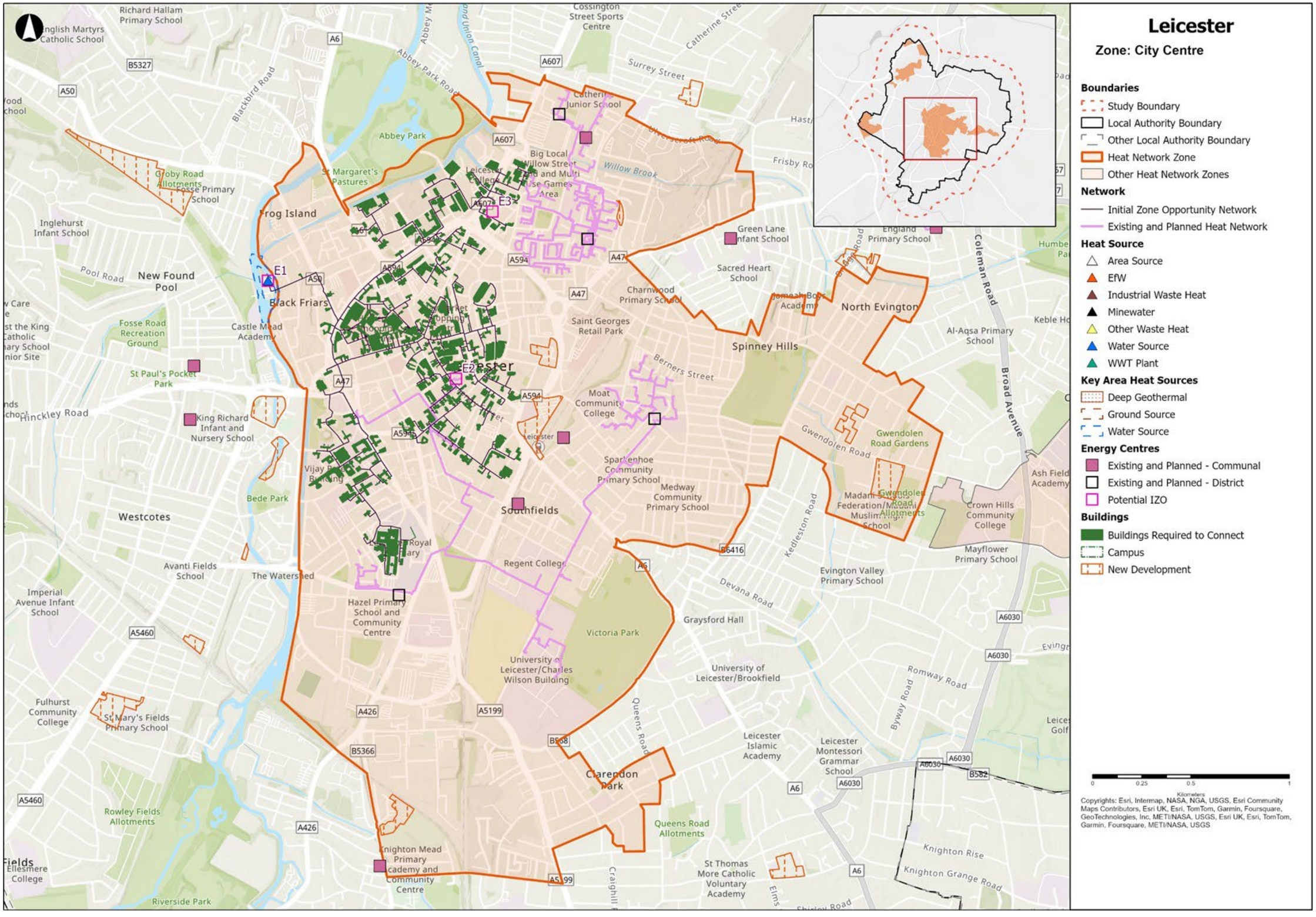
Table 2: City Centre - Summary Statistics for Initial Zone Opportunities[11]

CapEx	Heat	Network	CO_{2e} savings	Linear Heat Density	Heat Sources
~£275m	~225GWh/yr	18km	~35ktCO_{2e}/yr	12MWh/m	WSHPs

The IZO covers much of the city centre within the A598 ring road and includes and covers an area of high heat density. There are 1,407 buildings that are identified as potentially required to connect to a heat network with a total heat demand of 225GWh/yr, including Leicester Royal Infirmary, De Montfort University, Leicester College, several industrial parks, and a number of commercial units within Highcross Shopping Centre. The IZO is close to the River Soar, which could be a potential heat source, and the existing heat networks.

[9] Please note that the Aikman Avenue is technically not adopted by LDEC
[10] Routes can be expected to change as a better understanding of local constraints is developed through design.
[11] Please see Appendix 3 – Glossary, "Specific definitions" of the main report for definitions related to this table.

Figure 6: Initial Zone Opportunities in City Centre HNZ



3.1.4) City Centre – IZO Heat Demands

The heat demands identified within the IZO are described below. The Pilot programme used several sources including local data collected from building owners; national energy demand datasets; benchmarks applied via the National Zoning Model (NZM); and a standardised approach to estimate the potential heat demands of new development sites. More information is provided in Appendix 4.

Where there are different values between datasets, the methodology prioritised the use of the early prototype version of the National Zoning Model, for consistency. This has led to an overestimation of some commercial and light industrial heat demands presented in this report. Large anchor loads that are already connected to existing district-scale heat networks are not listed.

The IZO has an annual heat demand of around 225GWh/yr. A breakdown of heat demand by building typology can be found in Figure 7. The largest categories are non-domestic and public sector buildings with approximately 300 and 50 buildings respectively and a heat demand of ~120GWh/yr and ~70GWh/yr respectively.

Retail represents the largest contributor to the heat demand, with an estimated 55GWh/yr (24.3%) of heat demand. This is followed by hospitals and residential/nursing homes with an estimated 43GWh/yr (19.2%), domestic buildings with an estimated 39GWh/yr (17.2%), and office buildings with an estimated 34GWh/yr (14.9%). There are no new developments currently proposed for connection to the IZO.

Further details of the key heat demands for buildings potentially required to connect are provided in Table 3. The top ten anchor loads account for nearly 100GWh/yr of heat demand, accounting for approximately 44% of the overall demand.

Figure 7: City Centre - Categorisation of Heat Demand for Buildings Potentially Required to Connect in the IZO

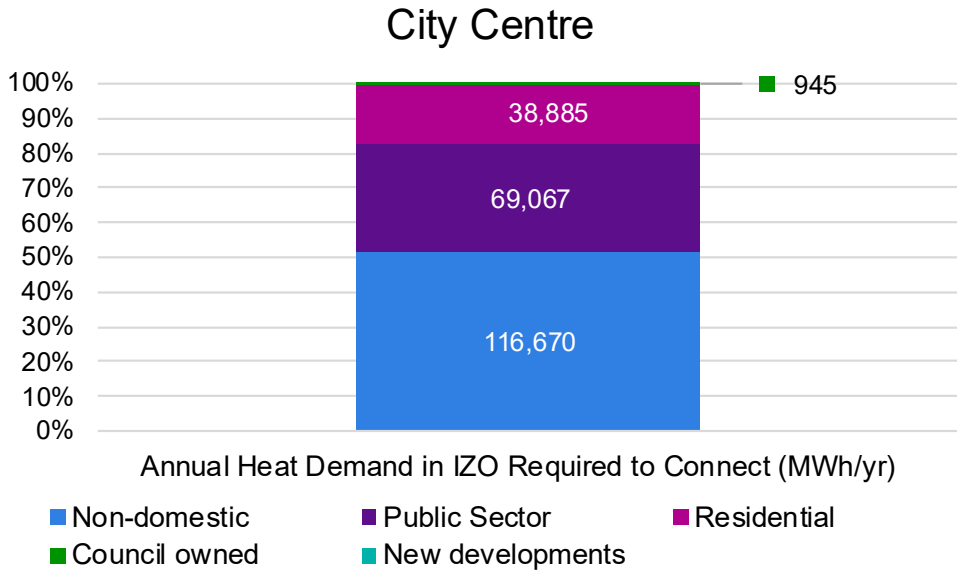


Table 3: City Centre - Key Heat Demands Potentially Required to Connect in the IZO[12]

Building name	Building category	Number of connections	Annual heat demand (MWh)	Data source
Leicester Royal Infirmary	Public Sector	1	41,180	Stakeholder metering data
St Matthews estate	Residential	1	27,400	Stakeholder metering data
St Marks estate	Residential	1	9,940	Stakeholder metering data
The Highcross Centre	Non-domestic	1	3,810	Benchmark (NZM)
The Loom	Residential	1	3,120	Benchmark (NZM)
St George's Tower	Residential	1	2,900	Benchmark (NZM)
HM Prison	Public Sector	1	2,840	Stakeholder metering data
De Montfort University	Public Sector	1	2,730	Benchmark (NZM)
Johal Buildings	Non-domestic	1	2,680	Benchmark (NZM)
Shonki Business Centre	Non-domestic	1	2,650	Benchmark (NZM)

3.1.5) City Centre – IZO Heat Sources

This IZO is in close proximity to the River Soar which has been identified as a potential opportunity for a WSHP. At the time of writing, it was proposed that an energy centre be installed on Soar Island (E1) however further feasibility work is required as a housing development is understood to be under development at this location. Given the size of the IZO, additional energy centres have been proposed to provide heat and redundancy, this could potentially include air source heat pumps (ASHP).

Table 4 and Table 5 summarise the key heat sources and potential energy centre locations identified. These are also shown in Figure 6 in Section 3.1.3 and on Map C in Appendix 1.

[12] Please refer to Appendix 3 for definitions related to building categories in this table.

Table 4: City Centre - Key Heat Source Opportunities for the IZO

Heat source type	Capacity (kWp)[13]	Temperature (ºC) [14]	Potential energy centre location
WSHP - River Soar	52,800	70-90	E1

Table 5: City Centre - Potential IZO Energy Centre Locations

EC ref number	Site type	Size (m^2)	Ownership	Heat source
E1	Land	1000	Council	WSHP
E2	Land	222	Council	ASHP
E3	Car Park	900	Council	ASHP

3.1.6) City Centre – IZO Heat Distribution

The approach to developing the heat network route considered economic viability, investment scale and returns, decarbonisation impact and deliverability. These criteria were applied in a standardised manner across all opportunities identified in the Pilot programme and therefore may not reflect detailed designs or proposed routes identified in more detailed feasibility work. Routing within the site boundary of a building or campus may not have been included if insufficient information was available. The IZO routing was developed solely around buildings which could be required to connect and did not consider potential voluntary connections.

The purpose of the concept heat network route is to define the scale, potential routing and identified associated constraints within the zone. Further work will be required to undertake a more detailed route assessment to take account of the buried utilities, building connections and other local strategic and local planning considerations.

Table 6 shows the network statistics including the network length and associated cost. Please see Appendix 5 for related methodology statements and assumptions.

The proposed network length is approximately 18km long starting from the River Soar and running along the A594 to Belgrave Circle in the north, connecting several industrial buildings and Leicester College campuses. In the west, it connects to predominantly retail and offices in the city centre between Highcross and Leicester railway station. The IZO also extends south, following the A594 to Leicester Royal Infirmary and along the way connects to several buildings belonging to De Montfort University.

[13] The supply capacity indicated is the anticipated peak capacity required from techno-economic modelling.
[14] The temperature at which heat will be distributed to heat offtakers, after upgrade processes.

Table 6: City Centre - Indicative Heat Network Statistics for the IZO

IZO description	Network length (km)	Network cost (£m)
City Centre	18	80

3.1.7) City Centre – IZO Key Constraints and Mitigations

[C1] River crossing: This river runs from north to south on the west side of the IZO. An energy centre is proposed to be located on Soar Island on the River Soar. The network would then need to cross the river to serve the loads within the city centre. A feasibility assessment would be required to identify potential crossing points for the heat network and the suitability of the island for an energy centre.

3.2) Beaumont

3.2.1) Beaumont – HNZ Summary

Beaumont HNZ is located approximately 3 miles to the north-west of the City Centre HNZ. The zone contains several industrial estates and business parks including Gorse Hill, Barrington Park, Ashton Business Park, Beaumont Shopping Centre and Babington Community College, each of which contain key loads which may be required to connect to a heat network. A cluster of low-density housing is located to the northwest and the zone is divided in the centre by Beaumont Park. The estimated annual heat demand in the strategic zone is around 60GWh/yr.

3.2.2) Beaumont - Existing Heat Networks

There are currently no operational, planned or proposed district heat networks in this zone.

3.2.3) Beaumont - Initial Zone Opportunities

A single IZO was identified in the Beaumont zone. Potential routing[15] is shown in Figure 8 and summary statistics provided in Table 7.

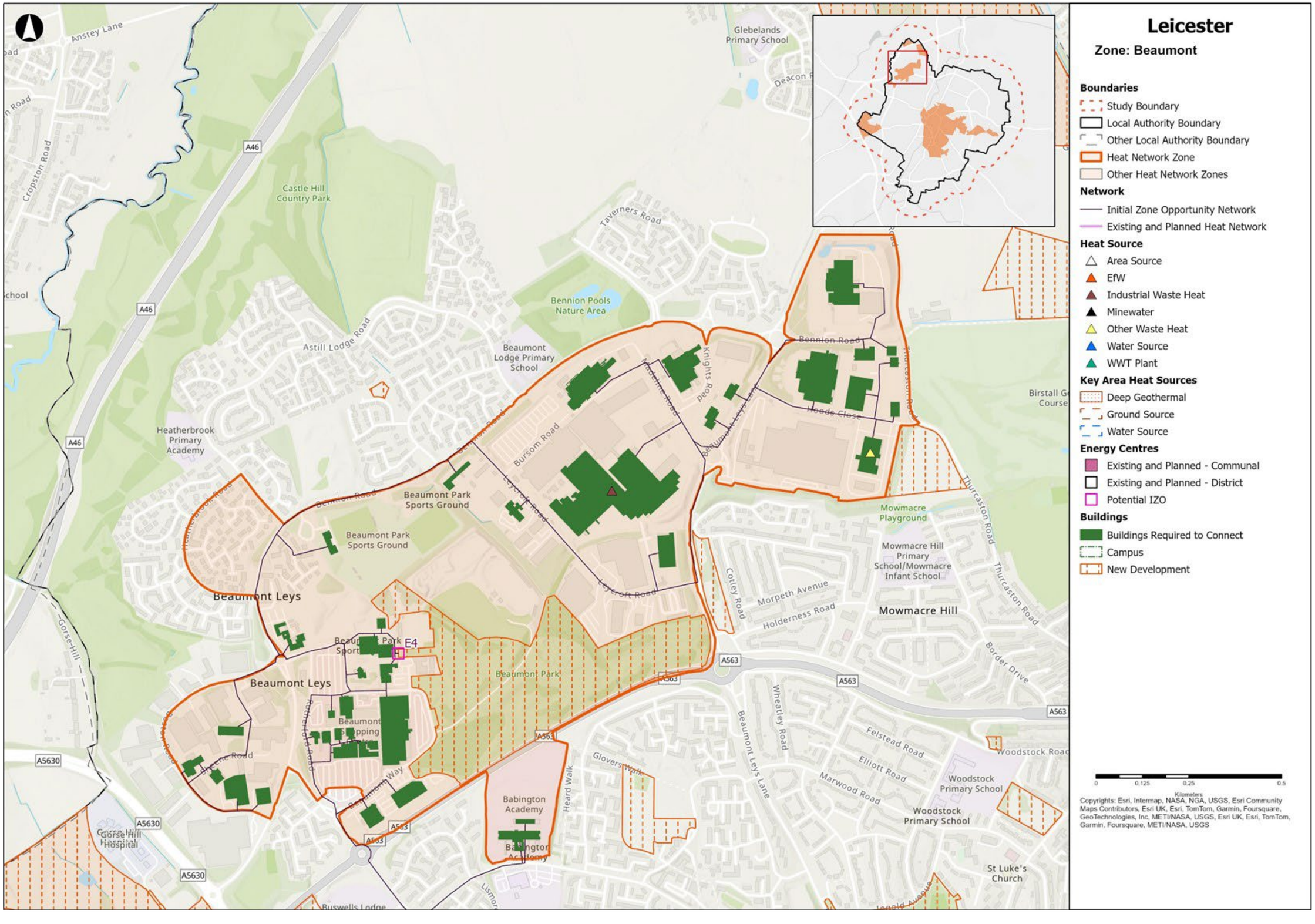
Table 7: Beaumont - Summary Statistics for Initial Zone Opportunities[16]

CapEx	Heat	Network	CO_{2e} savings	Linear Heat Density	Heat Sources
~£50m	>50GWh/yr	8km	~10ktCO_{2e}/yr	5MWh/m	ASHPs

The IZO spans the entirety of the zone and includes 41 buildings that are potentially required to connect to a heat network, accounting for over 50GWh/yr of heat demand. ASHPs are proposed as the primary heat source. Opportunities to recover waste heat from Walkers Snack Foods and Ball Mill have also been identified but are subject to further investigation. There is currently no existing heat network in place within the zone and no significant constraints identified that would impede the development of a district heating network.

[15] Routes can be expected to change as a better understanding of local constraints is developed through design.
[16] Please see Appendix 3 – Glossary, “Specific definitions” of the main report for definitions related to this table.

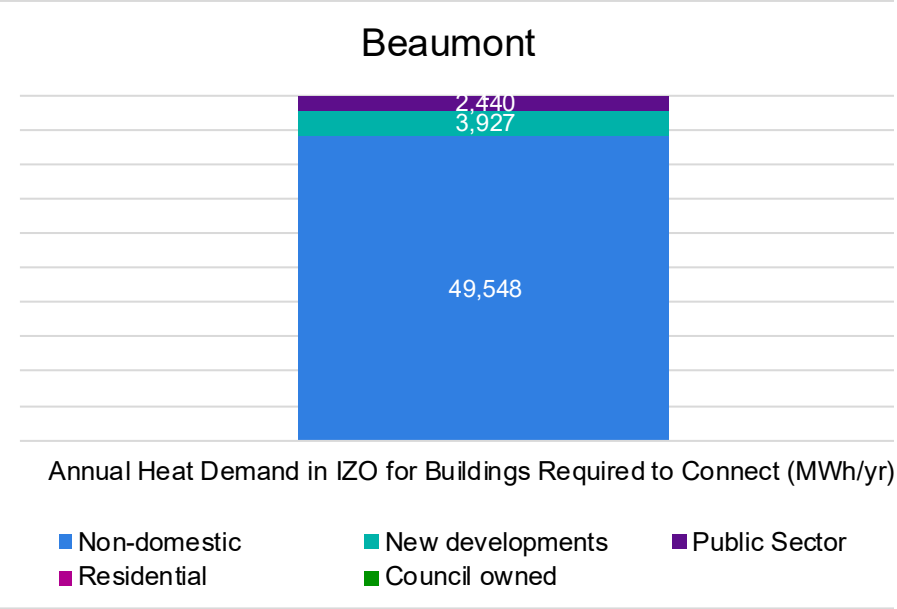
Figure 8: Initial Zone Opportunities in Beaumont HNZ



3.2.4) Beaumont – IZO Heat Demands

The IZO has an annual heat demand of around 50GWh/yr. There are a range of building typologies connected. A breakdown of the categorisation of heat demand can be found in Figure 9. Industrial buildings represent the largest contributor to the heat demand, with an estimated 39GWh/yr (70.1%) of heat demand. Followed by retail with an estimated 8GWh/yr (13.5%). New developments account for around 4GWh/yr (7.0%) of heat demand.

Figure 9: Beaumont - Categorisation of Heat Demand for Buildings Potentially Required to Connect in the IZO



Further details of the key heat demands of the buildings potentially required to connect are provided in Table 8 below. The top ten loads identified cover an estimated 38GWh/yr of heat demand, accounting for approximately 68% of demand.

Table 8: Beaumont - Key Heat Demands Potentially Required to Connect in the IZO[17]

Building name	Building category	Number of connections	Annual heat demand (MWh)	Data source
Walkers Snacks	Non-domestic	1	18,030	Benchmark (NZM)
Trelleborg Industrial	Non-domestic	1	3,700	Benchmark (NZM)
Tesco	Non-domestic	1	3,450	Benchmark (NZM)
Bradgate Bakery	Non-domestic	1	2,890	Benchmark (NZM)
Walkers Snacks Distribution Ltd	Non-domestic	1	2,450	Benchmark (NZM)
Bradgate Bakery	Non-domestic	1	2,220	Benchmark (NZM)
Walstead Binders	Non-domestic	1	1,400	Benchmark (NZM)
Taylor Bloxham Ltd	Non-domestic	1	1,230	Benchmark (NZM)
Babington Academy	Public sector	1	1,230	Benchmark (NZM)
Lotan Ltd	Non-domestic	1	1,093	Benchmark (NZM)

3.2.5) Beaumont – IZO Heat Sources

The primary low carbon heat source identified are ASHPs at a new energy centre (E4). There may be heat recovery potential from the Walkers Snacks site in the eastern part of the zone, but this would require further investigation and therefore is not listed within this report.

Table 9 and Table 10 summarise the key heat sources and potential energy centre locations identified. These are also shown in Figure 8 in Section 3.2.3 above and on Map C in Appendix 1.

Table 9: Beaumont - Key Heat Source Opportunities for the IZO

Heat source type	Capacity (kWp)	Temperature (ºC)	Potential energy centre location
ASHP	14,900	70-90 ºC[18]	E4

[17] Please refer to Appendix 3 for definitions related to building categories in this table.
[18] *The temperature at which heat will be distributed to heat offtakers, after upgrade processes.*

Table 10: Beaumont - Potential IZO Energy Centre Locations

EC ref number	Site type	Size (m^2)	Ownership	Heat source
E4	Strategic Development Site	71,400	LCC	ASHP

3.2.6) Beaumont – IZO Heat Distribution

The proposed network length is approximately 8km long and runs from Hoods Close in the east along Bennion Road north of the zone to Beaumont Leys in the west before going south, across the A563 towards Babington Academy. It connects to several key anchor loads which could also serve as potential sources of waste heat including properties within several business parks and industrial estates.

Table 11 shows the network statistics including the network length and associated costs. Please refer to Section 3.1.6 and Appendix 5 for the assumptions used.

Table 11: Beaumont - Indicative Heat Network Statistics for the IZO

IZO description	Network length (km)	Network cost (£m)
Beaumont	10	>20

3.2.7) Beaumont – IZO Key Constraints and Mitigations

There are no major constraints identified for the proposed IZO network route.

3.3) Braunstone

3.3.1) Braunstone – HNZ Summary

Braunstone is a zone which is centred around Braunstone Frith Industrial Estate, to the west of Leicester. The zone includes a number of distribution centres, warehouses and manufacturing plants some of which could also be potential sources of waste heat. To the north there is a strategic allocation site which has been identified from the Local Plan north of Scudamore Road and could be suitable for installation of a new energy centre. To the southwest there is a cluster of low-density housing while the southeast contains further commercial properties. The estimated annual heat demand in the zone, including the planned future development, is approximately 50GWh/yr.

3.3.2) Braunstone - Existing Heat Networks

There are currently no operational, planned or proposed district heat networks in this HNZ.

3.3.3) Braunstone - Initial Zone Opportunities

A single IZO was identified in the Braunstone zone. Potential routing[19] is shown in Figure 10 and summary statistics are provided in Table 12.

Table 12: Braunstone - Summary Statistics for Initial Zone Opportunities[20]

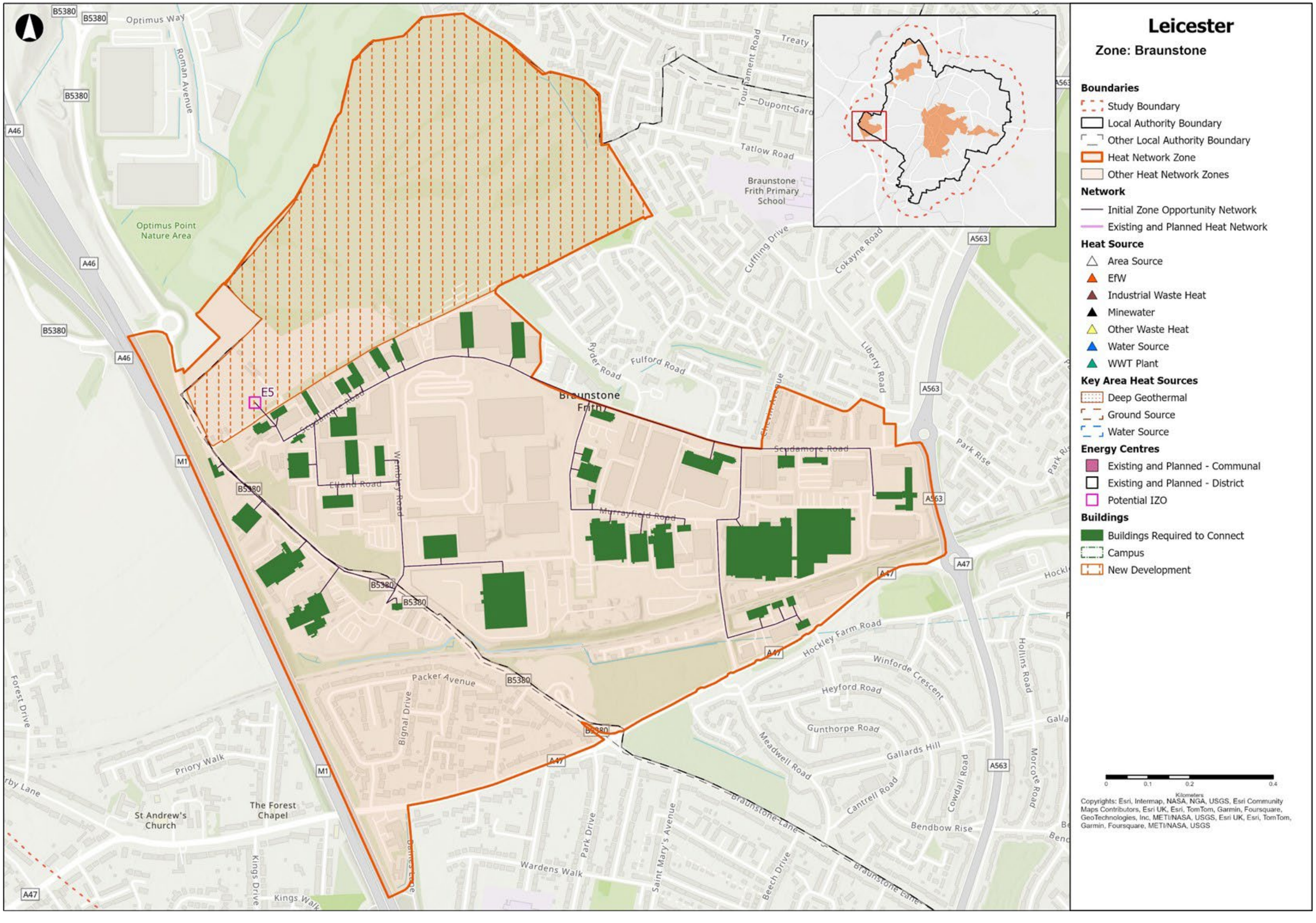
CapEx	Heat	Network	CO_{2e} savings	Linear Heat Density	Heat Sources
~£50m	>50GWh/yr	11km	~10ktCO_{2e}/yr	5MWh/m	ASHPs

The IZO spans from the B5380 in the west to the A563 in the east covering the whole of Braunstone Frith Industrial Estate. There is a railway which may pose a constraint to the south, separating potential loads located along Foxholes Road. To the north is a planned new development north of Scudamore Road which could be suitable for a new energy centre.

There are 451 buildings identified as potentially required to connect to a heat network, including the new development. These buildings account for over 50GWh/yr of heat demand. ASHPs are proposed as the primary heat source.

[19] Routes can be expected to change as a better understanding of local constraints is developed through design.
[20] Please see Appendix 3 – Glossary, “Specific definitions” of the main report for definitions related to this table.

Figure 10: Initial Zone Opportunities in Braunstone HNZ

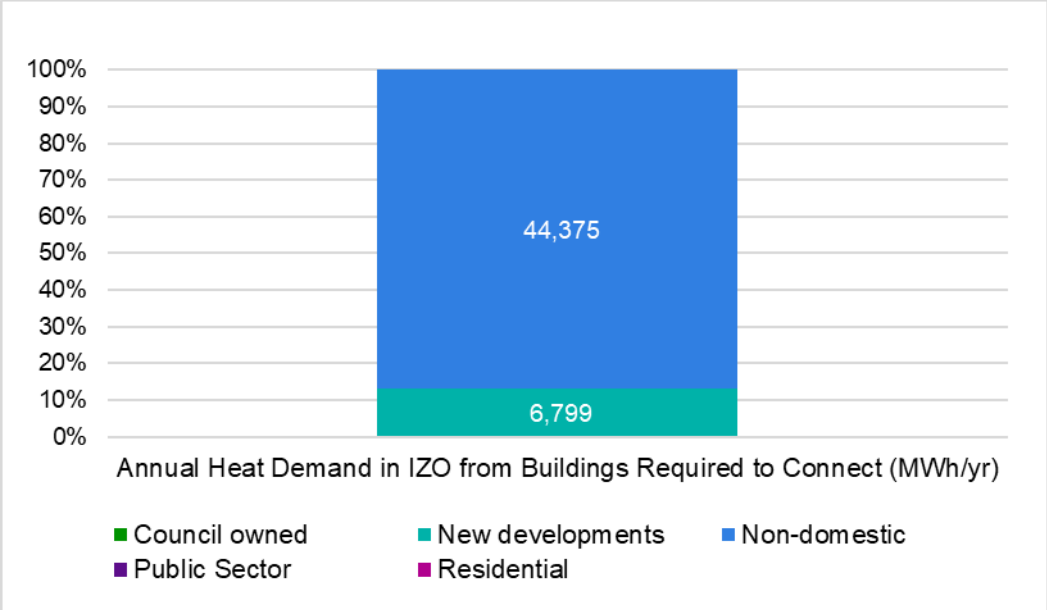


3.3.4) Braunstone – IZO Heat Demands

The IZO has an annual heat demand of around 50GWh/yr and there is a diverse range of key building typologies. The largest category in terms of number of buildings potentially required to connect is new developments, consisting of 412 buildings. Non-domestic buildings make up the remaining 39 buildings potentially required to connect.

A breakdown of the categorisation of heat demand can be found in Figure 11. Industrial buildings represent the largest contributor to the heat demand, with an estimated 40GWh/yr of heat demand (77.5%), followed by new developments with an estimated 7GWh/yr (13.3%).

Figure 11: Braunstone - Categorisation of Heat Demand for Buildings Potentially Required to Connect in the IZO



Further details of the key heat demands for buildings potentially required to connect. are provided in Table 13 below. The ten anchor loads identified cover an estimated 38GWh/yr of heat demand, accounting for approximately 74% of demand.

Table 13: Braunstone - Key Heat Demands Potentially Required to Connect in the IZO[21]

Building name	Building category	Number of connections	Annual heat demand (MWh)	Data source
Crown Packaging Manufacturing	Non-domestic	1	15,580	Benchmark (NZM)
Casepak	Non-domestic	1	5,510	Benchmark (NZM)
New development Western Park Golf Course	New development	1	5,360	Benchmark (NZM)
Salad Works	Non-domestic	1	2,090	Benchmark (NZM)
Samworth Brothers	Non-domestic	1	2,000	Benchmark (NZM)
Big Bear Confectionary	Non-domestic	1	1,900	Benchmark (NZM)
Blueberry Foods	Non-domestic	1	1,600	Benchmark (NZM)
Jones and Shipman	Non-domestic	1	1,240	Benchmark (NZM)
Cavendish Nuclear	Non-domestic	1	1,230	Benchmark (NZM)
Oadby Plastics	Non-domestic	1	1,050	Benchmark (NZM)

3.3.5) Braunstone – IZO Heat Sources

ASHPs are proposed as the primary heat source. As there is a new development planned north of Scudamore Road, this provides an opportunity to accommodate a potential energy centre site (E6). Table 14 and Table 15 summarise the key heat sources and potential energy centre locations identified. These are also shown in Figure 10 in Section 3.3.3 above and on Map C in Appendix 1.

Table 14: Braunstone - Key Heat Source Opportunities for the IZO

Heat source type	Capacity (kWp)	Temperature (ºC)	Potential energy centre location
ASHP	13,600	70-90 ºC[22]	E6

[21] Please refer to Appendix 3 for definitions related to building categories in this table.
[22] *The temperature at which heat will be distributed to heat offtakers, after upgrade processes.*

Table 15: Braunstone - Potential IZO Energy Centre Locations

EC ref number	Site type	Size (m^2)	Ownership	Heat source
E6	Land	500,000	Unknown	ASHP

3.3.6) Braunstone – IZO Heat Distribution

The proposed network length is approximately 11km long and is predominantly connected to loads within Braunstone Frith Industrial Estate. The proposed network route runs from the A47 in the east, along Scudamore Road and down the B5380 in the west.

Table 16 shows the network statistics including the network length and associated costs. Please refer to Section 3.1.6 and Appendix 5 for the assumptions used.

Table 16: Braunstone - Indicative Heat Network Statistics for the IZO

IZO description	Network length (km)	Network cost (£m)
Braunstone	11	25

3.3.7) Braunstone – IZO Key Constraints and Mitigations

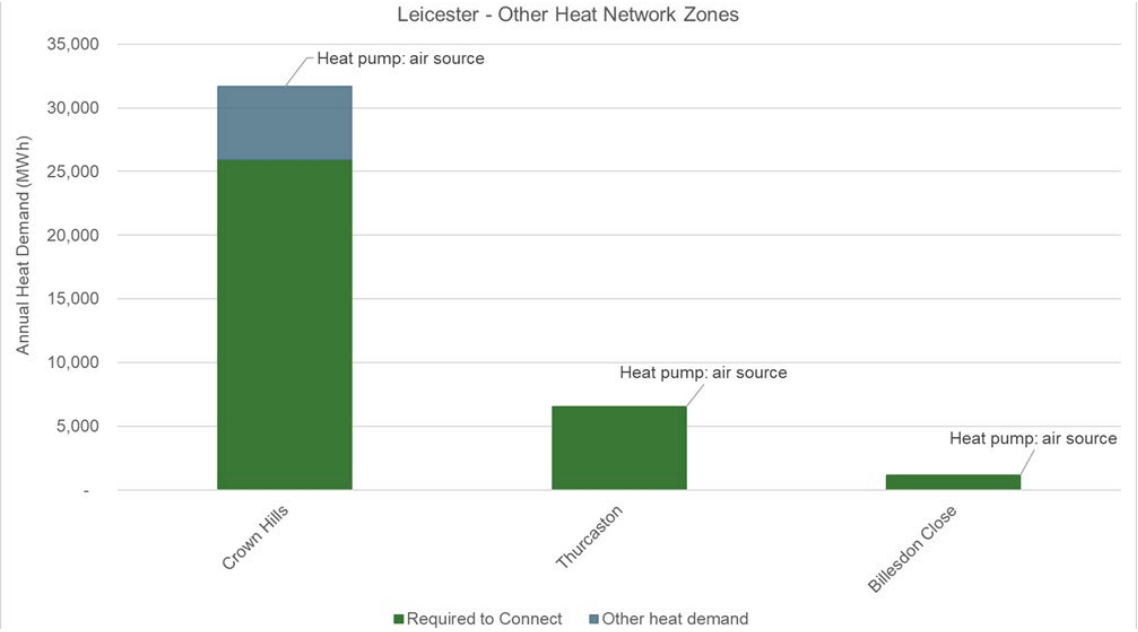
[C2] Railway line: A railway line runs east to west to the south of the IZO posing as a potential barrier to connecting loads located along Foxholes Road. A feasibility assessment would be required to identify potential crossing points for the heat network, with engagement with Network Rail and other key stakeholders.

4) Other Heat Network Zones

This section describes the 'Other' potential heat network zones that were identified in Leicester. These are areas where heat networks were deemed to offer the lowest carbon route to decarbonising heat but are often much smaller or discrete in nature than the 'Strategic' heat network zones identified. The approach taken in the Pilot programme did not apply a minimum threshold for zone identification and therefore future work will need to consider factors such as size and aggregation to ensure efficient and effective delivery of heat networks in the area.

Figure 12 illustrates the total annual heat demand, and the proportion of which is associated with buildings that may be potentially required to connect within each zone. Where potential heat sources have been identified these are labelled against each bar. A map of all zones can be found in Figure 4.

Figure 12: Total Heat Demand and Proportion Required to Connect in Other HNZs



LEICS_017: is situated east of the city centre and is dominated by several educational buildings and a hospital. It contains key anchor loads including Crown Hills Community College, Leicester General Hospital, St Paul's Roman Catholic School and The City of Leicester College.

LEICS_045: is situated west of the city centre. The area is currently undeveloped and does not contain any buildings. It has been identified as a strategic allocation site as part of Leicester's local plan. Future developments here could potentially be connected to Beaumont IZO nearby in the east.

LEICS_054: is situated north of the city centre. The area is currently undeveloped and does not contain any buildings. It has been identified as a strategic allocation site as part of Leicester's local plan. Future developments here could potentially be connected to Beaumont IZO nearby in the south.

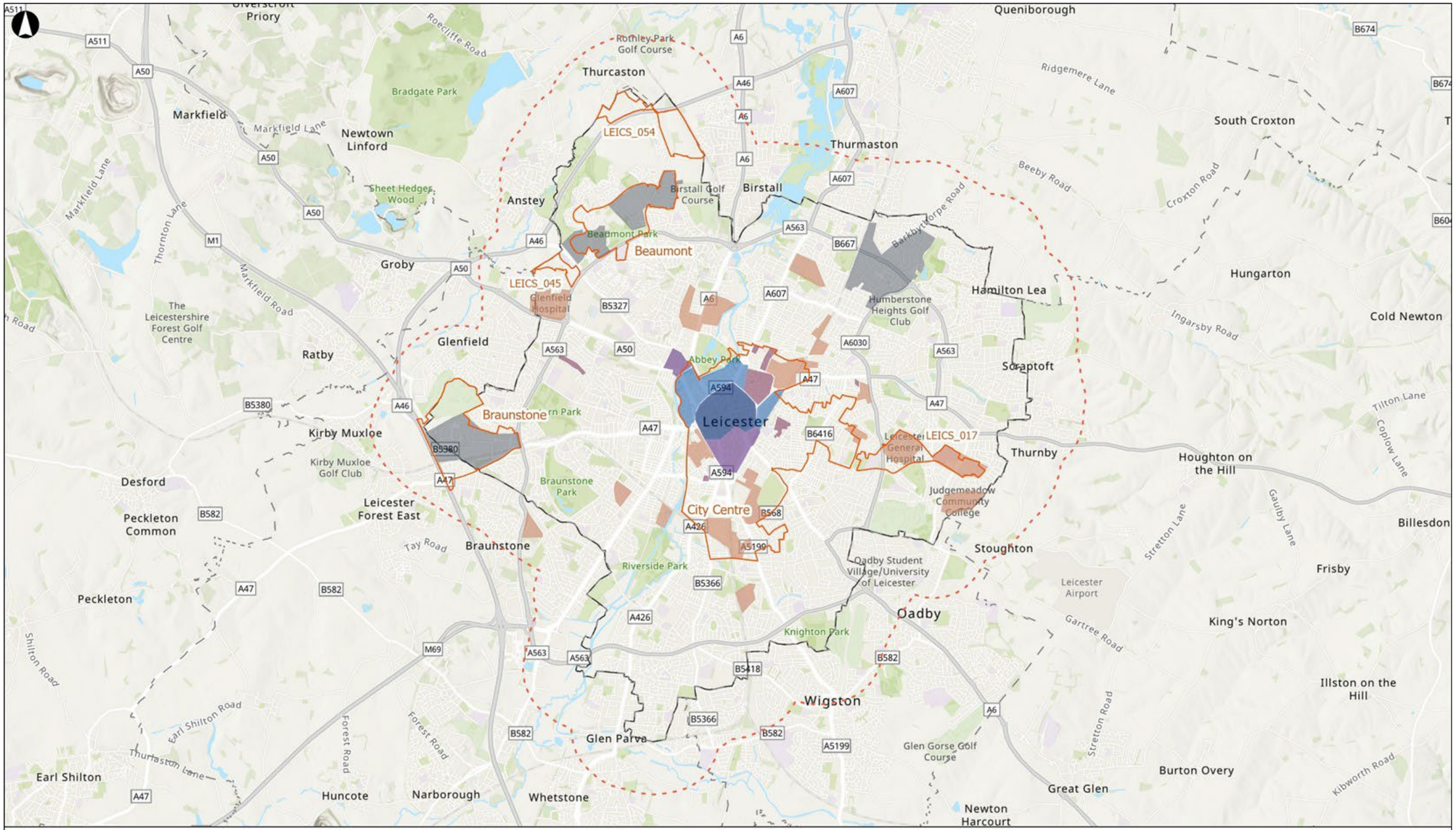
Appendix 1 – Maps and Legends

This section provides guidance on interpreting the icons and legends used throughout this report and Maps A-F that follow:

Legend / icon	Relevant map(s)	What this represents on the map	Comments on interpretation
	Report maps	Study boundary	Extends 1km beyond Local Authority boundary to include cross boundary opportunities
	Report maps	Local Authority boundary	
	Report maps	Other Local Authority boundary	
	Report maps	Heat network zones	This includes both Strategic HNZs and Other HNZs.
	Report maps	Other heat network zones	Smaller or discrete heat network zone opportunities
	Report maps	New developments	New development within heat network zones and IZOs that will still be in construction post-2025
Gates Hill	Report maps	Heat network zone name / reference number	‘Strategic’ zones are named; ‘Other’ zones are represented by a reference number
	Report maps	Buildings potentially required to connect	Buildings that could be required to connect (as described in the HNZ Consultation 2023)
	Report maps	Campuses	Multiple buildings owned and operated by the same organisation (e.g. Universities, Hospitals)
	Report maps	Initial Zone Opportunity concept network route	Conceptual heat network pipe routes between buildings that could be required to connect
	Report maps	Existing and Planned Heat Networks	Known existing or planned heat network pipe routes as provided by local stakeholders
	Report maps	Potential energy centre - IZO	Potential energy centre location for an IZO (see section 3)
	Report maps	Existing/planned energy centre - Communal HNs	‘Communal’ energy centres are those operated within a single building or across a campus
	Report maps	Existing/planned energy centre - District HNs	‘District’ energy centres supply multiple buildings across multiple sites
Appendix 1: A – Typology map			
	Appendix 1: Map A	Dense City Centre	Locally recognised as the City or Town centre, where buildings development is most dense
	Appendix 1: Map A	City Centre Fringe	Around the City or Town Centre or at its outskirts, where both building density reduces
	Appendix 1: Map A	Mixed Use District	A variety of building typologies, with no single typology prevailing in the area
	Appendix 1: Map A	Social Housing	Public, private and third sector social housing
	Appendix 1: Map A	Campus (health / education)	Buildings that are owned and operated together (e.g. Universities, Hospitals)

	Appendix 1: Map A	Commercial / business office	Public & private office space
	Appendix 1: Map A	Industrial areas	Primarily used for manufacturing, engineering, and warehousing
Appendix 1: B – Key heat demands			
	Appendix 1: Map B	Top 10 Heat Demands	The largest (anchor) heat loads within the Pilot programme study area (see Section 3)
	Appendix 1: Map B	Local Authority	Buildings owned or operated by the Local Authority
	Appendix 1: Map B	Other public sector	Other buildings owned or operated by the public sector (e.g. hospital, universities, Govt. estates)
	Appendix 1: Map B	Residential with existing communal heating	Residential buildings with existing communal heating systems installed
	Appendix 1: Map B	Non-domestic private	Non-domestic private buildings (e.g. commercial, offices)
	Appendix 1: Map B	Industrial	Mixed industrial sites (e.g. light or heavy industry, manufacturing, warehouses and distribution)
400 - 600	Appendix 1: Map B	Building heat demand (MWh/yr)	Circle size increases with size of heat demand
Appendix 1: C – Key Heat Sources and Potential Energy Centres			
	Appendix 1: Map C	EfW plant	**Point heat sources** have known or likely points of heat offtake/abstraction Mine water and water source ‘points’ indicate potential abstraction points. Other waste heat sources include sewers, electrical substations and other sources of heat. See section 3 for more detail on heat source capacities, where known. On the City-level Map C only, the heat waste symbol is sized according to its scale in GWh/yr
	Appendix 1: Map C	Industrial Waste Heat	
	Appendix 1: Map C	Mine water	
	Appendix 1: Map C	Other Waste Heat	
	Appendix 1: Map C	Water Source	
	Appendix 1: Map C	Waste Water Treatment	
	Appendix 1: Map C	Deep geothermal or mine water heat	**Area heat sources** differ from point-heat sources in that the exact location for extracting heat from the resource is not yet determined
	Appendix 1: Map C	Ground source	
	Appendix 1: Map C	Water source	
Appendix 1: D – Existing and planned heat networks			
	Appendix 1: Map D	Existing and planned heat networks	At this scale the route of an existing HN cannot be displayed, so an area outline is used instead
Appendix 1: E – Physical constraints			
	Appendix 1: Map E	Key constraints	Key heat network routing constraints as described in section 3

A. Leicester Typology Map



B. Key Heat Demands

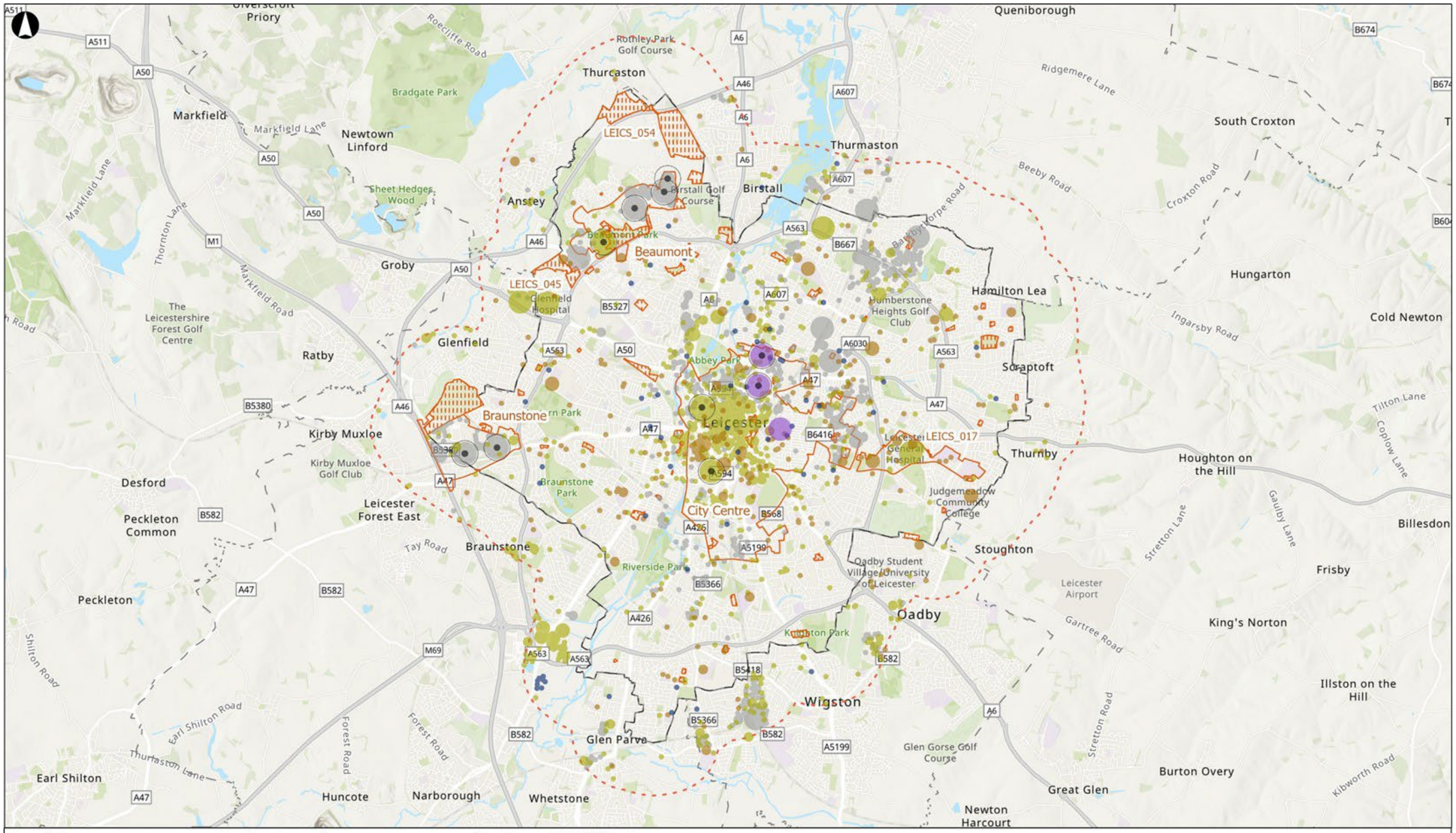
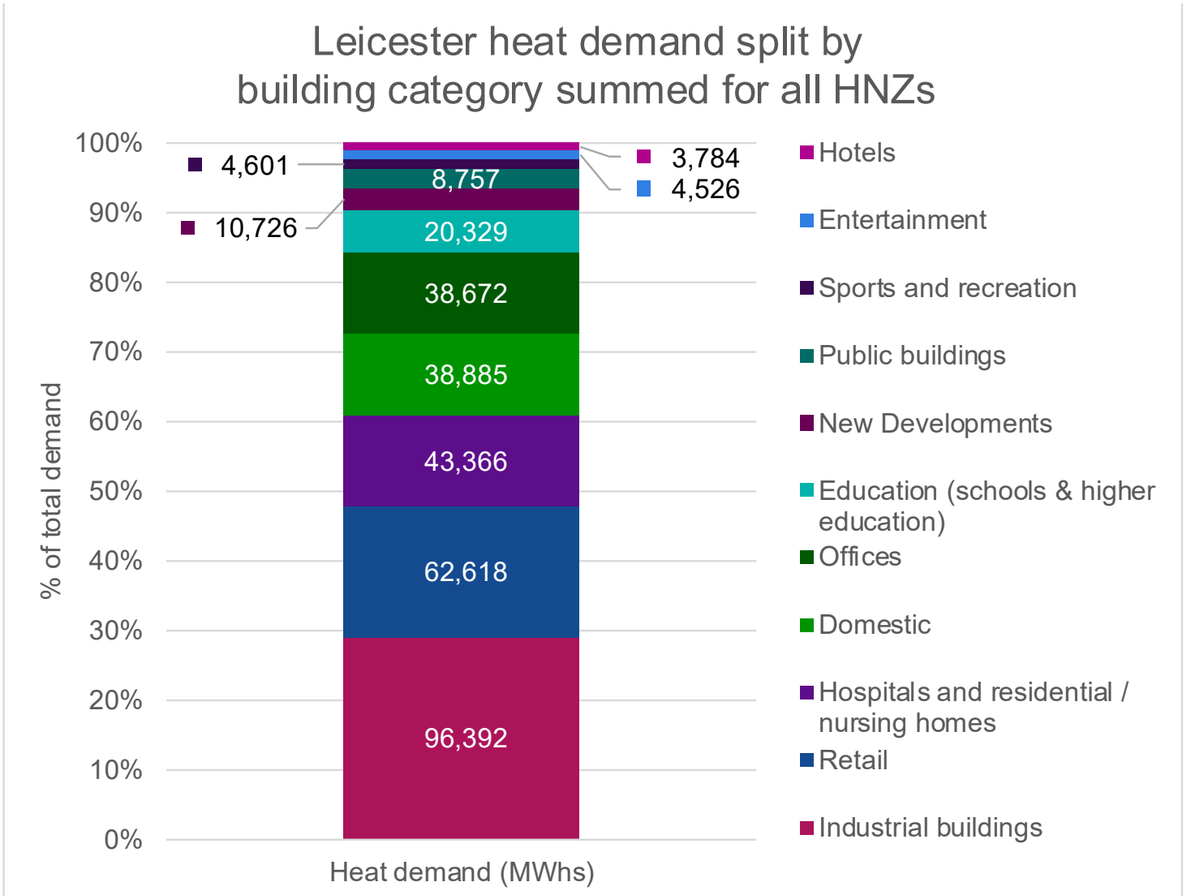


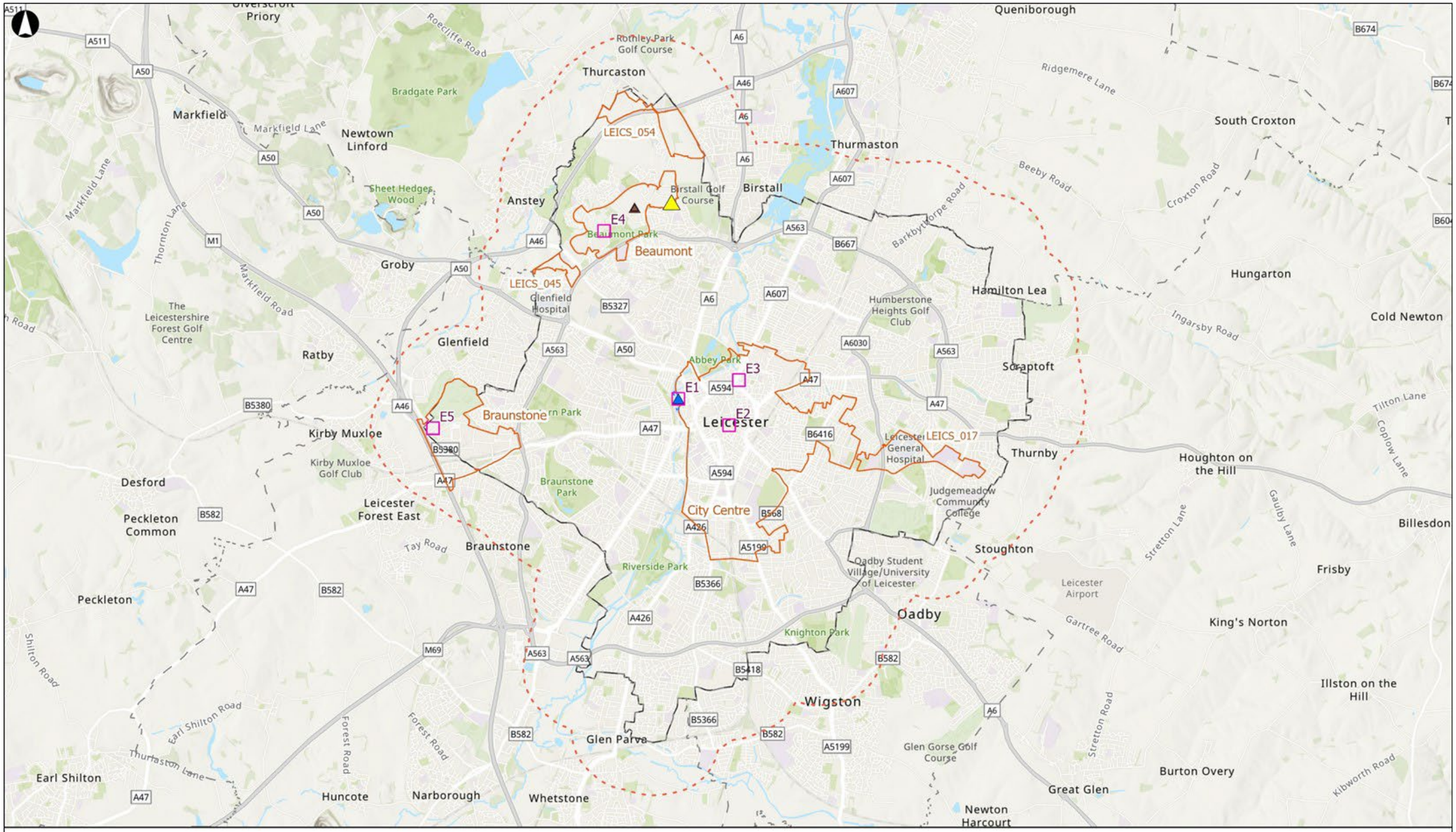
Table 17: Heat Demand split further by Building Categories across all Initial Zone Opportunities identified in Strategic HNZs in the Study Area

Building category	Number of Buildings Required to Connect in this category	Annual Heat Demand of Buildings Required to Connect across IZOs (MWh)
Industrial buildings	98	96,392
Retail	154	62,618
Hospitals and residential / nursing homes	9	43,366
Domestic	10	38,885
Offices	98	38,672
Education (schools & higher education)	28	20,329
New Developments	413	10,726
Public buildings	22	8,757
Sports and recreation	12	4,601
Entertainment	28	4,526
Hotels	7	3,784
Totals	**879**	**332,656**

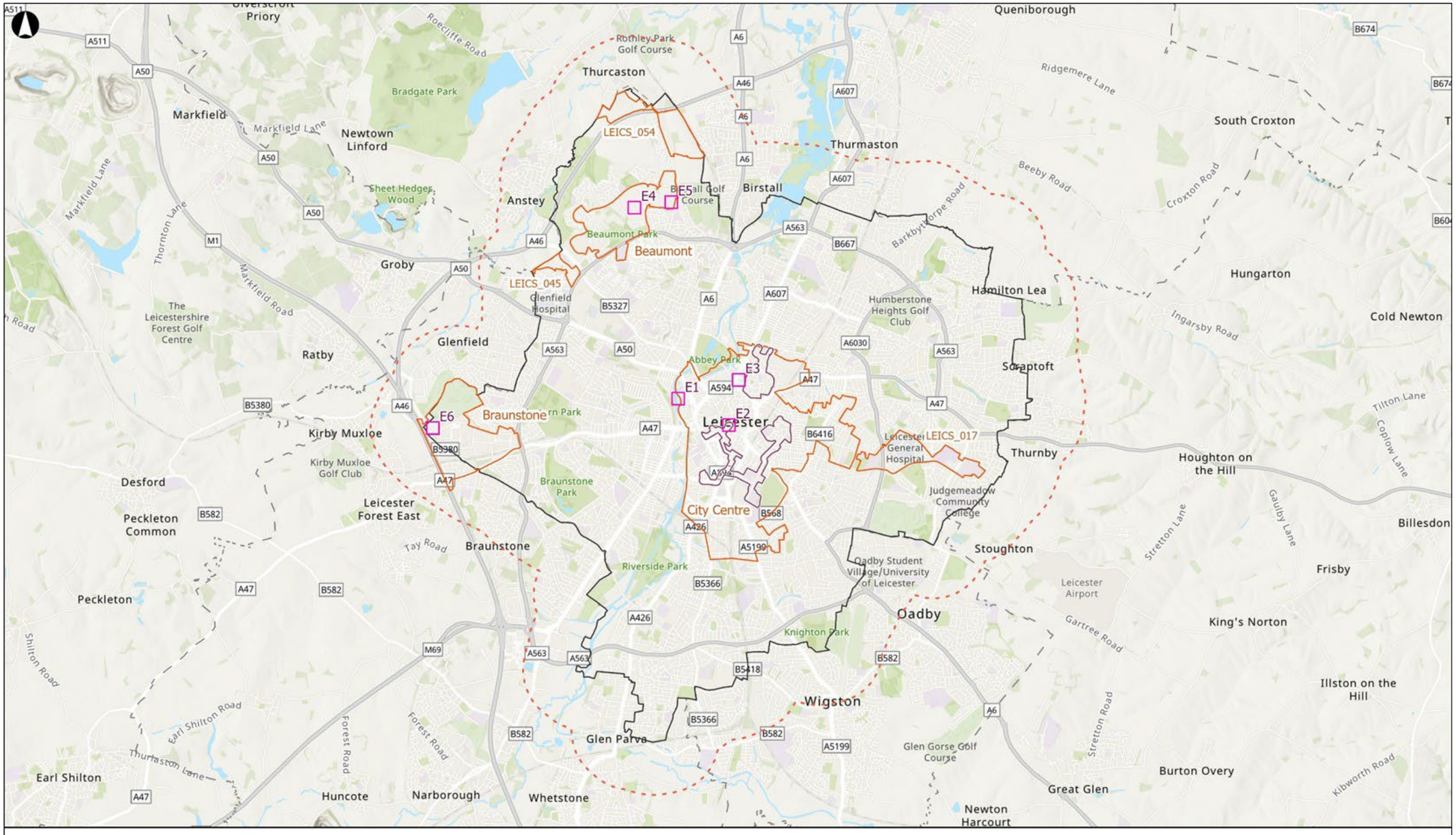


Note: In Leicester there are six HNZs with a total of three IZOs identified across them. The table and graph above summarise the heat demand for buildings potentially required to connect to these IZOs.

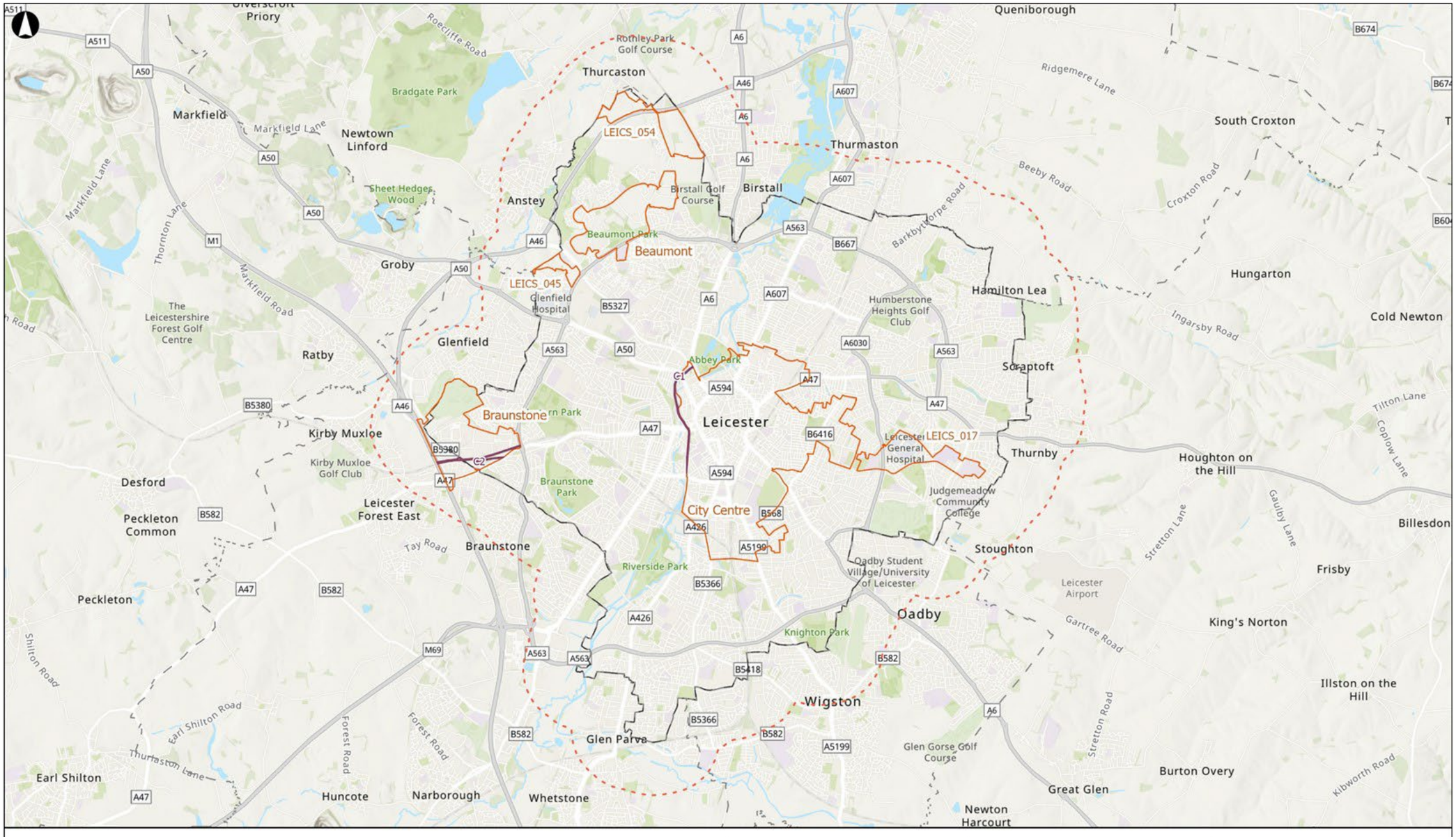
C. Key Heat Sources and Potential Energy Centres



D. Existing and Planned Heat Networks



E. Physical Constraints



Boundaries

- Study Boundary
- Local Authority Boundary
- Other Local Authority Boundary
- Heat Network Zones

Key Constraints

0 1 2 4
Kilometers

Scale: 1:70,000

Coordinate System: British National Grid

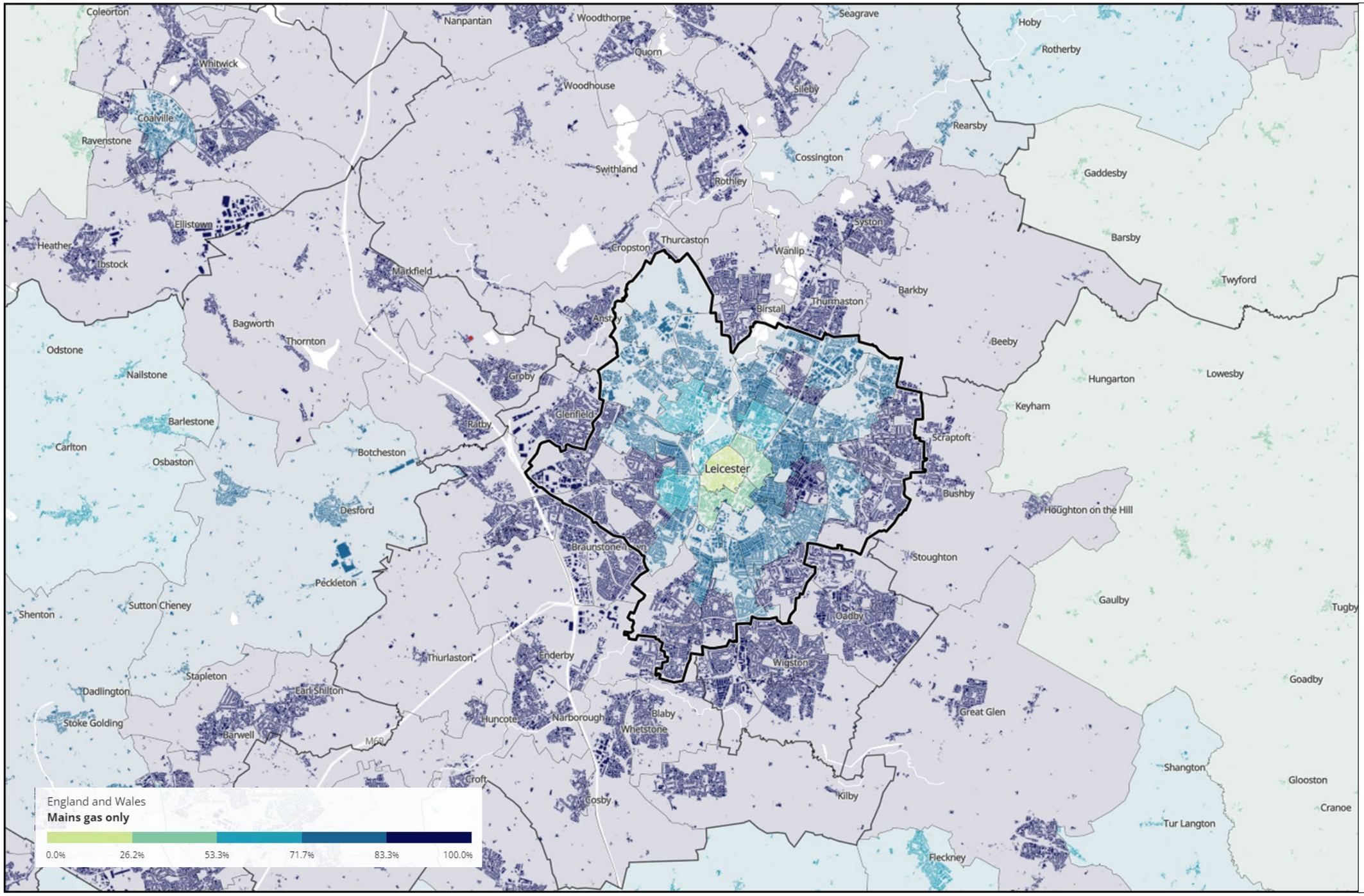
Department for Energy Security & Net Zero

Leicester

Map E

Physical Constraints

F. Off-Gas Grid Areas in Leicester



Appendix 2: Data Room Resources

Throughout the delivery of the Pilot programme, information resources have been compiled for future use in relation to the development of heat network zones.

These resources will remain restricted to DESNZ and the local authority. This is to ensure that the department remains within its Data Privacy Notice as shared with stakeholders providing the information. GIS outputs are not being published alongside the report as they are subject to change.

Table 18: Pilot Programme Standardised Information Resources

Information resource	Description of resource
Stakeholder Directory	A directory listing key stakeholders identified and approached during the Pilot programme, including organisation name, address, or website, contact names, work title and contact details.
Stakeholder meetings log and records	A log of key meetings held and related meeting records.
Datasets Directory	A list of datasets / reports shared by stakeholders cross-referencing who provided the item from the stakeholder directory and a description of the dataset.
Geospatial packages and related geo-coded datasets	Geo-coded datasets and descriptions related to maps produced in this report.

Table 19: Pilot Programme Study-Area-Specific Information Resources

Information resource	Description of resource
Leicester City Council (2021). Leicester Climate Change Emergency Strategy 2020-2023	Information from Leicester on the Climate Emergency
HNDU Study Regeneration Areas in Leicester (2017)	Assessment of heat network potential in three regeneration areas in Leicester. Report and underlying data concerning existing heat connections to the existing heat networks at the time
Bring Energy Heat Network Information	City Map and data on the existing heat network
Leicester Housing	Data on heat network connections

This publication is available from: https://www.gov.uk/government/collections/heat-networks

If you need a version of this document in a more accessible format, please email alt.formats@energysecurity.gov.uk. Please tell us what format you need. It will help us if you say what assistive technology you use.