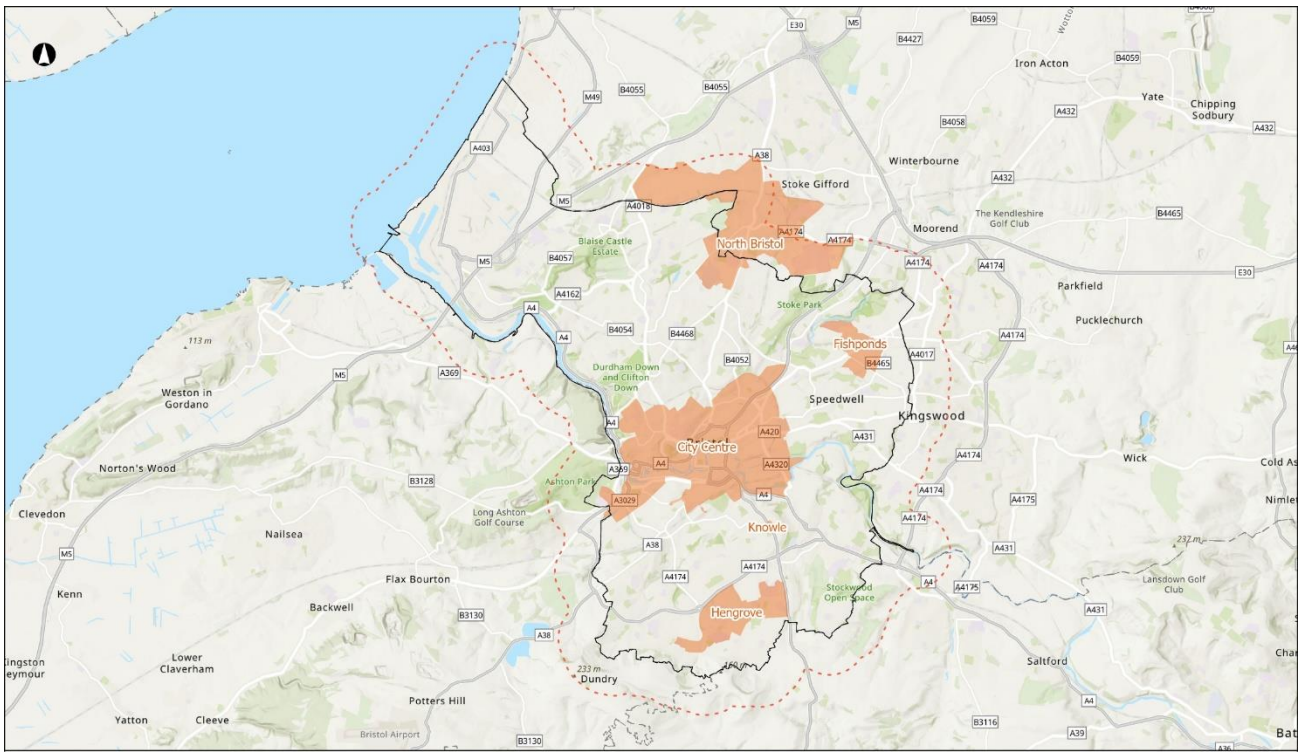
Department for Energy Security & Net Zero

Bristol

Heat Network Zoning

Zone Opportunity Report



February 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

This document was produced by Ramboll with support from Bristol City Council. This work was commissioned by DESNZ to inform their evidence base for future Heat Network Zoning Policy development.

We are grateful to all stakeholders who participated in the Pilot programme for their time and assistance.

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Contents

Executive Summary

About Bristol: Bristol is a city in southwest England, with a population of around 470,000, covering an area of 110km^2. It is characterised by a hilly landscape with the River Avon running through the city.

Local Energy Policy: Bristol declared a climate emergency in 2018 with plans to become carbon neutral by 2030. Heat decarbonisation is a key focus, to be delivered in partnership with Bristol City Leap.

Existing heat networks: Bristol has three operational heat networks in the city centre in Redcliffe, Old Market, and Bedminster. Five more are in active development. Bristol is a prioritised Advanced Zoning Programme (AZP) city.

Zones identified: Five heat network zones were identified in Bristol, with four considered strategic zones. The total annual heat demand across buildings required to connect within identified heat network zones is 475GWh/yr.

Strategic heat network zones: The total annual heat demand across buildings required to connect within strategic heat network zones is 475GWh/yr.

Key heat demands: The total annual heat demand for buildings connected to the initial zone opportunities is 325GWh/yr. Some of the largest buildings include hospitals, university buildings, and offices.

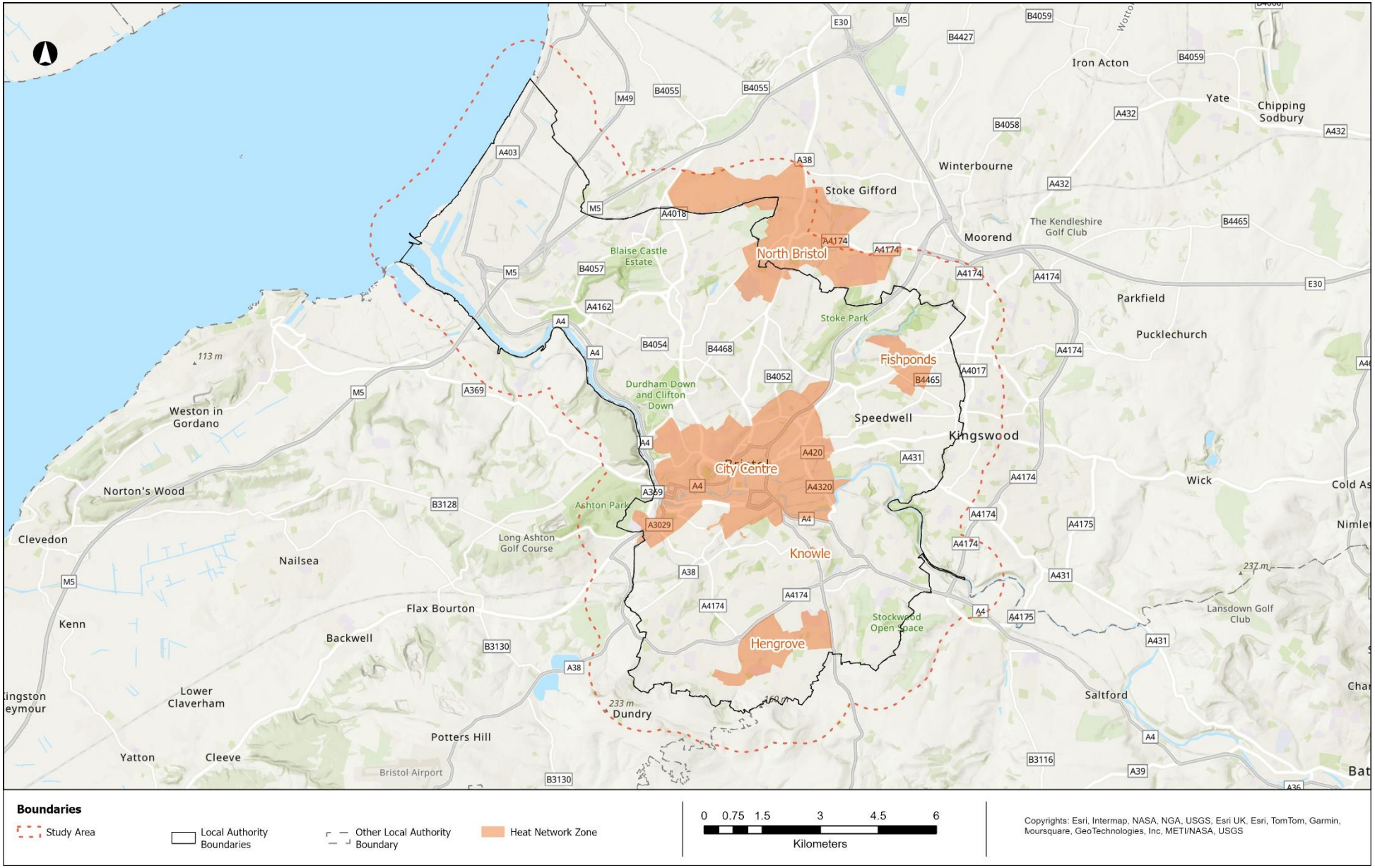
Key heat sources: Potential heat sources include water source and air source heat pumps, mine water and waste heat recovery, and longer-term aspirations to recover heat from outside of the city centre.

Estimated CapEx: The high-level estimate of capital expenditure to network all buildings required to connect in all zones is approximately £650m, of which the initial zone opportunities amount to approximately £475m.

Other heat network zones: Smaller heat network zones identified in areas such as Knowle are not the focus of this report but are mentioned for context.

Carbon savings: The initial zone opportunities identified could deliver carbon savings of approximately 40ktCO_{2e} annually.

Figure 1: Overview of Heat Network Zones in Bristol



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. 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 Bristol 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.

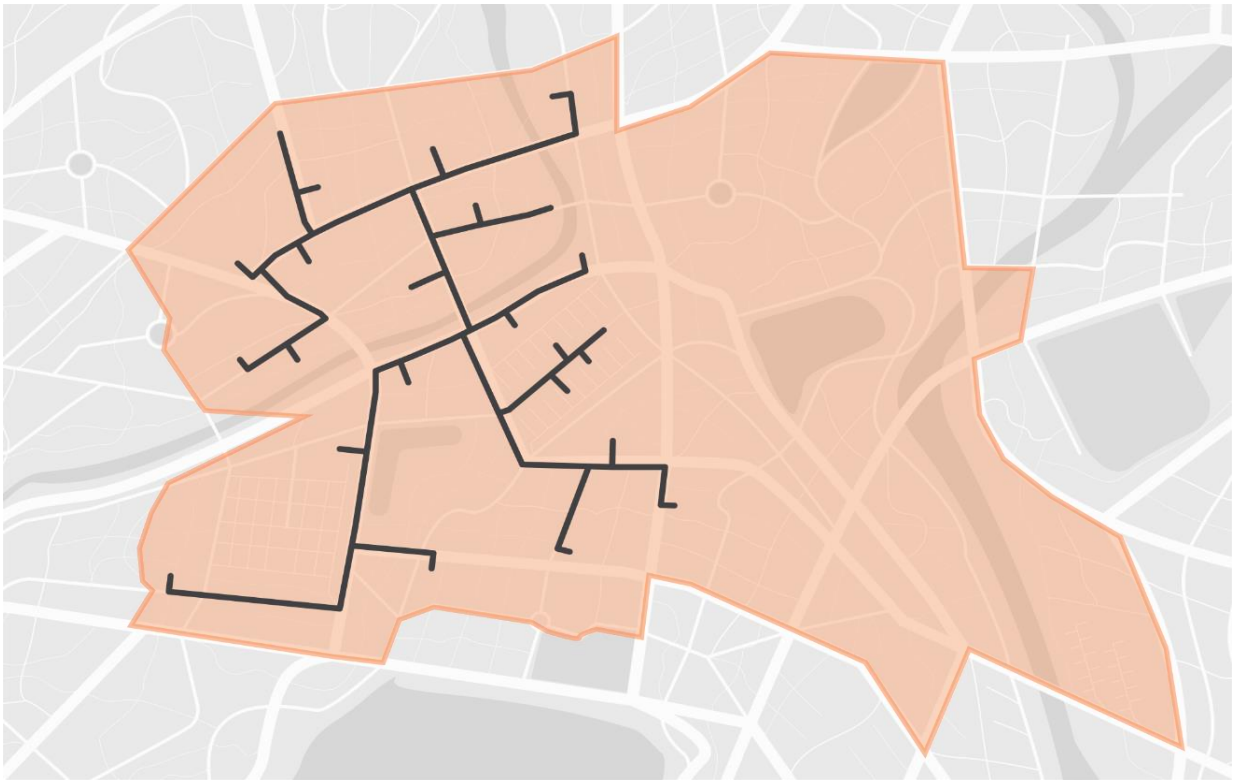
[1] More information can be found in the Heat Network Zoning Methodology Statements (Appendix 3, 4 & 5)

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 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 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.

Advanced Zoning Programme

The Advanced Zoning Programme (AZP) is working with 19 areas to support the construction of new zone scale heat networks as quickly as possible following the launch of heat network zoning in 2025. Amongst the programmes aims are to accelerate the delivery and construction of heat network zones; develop best practice guidance; provide project development support services; and promoting market transformation ready for the national rollout of Heat Network Zoning policy.

The programme builds upon lessons learnt from the Pilot programme and these outputs. In October 2024, DESNZ announced that ground-breaking heat network schemes in Leeds, Plymouth, Bristol, Stockport, Sheffield, and two more in London will receive prioritised support to advance to construction by the end of 2026.

AZP uses the latest zoning methodology (i.e. developed after the Pilot programme) and has undertaken further detailed development work with local stakeholders to further improve confidence and accuracy. The programme may also have applied local strategic and commercial considerations and therefore the opportunities may differ slightly from those presented here, using a national standardised approach. Where there is overlap, AZP studies should be considered more appropriate for use than the outputs from this Pilot programme.

2) Bristol Heat Networks Context

2.1) Bristol City Overview

Bristol is a city in the southwest England, covering an area of 110km^2 with an estimated population of 470,000. It is characterised by a hilly landscape with the River Avon running through the city. This location and its port made the historic centre of Bristol a significant port in the past. The city has a Unitary Authority administrative structure.

The city declared a climate emergency in November 2018 and has ambitious plans and projects in place towards its goal to become carbon neutral by 2030. City scale heat networks have been assessed as a key technology solution for heat decarbonisation in Bristol.

The city has set up its approach for scaling up heat network delivery by establishing a strategic partnership known as Bristol City Leap (BCL) with Ameresco, and their subcontractor Vattenfall Heat UK. Bristol City Council (BCC) has established a joint venture company to originate projects and the strategic partnership expects to deliver around £1bn in local energy projects and infrastructure over its 20-year period. BCL's partners Ameresco, and their subcontractor Vattenfall Heat UK, are committed to the development of £424m of low carbon energy infrastructure projects over the first five years (2023-2027).

BCL aims to provide local businesses and residents with access to reliable, affordable low carbon heat from sustainable sources.

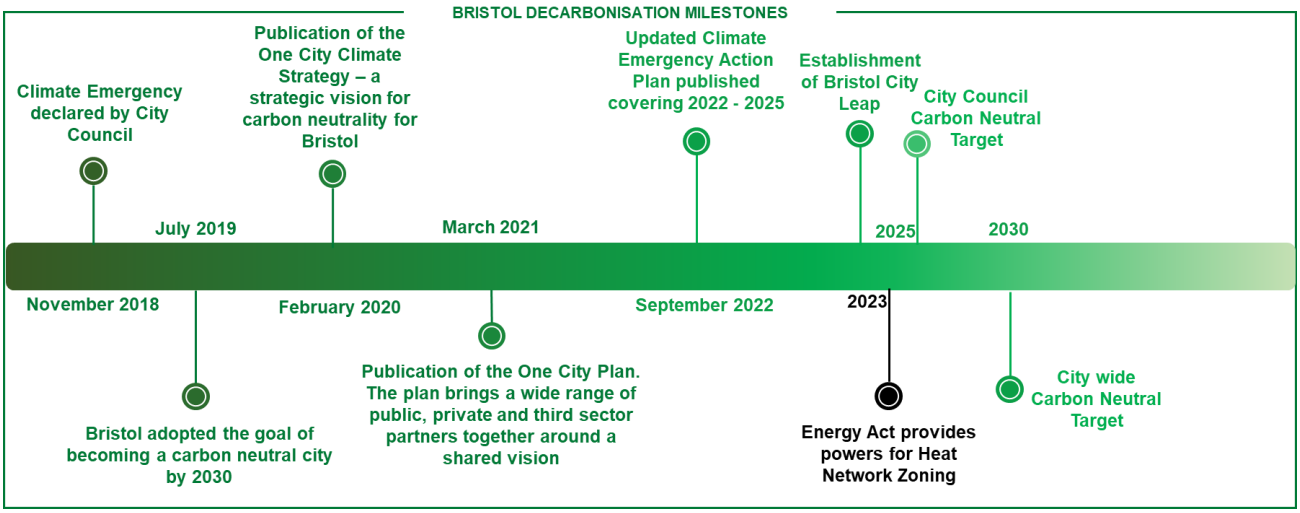
2.2) Bristol Net Zero Targets and Commitments

Bristol declared a climate emergency in 2018 and has a goal to become a carbon neutral city by 2030. It has a range of delivery programmes planned and underway to meet these commitments, alongside a comprehensive strategic framework. This net zero target covers scope 1, 2 and 3 emissions. Heat in buildings is the biggest source of emissions in Bristol (51% of energy consumption). These emissions are produced by approximately 165,000 buildings, with 30% being non-domestic and 70% domestic. Consequently, heat decarbonisation is an important area requiring significant investment.

The One City Climate Strategy was published in February 2020 which sets an ambition for 65,000 buildings (~39% of the total number of buildings representing over 50% of the city's heat demand) to be connected to heat networks. Individual heat pumps are being considered in areas of the city where heat networks are less suited. As aforementioned, BCL was established in 2023 to support BCC to achieve its carbon neutral targets.

Figure 3 summarises key dates in BCC's plans for decarbonisation and demonstrates their progress towards decarbonisation targets.

Figure 3: Bristol Decarbonisation Milestones



2.3) Delivering Heat Networks in Bristol

BCC has three operational heat networks within the city centre in Redcliffe, Old Market and Bedminster, now operated by BCL. Another five are in active development by BCL to support the decarbonisation plans of the city. Please refer to Section 3.1.2 for further details regarding the existing and planned heat networks in Bristol.

In addition to these existing and planned heat networks, plans to develop a City Ring Main and a Strategic Heat Main remain an option for longer term supply, with delivery models currently being explored by BCC. A Strategic Heat Main could deliver around 40MW heat supply from two Energy from Waste (EfW) plants. These plants are in the Avonmouth industrial area, to the north-west of the city along the Severn Estuary. A City Ring Main could connect the strategic heat main to the eight existing and planned heat networks in the city-centre. These options are not assessed as part of this report but included here for context.

Please refer to Appendix 2 for further information about the evidence compiled for heat network opportunities in Bristol. This includes a stakeholder directory and records of interactions with those stakeholders as well key studies and reports.

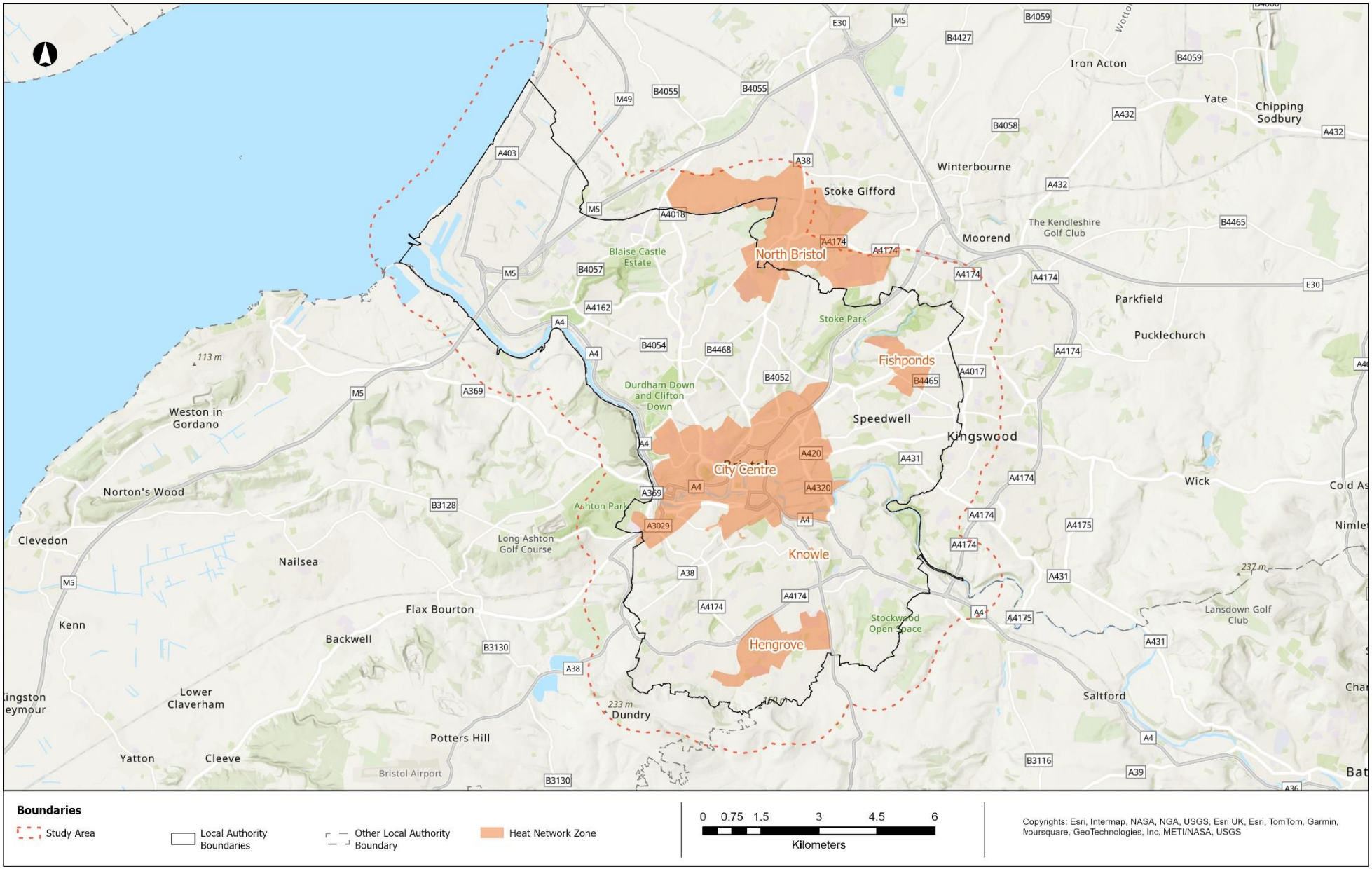
2.4) Bristol Heat Network Zones

A total of five potential HNZs were identified in Bristol, with four considered Strategic HNZs. Figure 4 shows the study area boundary as well as the boundaries of all HNZs identified within Bristol. The HNZs have been allocated a meaningful name agreed as relevant from a local perspective, 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.
- G: Coal Mine Authority Map - shows area where coal mine water may be a possible heat source.

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



3) Strategic Heat Network Zones

Strategic HNZs in Bristol

This section examines the four strategic HNZs and the IZOs identified within each. This covers the key heat demands, heat sources, energy centre locations and potential constraints for each IZO identified. 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 Bristol. 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 required to connect in all zones[3]	475
All buildings required to connect in strategic zones	475
All buildings connected to the IZOs	325

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

City Centre is in the centre of Bristol. In total, 250GWh/yr of heat will be delivered across the HNZ, making it the largest HNZ in Bristol. For more information, please see Section 3.1.

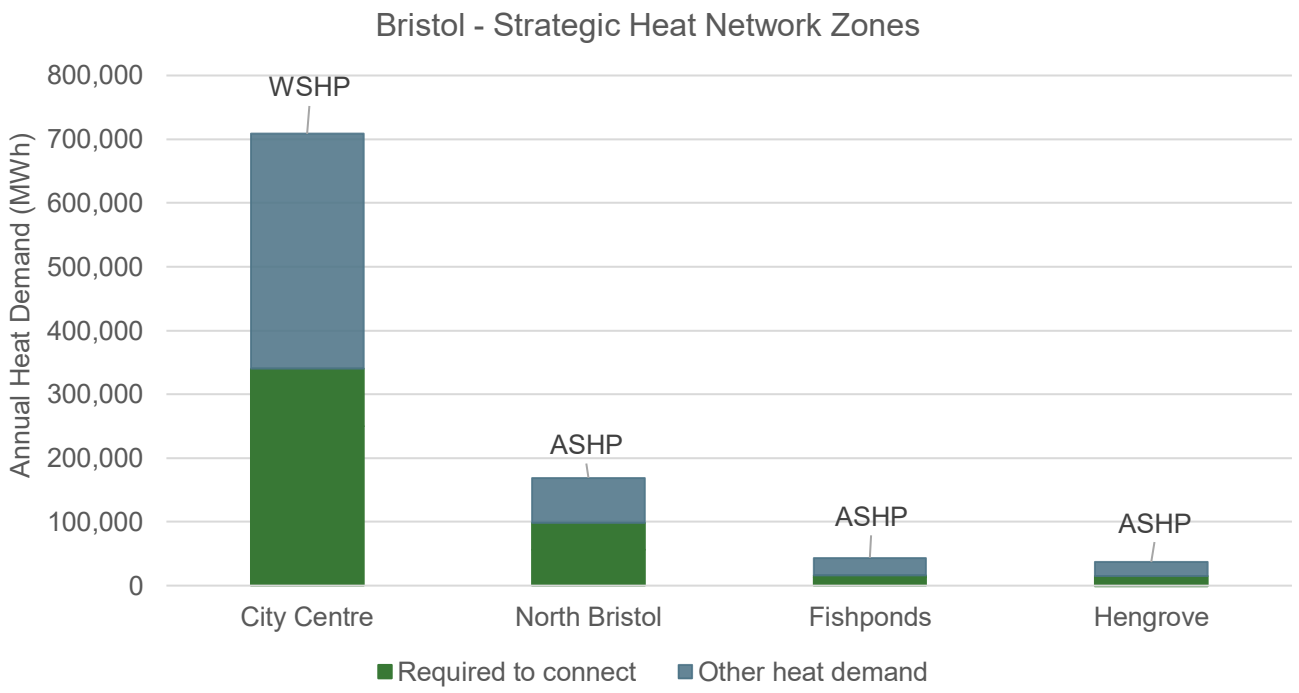
[3] Row 1 is an estimate of heat demand across buildings required to connect in all zones identified. Row 2 is as per row 1, but only within strategic zones. Row 3 includes buildings connected to the IZOs described and largely comprise of buildings potentially required to connect. Figures are generally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

North Bristol is in the north of Bristol. In total, 50GWh/yr of low carbon heat will be delivered in this HNZ supplying mainly a hospital, a university campus and a business park. For more information, please see Section 3.2.

Fishponds is in the north-west of Bristol. A total of 15GWh/yr of low carbon heat will be delivered in the HNZ. For more information, please see Section 3.3.

Hengrove is in the south of Bristol. This HNZ is driven by a new development and a small number of existing buildings. The total heat delivered in the HNZ is 15GWh/yr. For more information, please see Section 3.4.

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



3.1) City Centre

3.1.1) City Centre – HNZ Summary

City Centre is the largest strategic zone identified in Bristol. It is in the middle of Bristol and concentrated around the city centre (see Figure 4). A large part covers a dense urban area with the heat demand led by offices and retail units. Indicatively, 686 buildings in the zone have been identified as potentially required to connect to a heat network. The Floating Harbour and River Avon, which run through the zone, are opportunities for a low carbon heat source and a constraint where there is a need to connect buildings that are located on different banks. Please refer to Section 3.1.7 for further details on constraints and how these could be addressed.

3.1.2) City Centre – Existing Heat Networks

There are three operational heat networks, two planned heat networks in late-stage development and three early stage proposed heat network developments in the City Centre HNZ, as described below (see Appendix 1: Map D).

Operational Heat Networks and Planned Expansions

Redcliffe
Redcliffe is an existing heat network with 21 connections with total heat demand of around 41 GWh/yr. The main heat source is a biomass boiler.

Old Market
Old Market is an existing heat network with 9 connections. The total heat demand is approximately 21GWh/yr and the main heat supply is a water source heat pump (WSHP). There are plans to future proof this network by providing further low carbon heat.

Bedminster
Bedminster is a heat network in near proximity to the Redcliffe and Old Market heat networks, which began operation in May 2024. The network has three connections, supplying 41GWh/yr. The main heat source is air source heat pumps (ASHP).

Planned Heat Networks – Late stage

Temple
Temple is an area located in the south-west of the zone. Plans for the first energy centre are based on an ASHP.

City Centre
The large number of new developments and commercial buildings in proximity to the Floating Harbour creates an opportunity for a heat network in Bristol city centre. This network is served by a WSHP located at Castle Park Depot, abstracting water from the Floating Harbour. This network is expected to deliver more than 39GWh/yr for a CapEx of more than £14m.

Advanced Zoning Programme:

Bristol City Leap is a partnership between Bristol City Council and Ameresco UK, supported by Vattenfall Heat UK, to deliver energy investment into Bristol. Vattenfall operates Bristol Heat Networks, which currently serves almost 6,000 homes equivalent, across four network areas: Redcliffe, Old Market, Bedminster and Temple.

DESNZ has supported the City Council over the last 10 years, including via four successful applications to the Heat Network Investment Project (HNIP) (£13.4m). These networks are in various stages of operation and development. Within five years, the aim is for over 120 GWh of low-carbon heat to be delivered to customers through over £200 million of investment into high-quality, long-term infrastructure across the city. The Advanced Zoning Programme will support the acceleration of heat network deployment and ensure alignment with the upcoming Heat Network Zoning policy.

Proposed Heat Networks – Early stage

Feasibility studies are also underway at Ashton Gate (which centres on the City Gateway new development), Spike Island and Frome Gateway. Proposed networks at such an early stage are not shown on the heat network maps as heat network routes have not been established.

3.1.3) City Centre – Initial Zone Opportunities

Two discrete IZOs were identified in the City Centre zone (see Figure 6). Potential routing[4] for the IZOs is shown in Figure 6 and summary statistics provided in Table 2.

Table 2: City Centre - Summary Statistics for Initial Zone Opportunities[5]

CapEx	Heat	Network	CO_{2e} savings	Linear Heat Density	Heat Sources
~£425m	>250GWh/yr	~45km	>35ktCO_{2e}/yr	6.3MWh/m	WSHPs and Mine water

The **City Centre IZO** is in the centre of Bristol and it covers the areas of Frome Gateway, the dense urban city centre of Bristol, Spike Island and Ashton Gate. Several factors led to the creation and the size of this IZO including the high heat demand and existing studies.

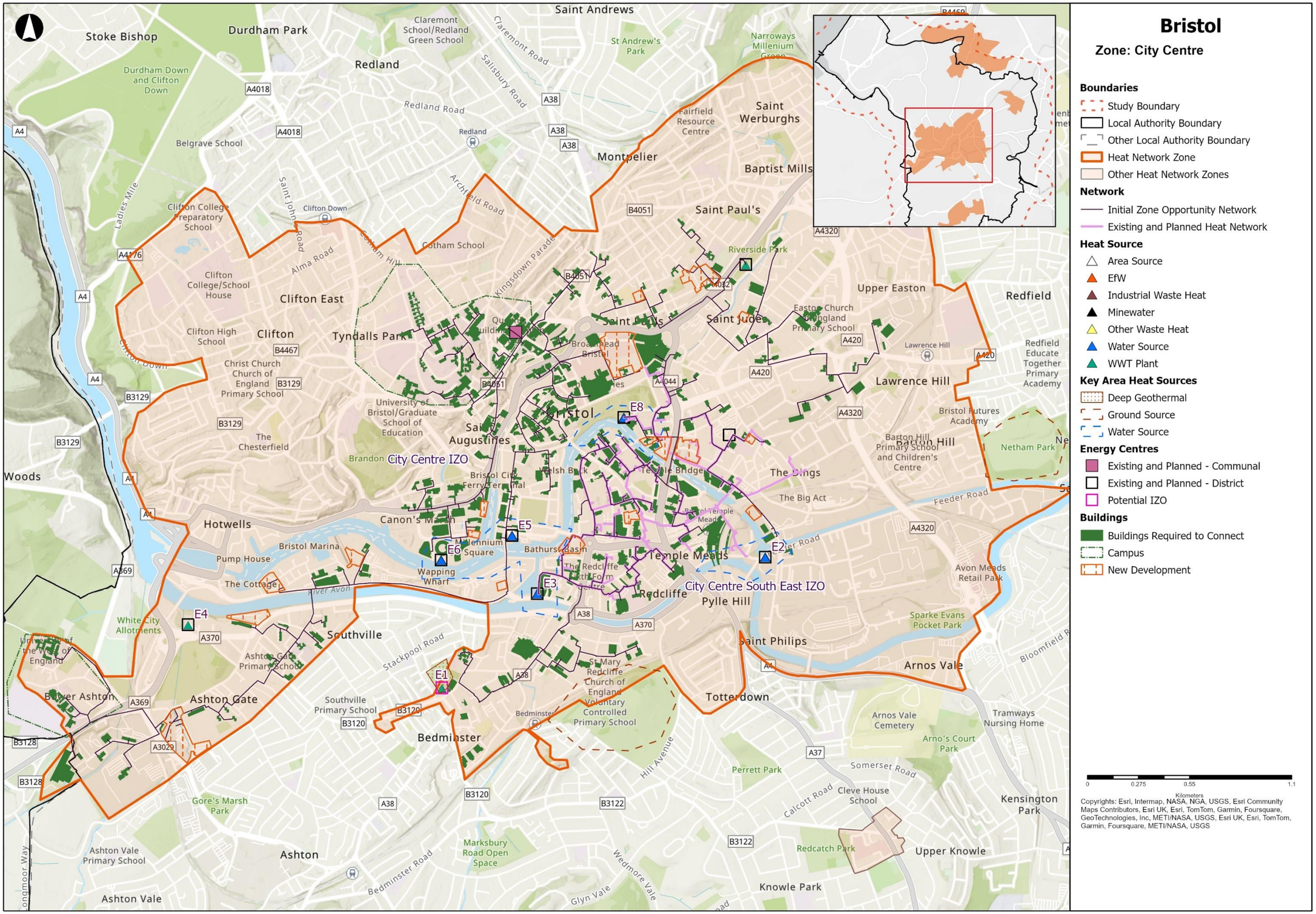
There are four proposed heat networks in this area. The development of this IZO is estimated to supply approximately 200GWh/yr to 268 buildings that may be required to connect. The estimated CapEx for this IZO is approximately £300m. The primary low carbon heat sources identified include WSHPs and mine water heat recovery.

The **City Centre South East IZO** is in the centre and south part of the zone, near to the City Centre IZO. It covers the areas of Old Market, Redcliffe, Bedminster and a small part of Temple area. Several factors led to the creation and the size of this IZO including the high heat demand and existing and planned heat networks.

There are two existing and two planned heat networks in this area. The development of this IZO is estimated to supply more than 50GWh/yr to 139 buildings that may be required to connect. The estimated CapEx for the development of this IZO is approximately £125m and the main heat source opportunity is WSHPs.

[4] Routes can be expected to change as a better understanding of local constraints is developed through design.
[5] 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.

A breakdown of heat demand per building typology is presented below (Figure 7), followed by the largest heat demands that may be required to connect (see Table 3 and Table 4). In the **City Centre IZO** public sector buildings are the largest contributor with new developments adding a significant load. In the **City Centre South East IZO**, non-domestic buildings comprise most of the heat demand.

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

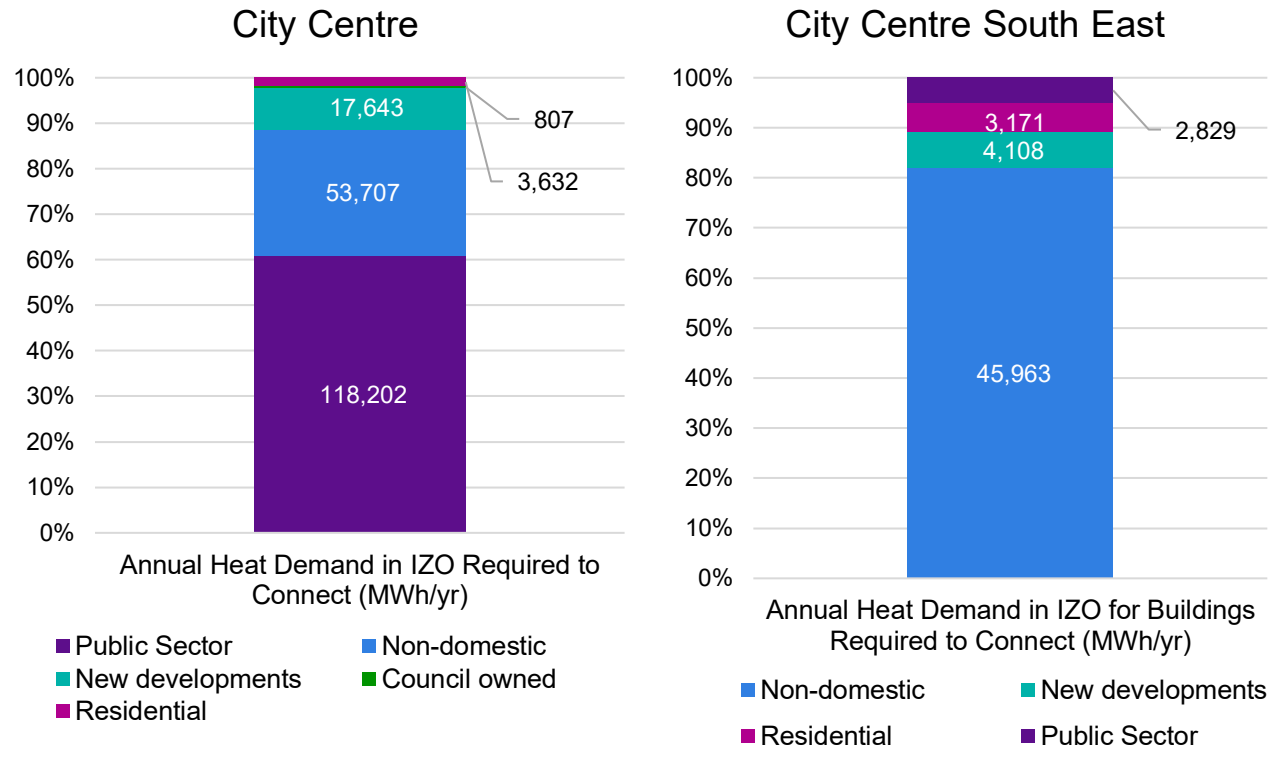


Table 3: City Centre - Key Heat Demands Required to Connect in the IZOs[6]

Building name	Building category	Number of connections	Annual Heat Demand (MWh)	Data Source
City Centre				
Bristol Royal Infirmary	Public Sector	1	70,304	ERIC National Dataset
University of Bristol	Public Sector	4	10,120	Benchmark (NZM)
Callowhill Court (Retail)	New Development	Unknown	6,461	Pilot methodology
City Centre Mall	Non-domestic	Unknown	5,542	Benchmark (NZM)
Ashton Gate Redevelopment	New developments	6	3,504	Benchmark (NZM)
Canons House	Non-domestic	1	2,168	Benchmark (NZM)
Dove Lane Residential	New Developments	Unknown	2,001	Benchmark (NZM)
Bristol Day Nursery	Education	2	1,740	Benchmark (NZM)
St. Michaels Hospital	Hospitals	7	1,473	Benchmark (NZM)
The Horsefair	Retail	1	1,437	Benchmark (NZM)

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

Table 4: City Centre - Key Heat Demands for Buildings Required to Connect in the IZOs[7]

Building name	Building category	Number of connections	Annual Heat Demand (MWh)	Data Source
City Centre South East				
Glassfields	New Development	Unknown	2,153	Pilot methodology
Glass Wharf	Non-domestic	Unknown	2,078	Benchmark (NZM)
Temple Back East	Non-domestic	Unknown	1,908	Benchmark (NZM)
Glass House	Non-domestic	Unknown	1,846	Benchmark (NZM)
Asda Bedminster	Non-domestic	Unknown	1,338	Benchmark (NZM)
21 St Thomas Street	Non-domestic	Unknown	1,296	Benchmark (NZM)
Temple Way	Non-domestic	Unknown	1,056	Benchmark (NZM)
Mercure Holland House Hotel	Public Sector	Unknown	964	Benchmark (NZM)
Kingsdown House	Non-domestic	Unknown	905	Benchmark (NZM)

3.1.5) City Centre – IZO Heat Sources

Historical data from previous studies has been reviewed and included in this section. Further engagement with BCL and BCC has identified no new/additional information on potential available heat source capacities within Bristol. Table 5 and Table 6 summarise the key heat sources and potential energy centre locations identified and are shown in Figure 6 in section 3.1.3 and on Appendix 1: Maps C and G.

The opportunity to use heat from the Floating Harbour using a WSHP has been explored as one of the main options to develop and expand heat networks in the City Centre zone. ASHPs are also considered a feasible technology option to provide low carbon heat to the existing and planned networks. Other potential heat sources considered include heat from mine water, sewers and from the River Avon.

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

As aforementioned, there are two existing operational heat networks in Bristol and existing energy centres. These are the Castle Park Energy Centre comprising a WSHP and gas boilers; a biomass low temperature hot water (LTHW) boiler in Broughton House; a gas fired CHP at 100 Temple Street; and a gas fired CHP at the Bristol Royal Infirmary. There are further plans to decarbonise the heat supplied with planned low carbon energy centres.

Table 5: City Centre - Key Heat Source Opportunities for the IZOs

Heat source type	Full Opportunity Capacity (kWp)	Temperature (ºC)	Potential Energy Centre (Ref number)
WSHPs			
Dame Emily Park (Sewer)	3,000 kWp	50-80 ºC[8]	E1
Feeder Road, Totterdown Basin (Floating Harbour)	6,000 kWp	50-75 ºC[8]	E2
Lower Guinea Street Bathurst Basin (Floating Harbour)	3,000 kWp	60-80 ºC[8]	E3
Ashton Avenue Pumping Station (Sewer)	10,000 kWp	50-80 ºC[8]	E4
Riverside (River Avon)	4,000 kWp	60-80 ºC[8]	E4
The Grove (Floating Harbour)	4,000 kWp	60-80 ºC[8]	E5
Western Harbour (Floating Harbour)	10,000 kWp	60-80 ºC[8]	E6
Frome Gateway (Sewer)	7,000 kWp	60-80 ºC[8]	E7
Mine water heat recovery Dean Lane Colliery	2,892 kWp	50-80 ºC[8]	E1
Existing heat networks Castle Park (Floating Harbour, WSHP)	3,000kWp	70-85ºC[9]	E8

[8] *The temperature at which heat will be distributed to heat offtakers, after upgrade processes*
[9] *The temperature at which existing energy centre plant supplies heat to heat offtakers*

Table 6: City Centre - Potential IZO Energy Centre Locations

EC Ref number	Site type	Size (m^2)	Ownership	Heat Source
E1	Land	300	BCC	Sewer or Mine Water
E2	Land	600	Homes England	Floating Harbour
E3	Land	300	BCC	Floating Harbour
E4	Land	1000	BCC	Sewer or River
E5	Land	400	BCC	Floating Harbour
E6	Land	1000	BCC	Floating Harbour
E7	Building	700	BCC	Sewer
E8	Land	600	BCC	Floating Harbour

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 7, shows the network statistics for the IZO including the network length and associated cost. Please see Appendix 5 for related methodology statements and assumptions.

Table 7: City Centre - Indicative Heat Network Statistics for IZOs

IZO Heat Network description	Network length (km)	Network cost (£m)
City Centre	45	175

3.1.7) City Centre – IZO Key Constraints and Mitigations

All identified risks and constraints can be seen in Appendix 1: Map E and the key physical barriers for the IZOs identified are summarised below.

City Centre IZO:

[C2, C3, C5, C9] Road crossings: The City Centre network will need to cross several main roads, including the A38, A370, A4 and A4032. These roads are crossed four times in total by the network. A study is needed to evaluate the feasibility of these crossings and sections of various A roads.

[C4] River crossings: There are two river crossings in the City Centre network however follow existing bridge infrastructure. This will require a study to evaluate the feasibility of crossing over the existing road bridges.

City Centre South East IZO:

[C2, C9] Road crossings: There are several roads in the City Centre South East network that will need to be crossed. The two prominent main roads travelling through the City Centre South East network area are the A38 and A4044, whilst most of the network follows smaller roads. A segment of the network aligns with the existing “Old Market network”, indicating that constraints in these areas have already been considered. The network crosses the two main roads four times. This will require a study to evaluate the feasibility of crossing these roads.

[C4] River crossings: There are two river crossings, both facilitated by robust road bridge infrastructure. This will require a study to evaluate the feasibility of crossing over the existing road bridges.

[C12] Rail crossing: The proposed network crosses under a small section of railway to the east of the main network area. This will require a study to evaluate the feasibility of crossing under a railway bridge and along the restricted road area.

3.2) North Bristol

3.2.1) North Bristol – HNZ Summary

North Bristol is a strategic HNZ located in the north of Bristol. It covers a suburban area with a university campus and a hospital that are the two large consumers. In total, 117 buildings have been identified as potentially required to connect in the zone. Large scale ASHPs and recovery of waste heat from the Southmead Hospital data centre, have been identified as key low-carbon heat source opportunities in the HNZ.

3.2.2) North Bristol – Existing Heat Networks

No existing heat networks have been identified in the HNZ.

3.2.3) North Bristol – Initial Zone Opportunities

Two discrete IZOs were identified in the North Bristol zone. Potential routing[10] for the IZOs are shown in Figure 8 and summary statistics provided in Table 8.

Table 8: North Bristol - Summary Statistics for Initial Zone Opportunities[11]

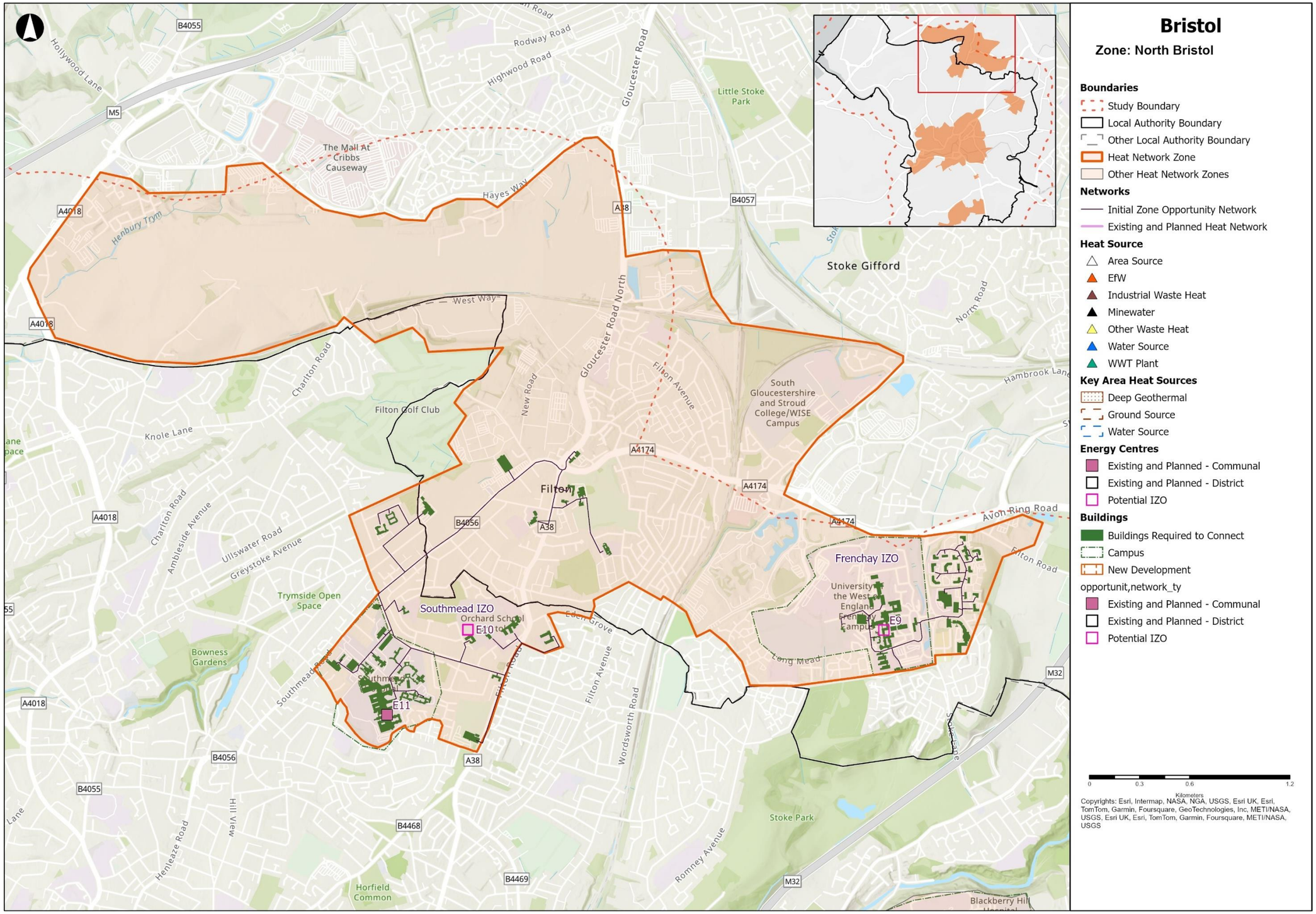
CapEx	Heat	Network	CO_{2e} savings	Linear Heat Density	Heat Sources
~£50m	>50GWh/yr	~10km	~10ktCO_{2e}/yr	5.5MWh/m	ASHPs and waste heat

The **Southmead IZO** comprises one campus heat network that covers an area around the Southmead Hospital to the west of the HNZ, with available heat sources nearby. The CapEx required for delivery this is estimated to be £35m to connect heat demands estimated at 45GWh/yr with annual carbon savings of almost 8ktCO_{2e}.

This **Frenchay IZO** comprises one heat network that covers the area in and around the University of the West of England (UWE) Frenchay campus. The campus is the main driver for the development of a heat network here, surrounded by several other buildings that may be required to connect. The IZO is located to the west of the zone and the CapEx required for delivery is around £15m. The connected heat demand is more than 10GWh/yr and annual carbon savings are around 2ktCO_{2e}.

[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 8: Initial Zone Opportunity in North Bristol HNZ



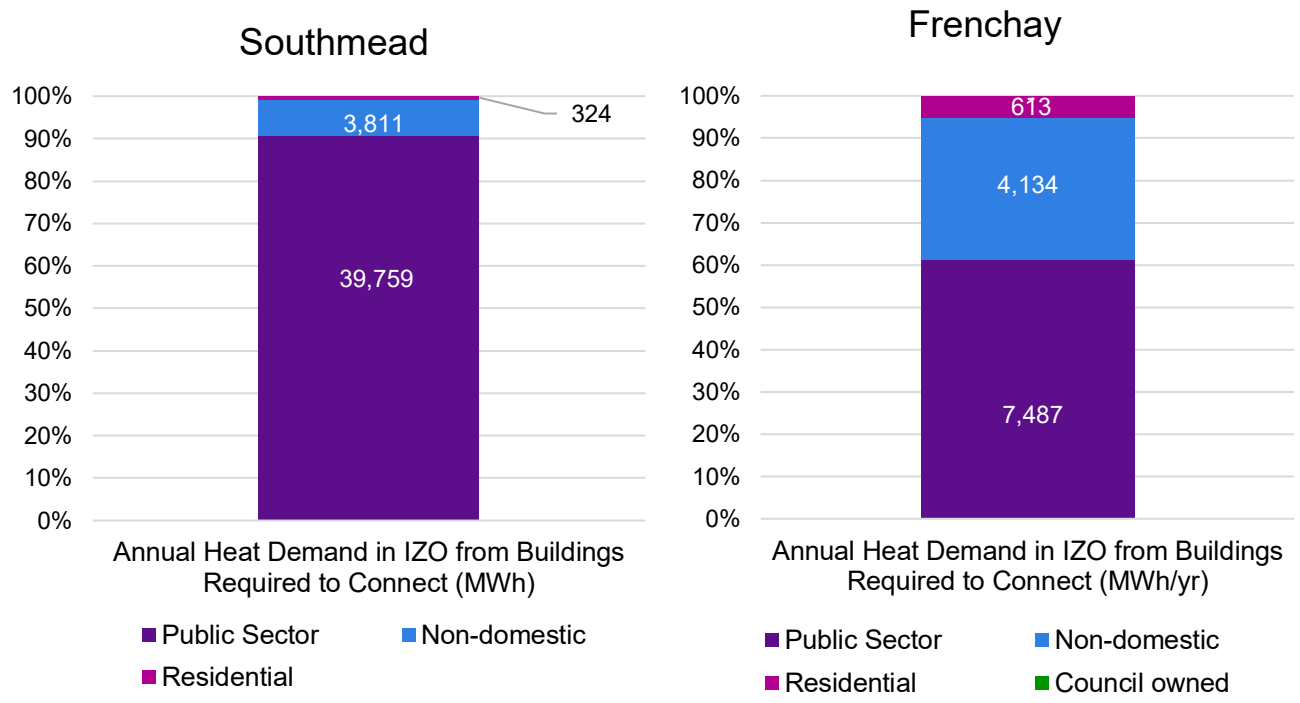
3.2.4) North Bristol – IZO Heat Demands

A breakdown of heat demand per building typology is presented below (see Figure 9). The largest heat demands[12] that may be required to connect in each IZO are listed in Table 9 and Table 10 on the following pages.

In the **Southmead IZO**, the heat demand is dominated by Southmead Hospital with a small number of non-domestic buildings and one local authority owned building situated nearby. Southmead hospital consists of several buildings. There is an existing steam network, constructed in 1967, and a LTHW communal network that supplies the Science Quarter. There are plans to decommission the steam network and replace it with heat pumps. Educational, sports, recreational and offices are the other building typologies with the highest heat demands.

In the **Frenchay IZO**, the heat demand is dominated by non-domestic (offices) and public sector (university campus) buildings. Frenchay IZO consists of a small number of buildings with significant heat demand. The buildings of the UWE and the Bristol Business Park are the two major heat demands that are driving the development of the IZO.

Figure 9: North Bristol - Categorisation of Heat Demand for Buildings Required to Connect in IZOs



[12] Please refer to section 3.1.4 for a description of IZO heat demands.

Table 9: North Bristol - Key Heat Demands Required to Connect in the Southmead IZO[13]

Building name	Building category	Number of connections	Annual Heat Demand (MWh)	Data Source
Southmead Hospital	Public Sector	Unknown	37,117	ERIC National Dataset
Orchard School	Education	1	8,694	Benchmark (NZM)
Horfield Leisure Centre	Sports and Recreation	1	8,166	Benchmark (NZM)
Brandon House	Office	1	1,115	Benchmark (NZM)
BAWA Healthcare and Leisure	Sports and Recreation	1	478	Benchmark (NZM)
Johnsons Apparelmaster	Industrial	1	395	Benchmark (NZM)
Multicultural Educational Centre	Office	1	352	Benchmark (NZM)
Fonthill Primary School	Education	1	348	Benchmark (NZM)
Filton Recreational Centre	Education	1	303	Benchmark (NZM)
The Fonthill Centre	Education	1	279	EPC

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

Table 10: North Bristol - Key heat demands for Buildings Required to Connect in the Frenchay IZO[14]

Building name	Building category	Number of connections	Annual Heat Demand (MWh)	Data Source
University of West England	Public Sector	10	7,487	Benchmark (NZM)
Bristol Business Park	Office	20	3,814	Benchmark (NZM)
Stoke Gifford Retirement Village	Residential	Unknown	613	Benchmark (NZM)
Northavon House	Office	1	320	Benchmark (NZM)

3.2.5) North Bristol – IZO Heat Sources

Table 11 and Table 12 summarise the key heat sources and potential energy centre locations identified and are shown in Figure 8 in Section 3.2.3 and on Appendix 1: Map C. A total of three heat sources have been proposed to meet the heat demand in the IZO. These comprise two ASHPs and recovery of waste heat from the Southmead Hospital data centre. The capacities included in Table 11 below represent the full opportunity capacity of the heat sources.

Table 11: North Bristol - Key Heat Source Opportunities for the IZOs

Heat source type	Full Opportunity Capacity (kWp)	Temperature (ºC)	Potential Energy Centre (Ref number)
ASHP			
Land	8,200	30-70 ºC[15]	E9
Building	3,300	30-70 ºC[15]	E10
Data centre			
Southmead Hospital	1,340	40-70 ºC[15]	E11

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

Table 12: North Bristol - Potential IZO Energy Centre Locations

EC Ref number	Site type	Size (m^2)	Ownership	Heat Source
E9	Land	850	UWE	ASHP
E10	Building	350	BCC	ASHP
E11	Building	900	UHB	WSHP

3.2.6) North Bristol – IZO Heat Distribution

Table 13 shows the network statistics for the IZO including the network length and associated costs. Please refer to Section 3.1.6 and Appendix 5 for the assumptions used.

Table 13: North Bristol - Indicative Heat Network statistics for IZOs

IZO Heat Network description	Network length (km)	Network cost (£m)
North Bristol	10	25

3.2.7) North Bristol – IZO Key Constraints and Mitigations

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

3.3) Fishponds

3.3.1) Fishponds – HNZ Summary

Fishponds is a strategic HNZ located in the north-east suburbs of Bristol, approximately 3 miles from the city centre. Key buildings that may be required to connect in the HNZ include the University of West of England Glenside campus, Blackberry Hill Hospital, and Bristol Metropolitan Academy. Large scale ASHPs been identified as the primary low-carbon heat source opportunity.

3.3.2) Fishponds – Existing Heat Networks

Proposed Heat Networks – Early stage

BCC is currently undertaking a heat network feasibility study in Fishponds, due to the planned regeneration of the area. As the scheme is in its early stage of development, a network route is not shown on Appendix 1: Map D.

3.3.3) Fishponds – Initial Zone Opportunities

A single IZO was identified in the Fishponds zone. Potential routing[16] for the IZO is shown in Figure 10 and summary statistics provided in Table 14.

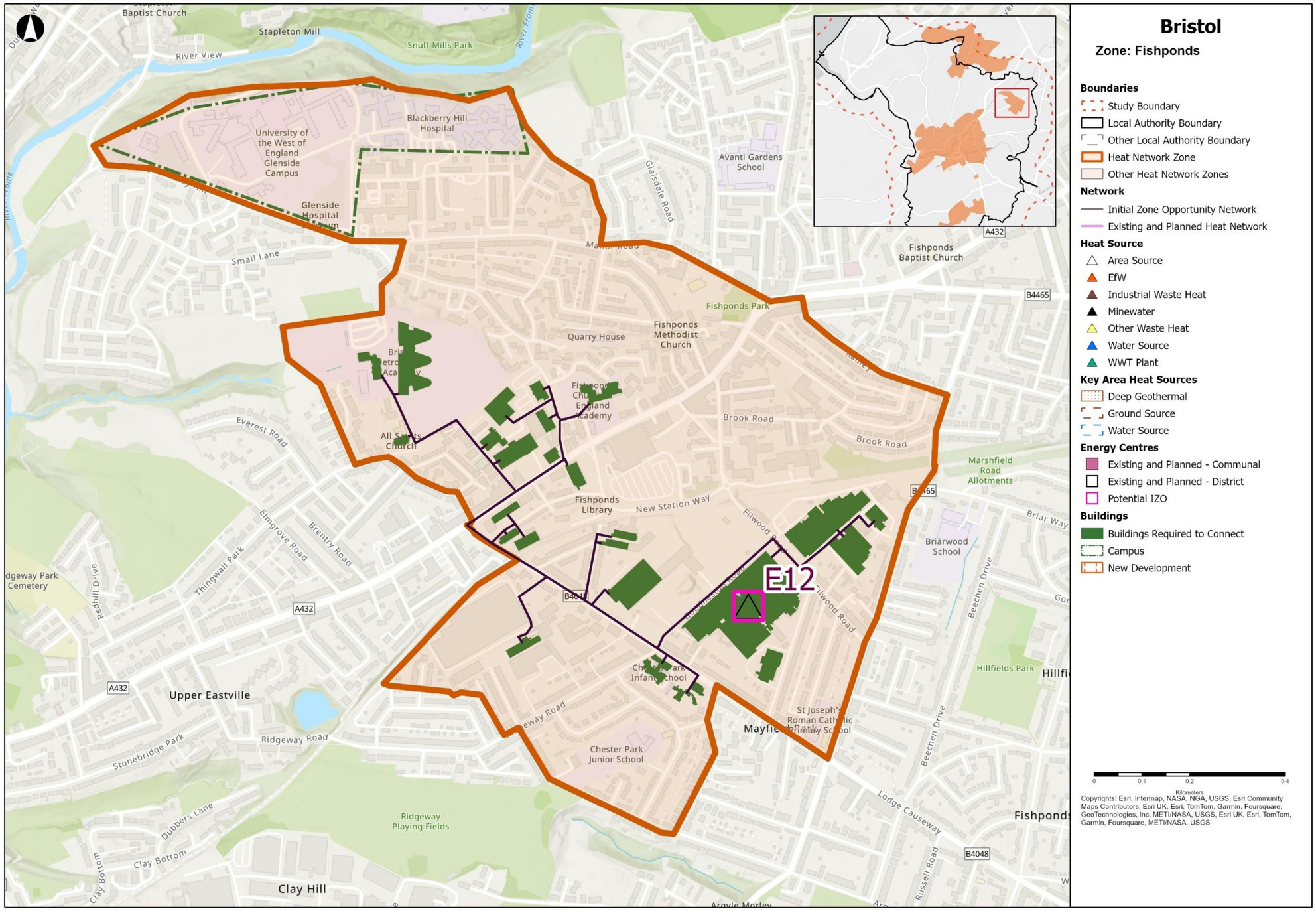
Table 14: Fishponds - Summary Statistics for Initial Zone Opportunities[17]

CapEx	Heat	Network	CO_{2e} savings	Linear Heat Density	Heat Sources
~£15m	~15GWh/yr	>3km	~2ktCO_{2e}/yr	4.2MWh/m	ASHPs

The identified IZO is driven by the high concentration of non-domestic buildings potentially required to connect. A centralised ASHP solution is proposed, at this stage, prior to further examination of other options. The IZO requires a CapEx of around £15m for delivery of the IZO. This would connect heat demands estimated at approximately 15GWh/yr and deliver carbon savings of 2ktCO_{2e}/yr.

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

Figure 10: Initial Zone Opportunity in Fishponds HNZ



3.3.4) Fishponds – IZO Heat Demands

A breakdown of heat demand per building typology is presented below (see Figure 11). The largest heat demands that may be required to connect are listed in Table 15.

The main building categories that may be required to connect are industrial, non-domestic, public sector and a small amount of residential. Non-domestic buildings represent the greatest proportion of heat demands in the IZO, representing more than 11GWh/yr[18] and over 85% of the total.

Figure 11: Fishponds - Categorisation of Heat Demand for Buildings Required to Connect in IZO

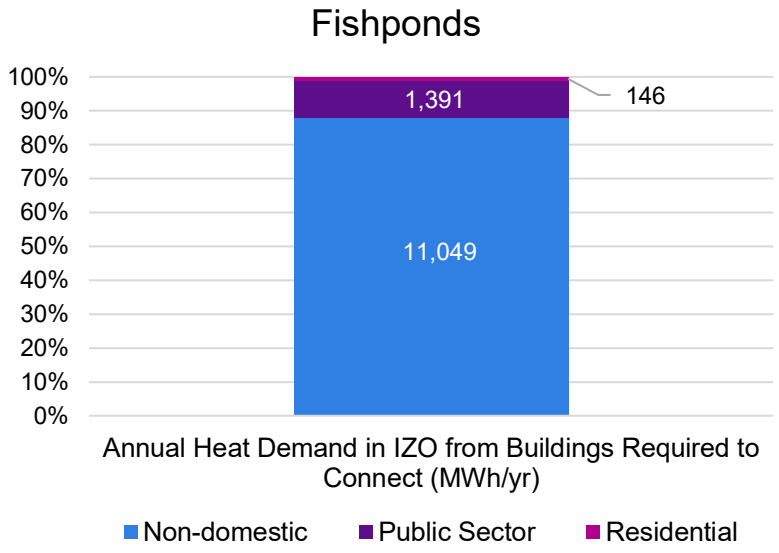


Table 15: Fishponds - Key Heat Demands Required to Connect in the IZO[19]

Building name	Building category	Number of connections	Annual Heat Demand (MWh)	Data Source
Verona House	Non-domestic	1	1,905	Benchmark (NZM)
Filwood House	Non-domestic	1	1,158	Benchmark (NZM)
Buzz Bingo	Non-domestic	1	560	Benchmark (NZM)
Oakwood Park	Non-domestic	1	428	Benchmark (NZM)

[18] Please refer to section 3.1.4 for a description of IZO heat demands.
[19] Please refer to Appendix 3 for definitions related to building categories in this table.

Building name	Building category	Number of connections	Annual Heat Demand (MWh)	Data Source
Channons Hill Retail Park	Non-domestic	1	409	Benchmark (NZM)
Proxima	Non-domestic	1	394	Benchmark (NZM)
Bristol Metropolitan Academy	Public Sector	1	323	Benchmark (NZM)
Fishponds C of E Academy	Public Sector	1	259	Benchmark (NZM)
Lodge House	Non-domestic	1	223	Benchmark (NZM)
St Matthias Park PRU	Public Sector	1	197	Benchmark (NZM)

3.3.5) Fishponds – IZO Heat Sources

Table 16 and Table 17 summarise the key heat sources and potential energy centre locations identified for this IZO. These are also shown in Figure 10 in Section 3.3.3 above and Appendix 1: Map C. The capacities included in Table 16 below represent the full opportunity capacity of the heat sources.

Table 16: Fishponds - Key Heat Source Opportunities for the IZOs

Heat source type	Full Opportunity Capacity (kWp)	Temperature (ºC)	Potential Energy Centre (Ref number)
ASHP	3,400	30-70 ºC[20]	E12

Table 17: Fishponds - Potential IZO Energy Centre Locations

EC Ref number	Site type	Size (m2)	Ownership	Heat Source
E12	Land	350	BCC	ASHP

[20] The temperature at which heat will be distributed to heat offtakers, after upgrade processes

3.3.6) Fishponds – IZO Heat Distribution

Table 18 shows the network statistics for the IZO including the network length and associated costs. Please refer to Section 3.1.6 and Appendix 5 for the assumptions used.

Table 18: Fishponds - Indicative Heat Network statistics for the IZO

IZO Heat Network description	Network length (km)	Network cost (£m)
Fishponds	3	6

3.3.7) Fishponds – IZO Key Constraints and Mitigations

[C8] Road crossing: There is one main road in the Fishponds area (A432) which the network would run along. This will require a study to evaluate the feasibility of using an A road for a section of the network.

3.4) Hengrove

3.4.1) Hengrove – HNZ Summary

Hengrove is a strategic HNZ, located in the south suburbs, approximately 2 miles from Bristol City Centre. This HNZ can be seen in the city zones overview map shown in Figure 4.

3.4.2) Hengrove – Existing Heat Networks

Proposed Heat Networks – Early stage

Hengrove Communal Network
There is a provision for a communal heat network within a new development in Hengrove. This can potentially be used to develop an energy centre. As the scheme is in its early stage of development, a network route is not shown on Appendix 1: Map D.

3.4.3) Hengrove – Initial Zone Opportunities

A single IZO was identified in the Hengrove zone. Potential routing[21] for the IZO is shown in Figure 12 and summary statistics provided in Table 19.

Table 19: Hengrove - Summary Statistics for Initial Zone Opportunities[22]

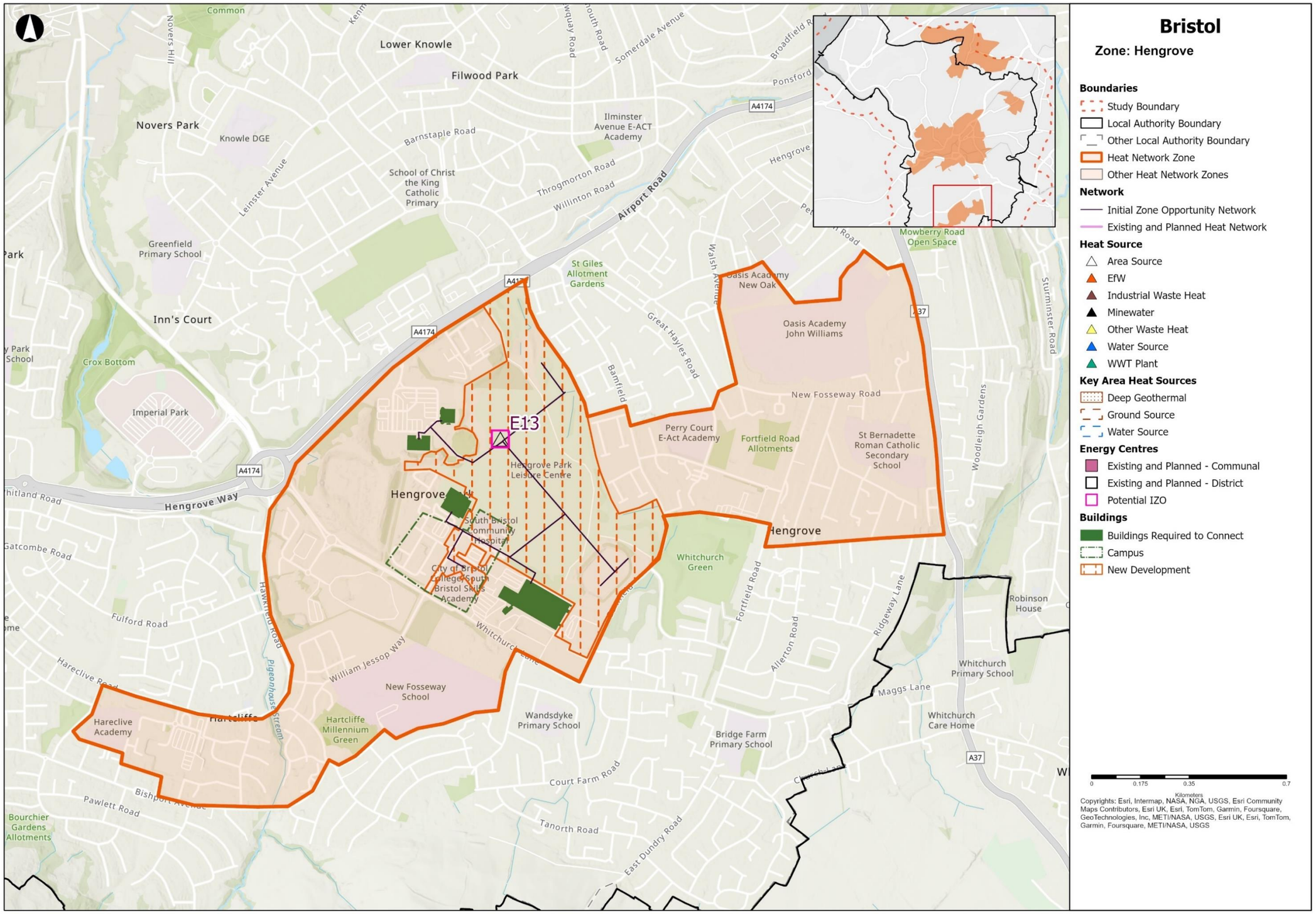
CapEx	Heat	Network	CO_2e savings	Linear Heat Density	Heat Sources
~£10m	~15GWh/yr	~3km	>2ktCO_{2e}/yr	2.5MWh/m	ASHPs

The identified IZO is driven by plans for a new development in the area which is of strategic importance to Bristol. The development includes residential development of up to 1,435 dwellings, up to 4,515m^2 of office spaces, and up to 4,500m^2 of education floor space to enable the expansion of Bristol College Skills Academy, and provision of an energy centre for communal heat and power.

The IZO requires a CapEx of around £10m for delivery of the IZO. This would connect heat demands estimated at approximately 15GWh/yr and deliver carbon savings of over 2ktCO_{2e}/yr.

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

Figure 12: Initial Zone Opportunity in Hengrove HNZ



3.4.4) Hengrove – IZO Heat Demands

A breakdown of heat demand per building typology is presented below (see Figure 13). The largest heat demands[23] that may be required to connect are listed in Table 20.

Figure 13: Hengrove - Categorisation of Heat Demand for Buildings Required to Connect in IZO

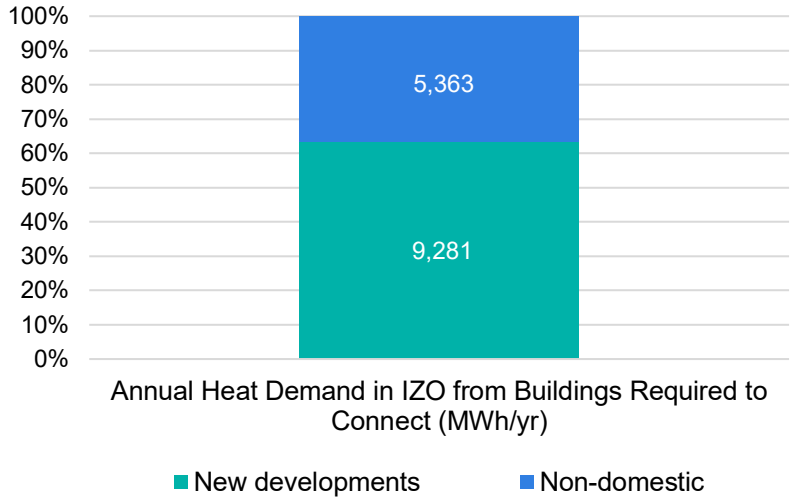


Table 20: Hengrove - Key Heat Demands for Buildings Required to Connect in the IZO[24]

Building name	Building category	Number of connections	Annual Heat Demand (MWh)	Data Source
Hengrove Park	New Development	Unknown	9,281	Benchmark (NZM)
Visual Impact Ltd	Non-domestic	1	3,851	Benchmark (NZM)
Cine UK Ltd, Hengrove Leisure Park	Non-domestic	1	811	Benchmark (NZM)
Gala Clubs, Hengrove Leisure Park	Non-domestic	1	462	Benchmark (NZM)
Hengrove Park Leisure Centre	Non-domestic	1	239	Benchmark (NZM)

[23] Please refer to section 3.1.4 for a description of IZO heat demands.
[24] Please refer to Appendix 3 for definitions related to building categories in this table.

The largest heat demand connected to Hengrove IZO is the Hengrove Park new development, which consists of residential, offices and commercial spaces, and is estimated to have a total heat demand of approximately 9MWh/yr. The IZO also connects to existing non-domestic buildings in the area including leisure buildings and a light industrial building.

3.4.5) Hengrove – IZO Heat Sources

A new energy centre location was chosen based on the location of the heat demand and land availability within the new development site which has a provision for a centralised energy centre. ASHPs will be used as the primary supply option. Tables 22 and 23 summarise the key heat sources and potential energy centre locations identified. These are also shown on Figure 12 in Section 3.4.3 above and Appendix 1: Map C.

Table 21: Hengrove - Key Heat Source Opportunities for the IZO

Heat source type	Capacity (kWp)	Temperature (ºC)	Potential Energy Centre (Ref number)
ASHP Hengrove Park	3,400	30-70 ºC[25]	E13

Table 22: Hengrove - Potential IZO Energy Centre Locations

EC Ref number	Site type	Size (m^2)	Ownership	Heat Source
E13	Land	350	Private	ASHP

3.4.6) Hengrove – IZO Heat Distribution

Table 23 shows the network statistics for the IZO including the network length and associated costs. Please refer to Section 3.1.6 and Appendix 5 for the assumptions used.

Table 23: Hengrove - Indicative Heat Network statistics for the IZO

IZO Heat Network description	Network length (km)	Network cost (£m)
Hengrove	3	3

3.4.7) Hengrove - IZO Key Constraints and Mitigations

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

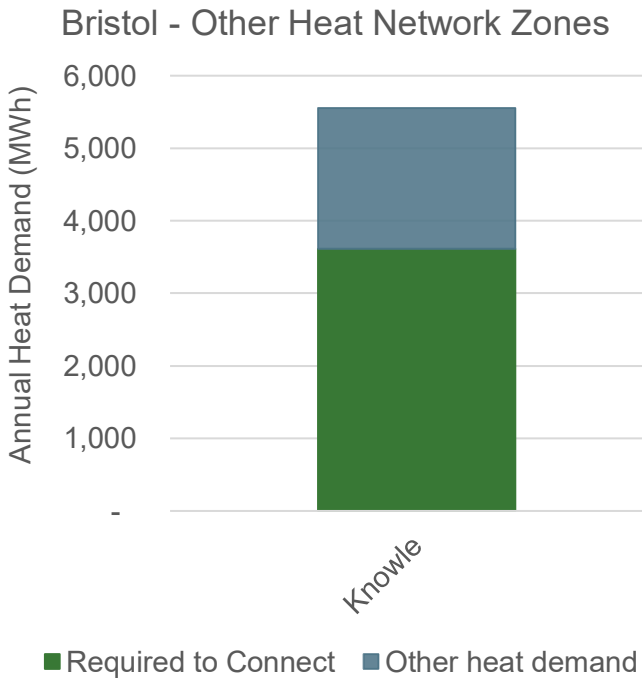
[25] The temperature at which heat will be distributed to heat offtakers, after upgrade processes

4) Other Heat Network Zones

This section describes the 'Other' potential heat network zones that were identified in Bristol. 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.

In Bristol, one Other potential heat network zone has been identified. Figure illustrates the total annual heat demand, and the proportion of which is associated with buildings that may be required to connect within the zone. A map of the zones identified can be found in Figure 4.

Figure 14: Total Heat Demand and Proportion Required to Connect in Other HNZs



Knowle: is a HNZ situated south from the City Centre. The zone consists of a new development and a public sector building. The new development comprises residential units, commercial spaces, and community spaces. Despite it being located relatively close to the City Centre HNZ, it is not close enough to be part of the zone and not large enough to be considered as a strategic zone.

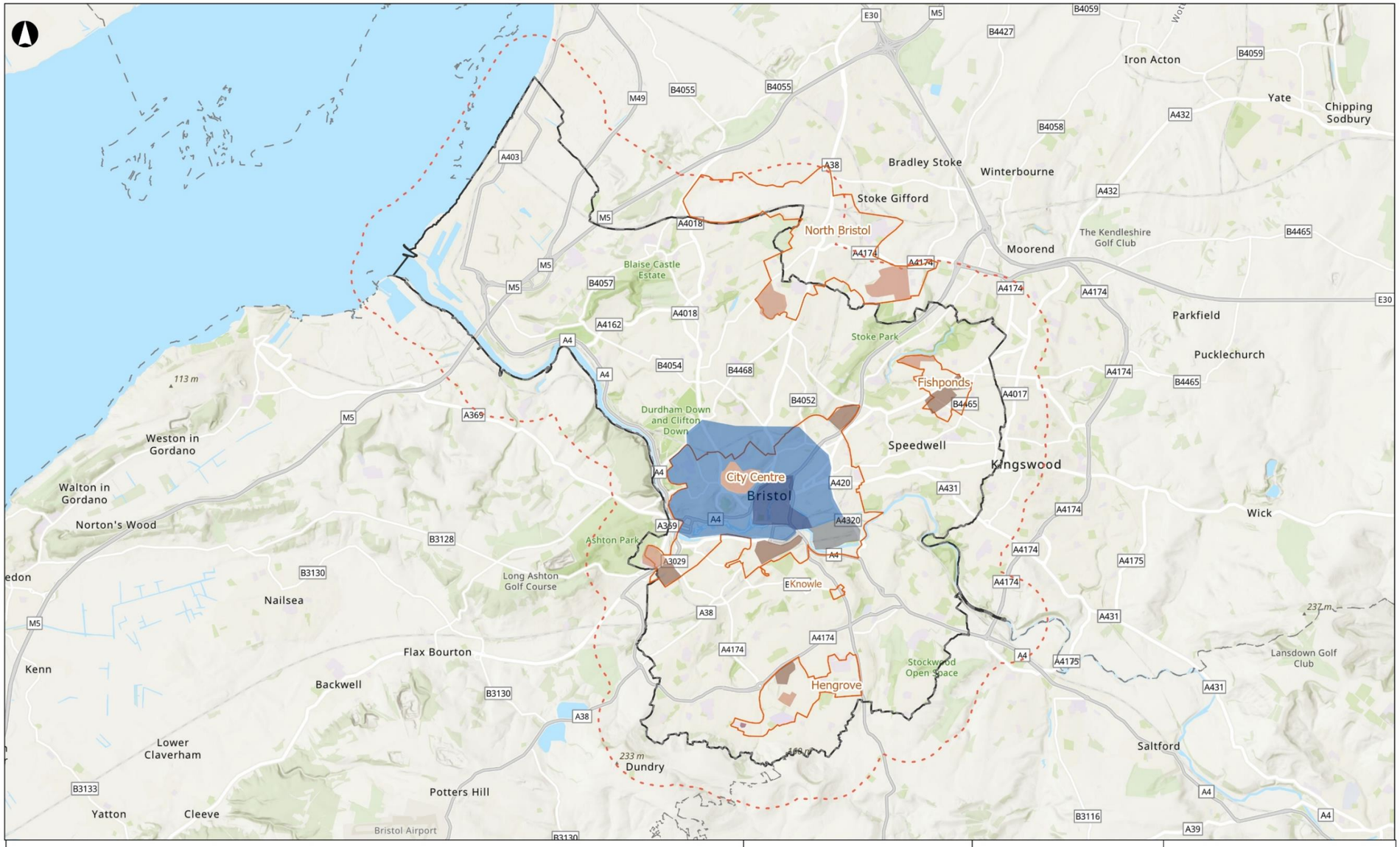
Appendix 1: Maps and Legends

This section provides guidance on interpreting the icons and legends used throughout this report and Maps A-G 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. Bristol Typology Map



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

KeyTypologies
- Dense city centre
- City centre fringe
- Mixed use district
- Social housing
- Campus (health/education)
- Commercial / business office district
- Industrial areas

0 1.25 2.5 5
Kilometers
Scale: 1:85,000
Coordinate System: British National Grid

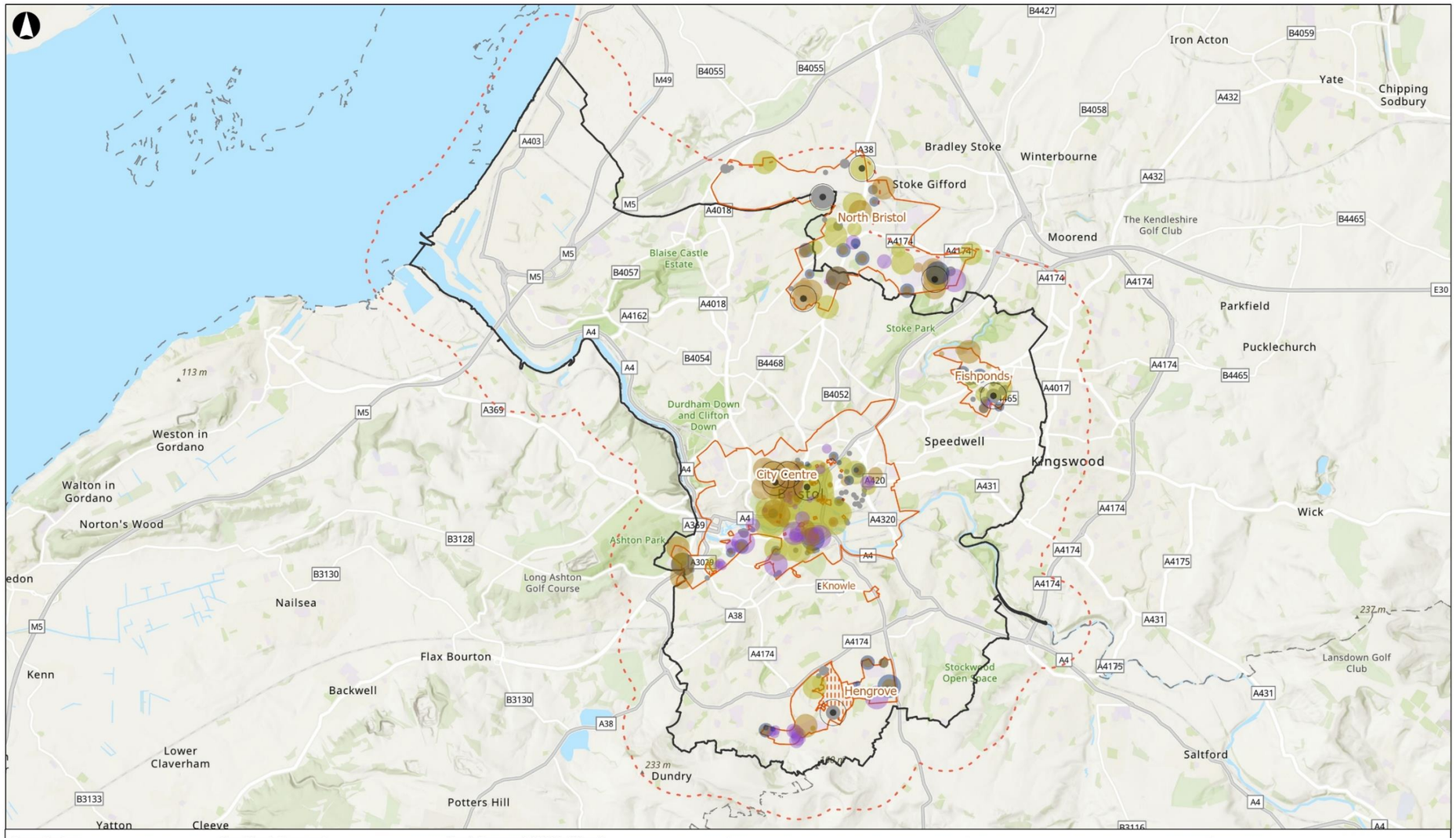
Department for Energy Security & Net Zero

Bristol

Map A

City Typologies

B. Key Heat Demands



Boundaries
- Study Boundary
- Local Authority Boundary
- Other Local Authority Boundary
- Heat Network Zones
- New Development

Key Heat Demand
- Local authority
- Other public sector
- Residential with communal heating
- Non-domestic private buildings
- Industrial
- Top 10 heat demands

Heat Demand (MWh/Year)
- 100 - 200
- 200 - 400
- 400 - 600
- 600 - 1,000

0 1.25 2.5 5
Kilometers

Scale: 1:85,000
Coordinate System: British National Grid

Department for Energy Security & Net Zero

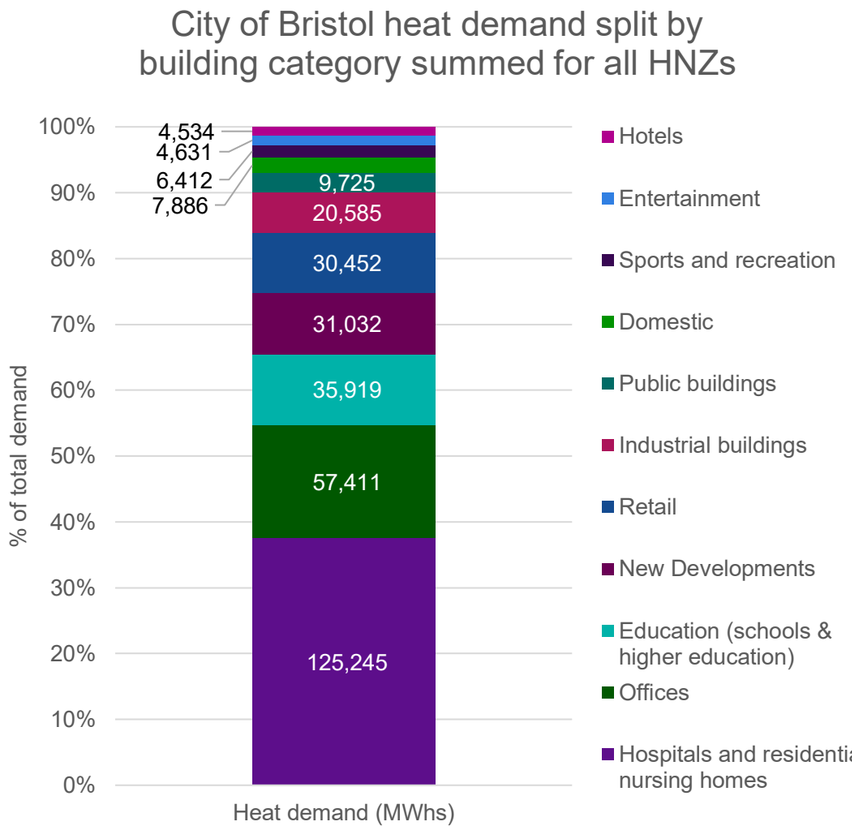
Bristol

Map B

Key Heat Demand

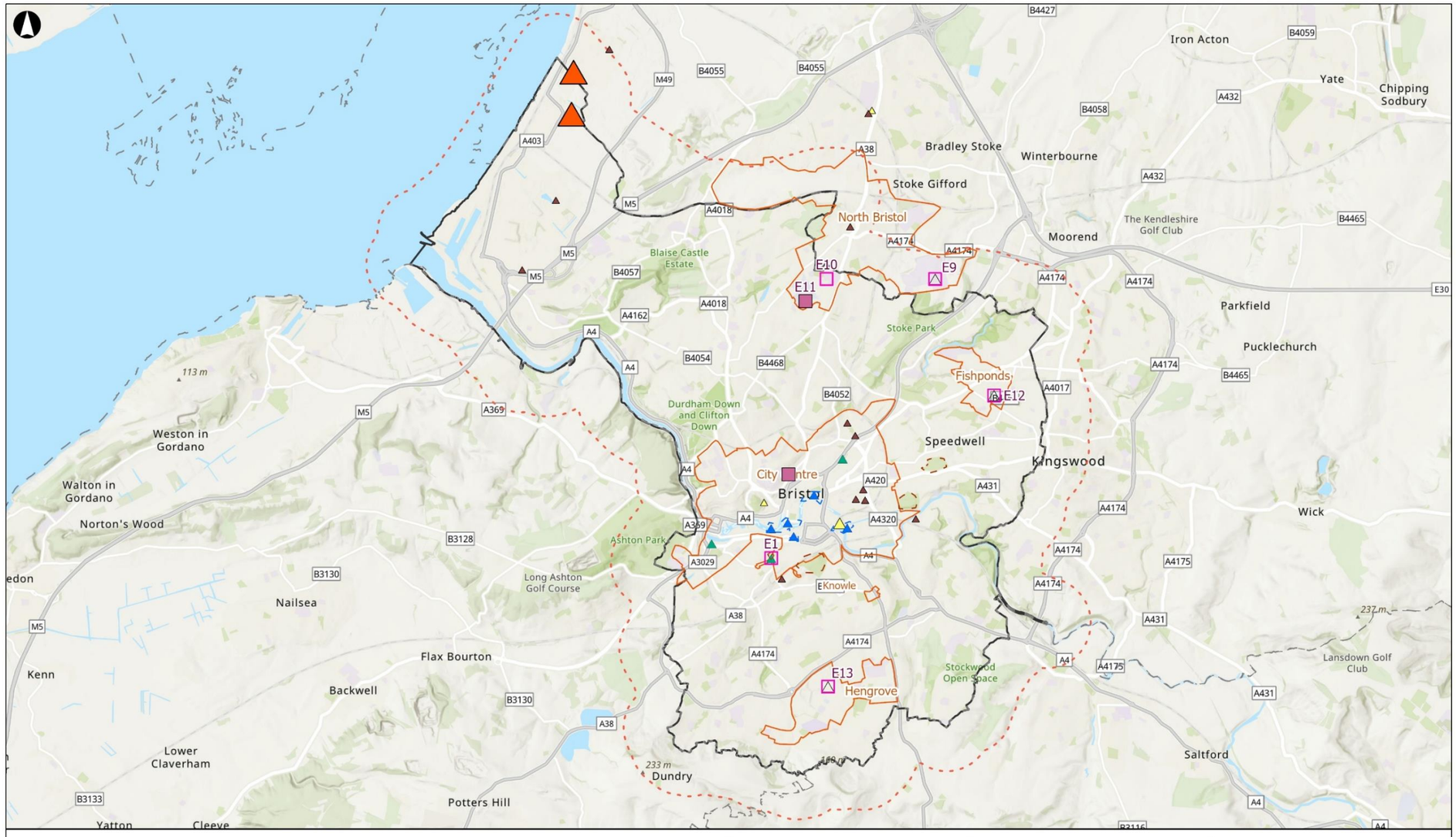
Table 24: Heat Demand split further by Building Categories across all Initial Zone Opportunities identified in Strategic HNZs in the Study Area

Building category	Number of buildings required to connect in this category	Annual Heat Demand of buildings required to connect across IZOs (MWh)
Hospitals and residential/nursing homes	38	125,245
Offices	178	57,411
Education (schools & higher education)	68	35,919
New developments	24	31,032
Retail	64	30,452
Industrial buildings	34	20,585
Public buildings	32	9,725
Domestic	36	7,886
Sports and recreation	14	6,412
Entertainment	9	4,631
Hotels	15	4,534
Totals	512	333,834

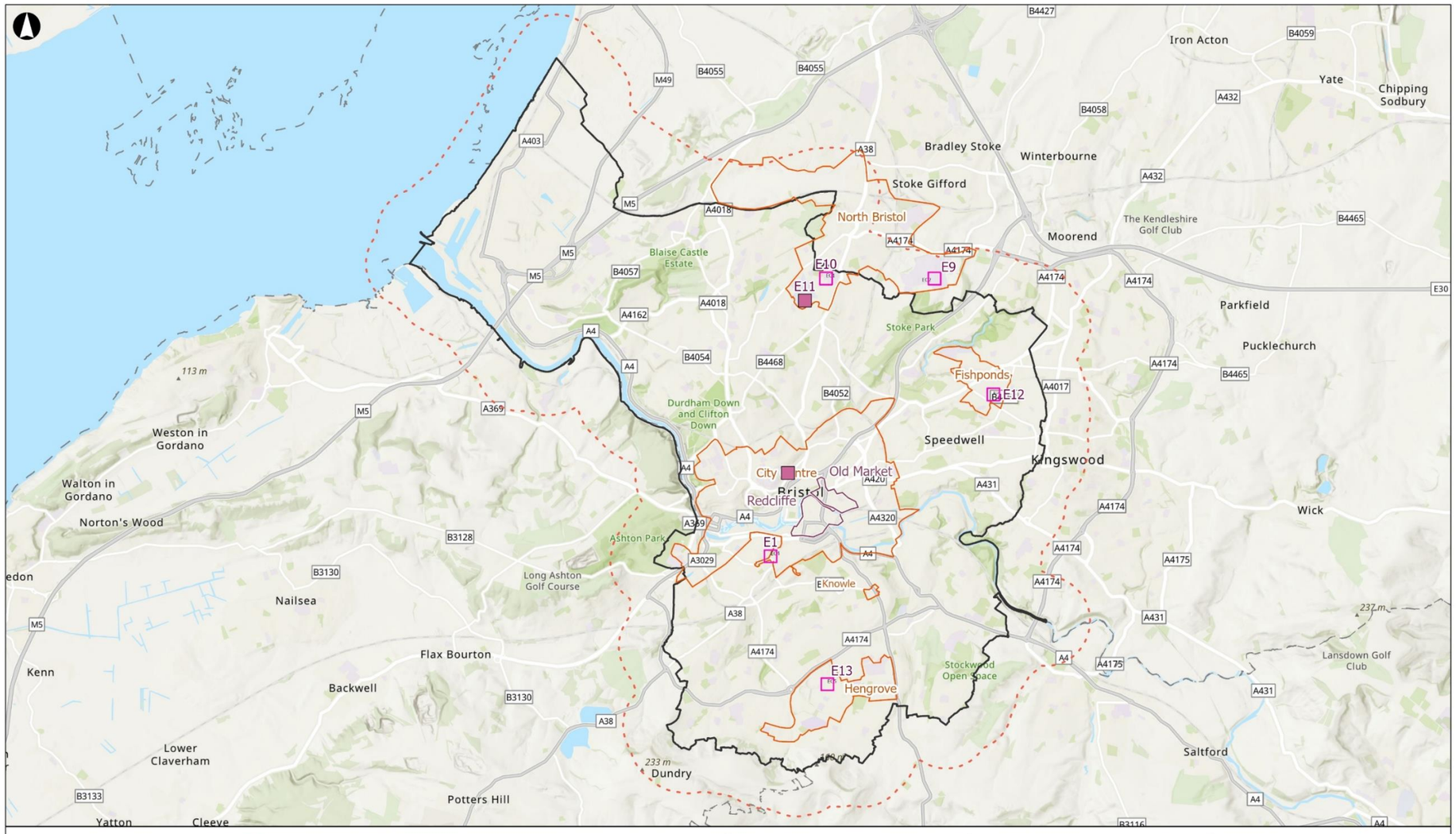


Note: In Bristol there are four HNZs with a total of six IZOs identified across them. The table and graph above summarise and categorise the heat demand for buildings required to connect to the IZOs.

C. Key Heat Sources and Potential Energy Centres



D. Existing and Planned Heat Networks



Boundaries

- Study Boundary
- Local Authority Boundary
- Other Local Authority Boundary

- Existing and Planned Heat Networks

Energy Centres

- Potential IZO

0 1.25 2.5 5
Kilometers

Scale: 1:85,000

Coordinate System: British National Grid

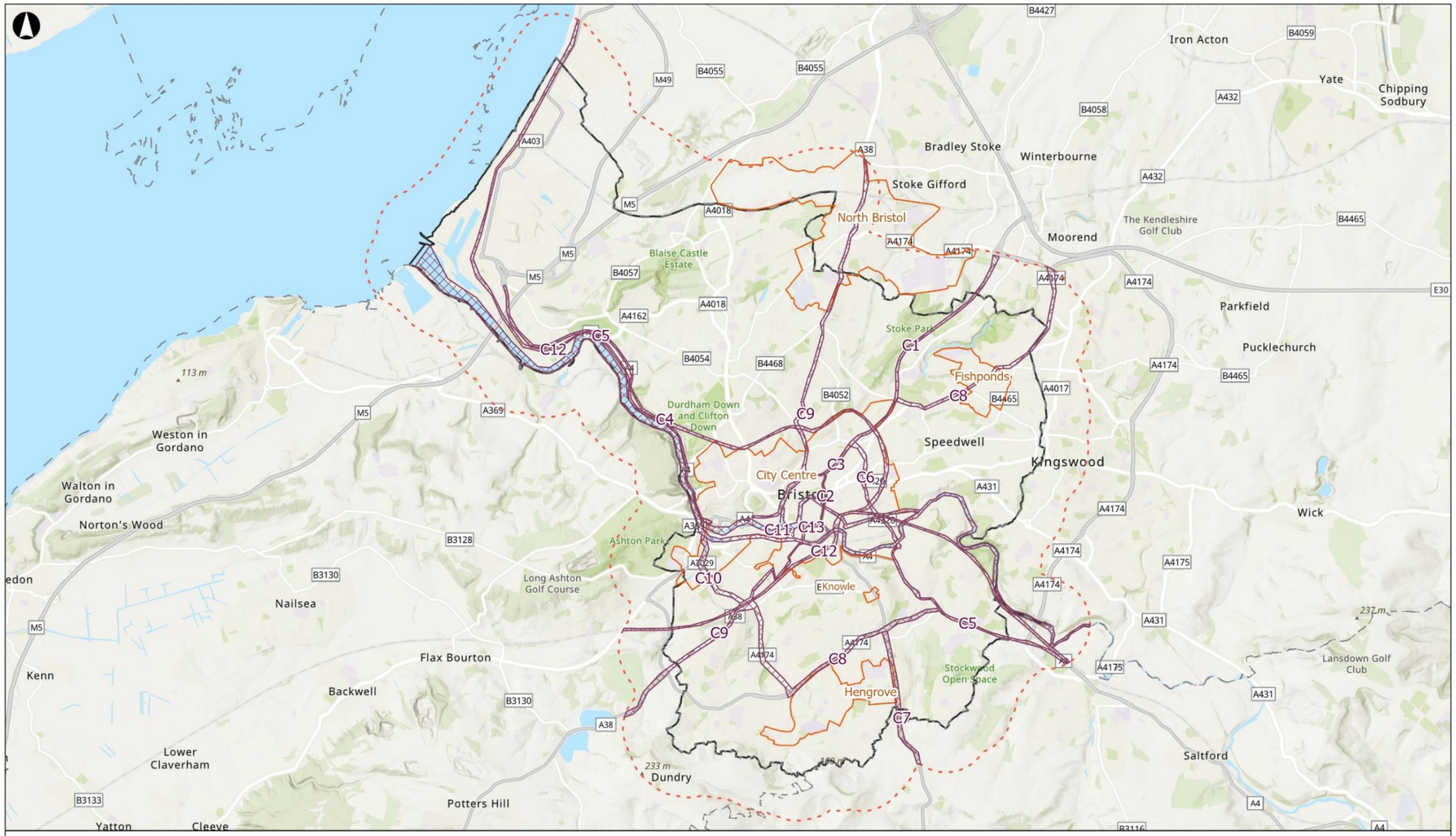
Department for Energy Security & Net Zero

Bristol

Map D

Existing Heat Networks

E. Physical Constraints



Boundaries

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

Key Constraints

0 1.25 2.5 5
Kilometers

Scale: 1:85,000

Coordinate System: British National Grid

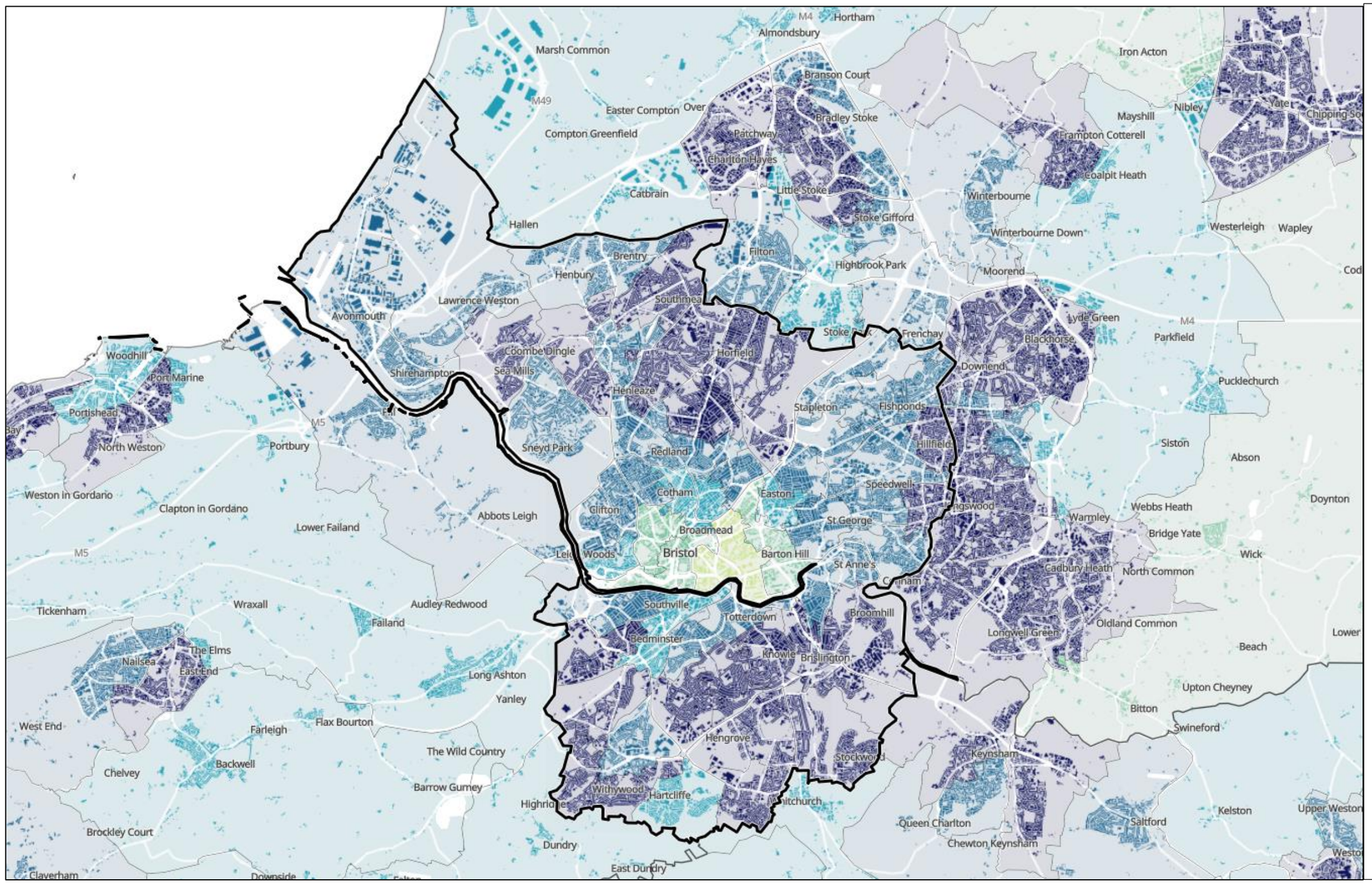
Department for Energy Security & Net Zero

Bristol

Map E

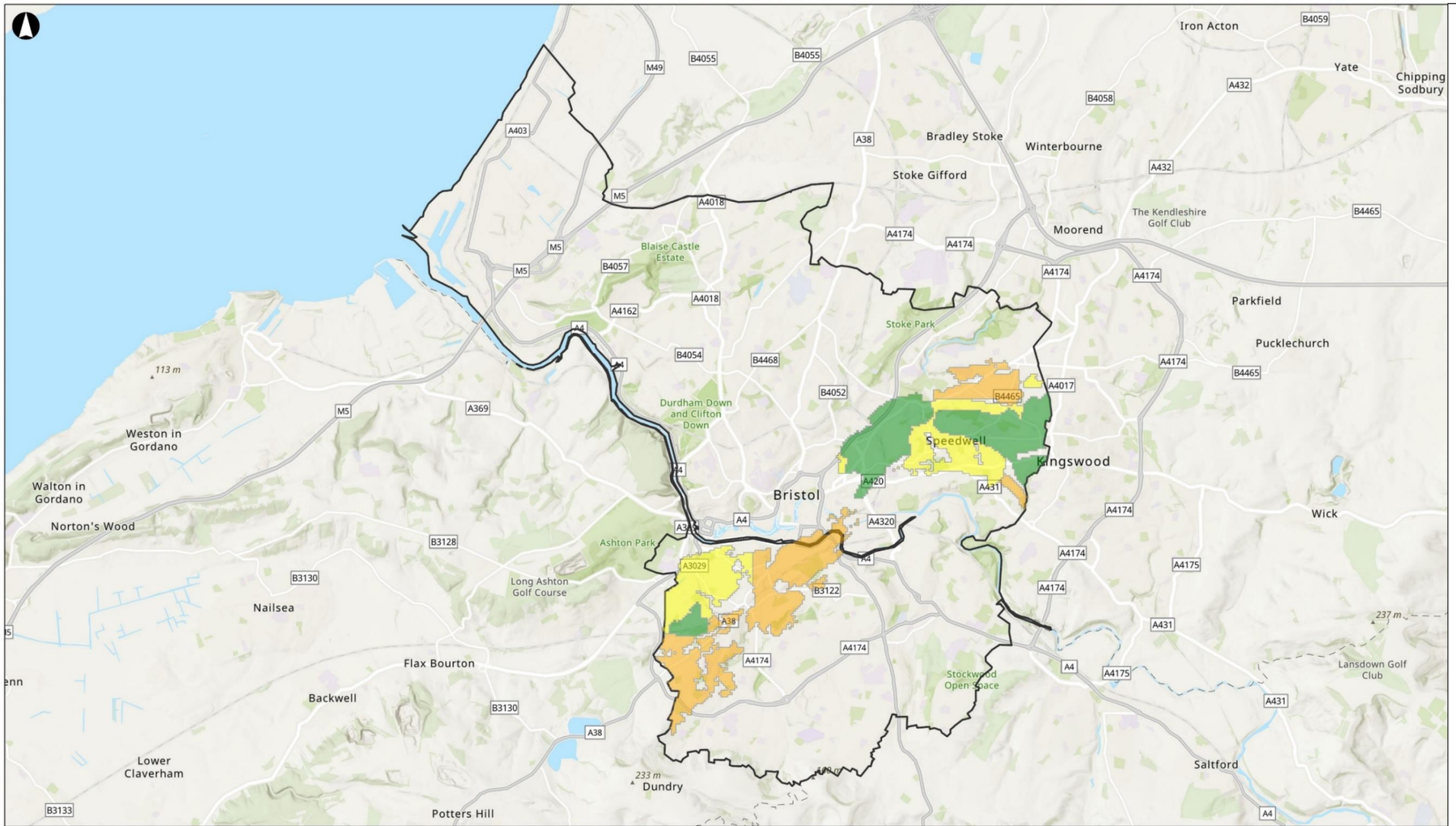
Physical Constraints

F. Off-Gas Grid Areas in Bristol



Credit: This is an excerpt from the ONS Census Maps 2021 which is available to explore online. The data shown is subject to Crown copyright protection, is published under the Open Government Licence (OGL) and embeds map data which is copyright of Ordnance Survey and Street maps.

G. Coal Mine Water Map



This mine-water heat opportunity map, developed by The Coal Authority, provides an indication of where water from former mine workings could potentially be extracted to provide a source of heat to supply heat networks. The areas of historic coal mine workings within the Local Authority boundary were assessed and a number of factors, such as depth to workings and water levels, were analysed to identify areas of potential opportunity and classified as either 'Good', 'Possible' or 'Challenging'. This opportunity map can be used in combination with plans for heat network projects to identify specific locations where more detailed feasibility studies could be undertaken

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 25: 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 26: Pilot Programme Study-Area-Specific Information Resources

Information resource	Description of resource
Existing Heat or Cooling Network RFI	Existing heat and/or cooling networks information.
Existing Heat Users Data Collection RFI	Existing heat demands information.
Planned New Developments RFI	Planned new developments in Bristol
BCC Network Installed Maps	Maps depicting existing heat networks in Bristol
Planning Application Database	Database with planning applications in Bristol

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.