



AECOM Infrastructure & Environment UK Limited  
2 Leman Street  
London  
E1 8FA  
UK

aecom.com

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Maidstone DEN Feasibility Study Uplift

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**From:**

Luke Mulvey

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**To:**

Kent County Council

**CC:**

# Memo (No.02): Rev 01

**Subject:** Maidstone District Heating Network - Potential Future Network Expansion

## Introduction

In order to assess the potential for the expansion of the proposed District Heating Network (DHN) beyond the initial 'core scheme' (encompassing KCC buildings and HMP Maidstone), a high level desktop based heat mapping exercise has been conducted in the local area. The study has looked at potential additional heat loads within a ~1km radius around the currently proposed network.

# Methodology

Buildings were identified using satellite imagery (i.e. Google Earth), and their suitability assessed via published EPCs and DEC's as these detailed the:

- Installed primary heating system(s);
- Internal floor areas; and
- Their estimated annual primary fuel (fossil fuel and electricity) consumption (if the certificates were produced after 2013).

For those buildings with an EPC or DEC produced prior to 2013, the annual thermal consumption was estimated using the online CIBSE energy benchmarking tool<sup>1</sup>.

In order to be considered for inclusion on the DHN, a building or new development is required to meet the following criteria:

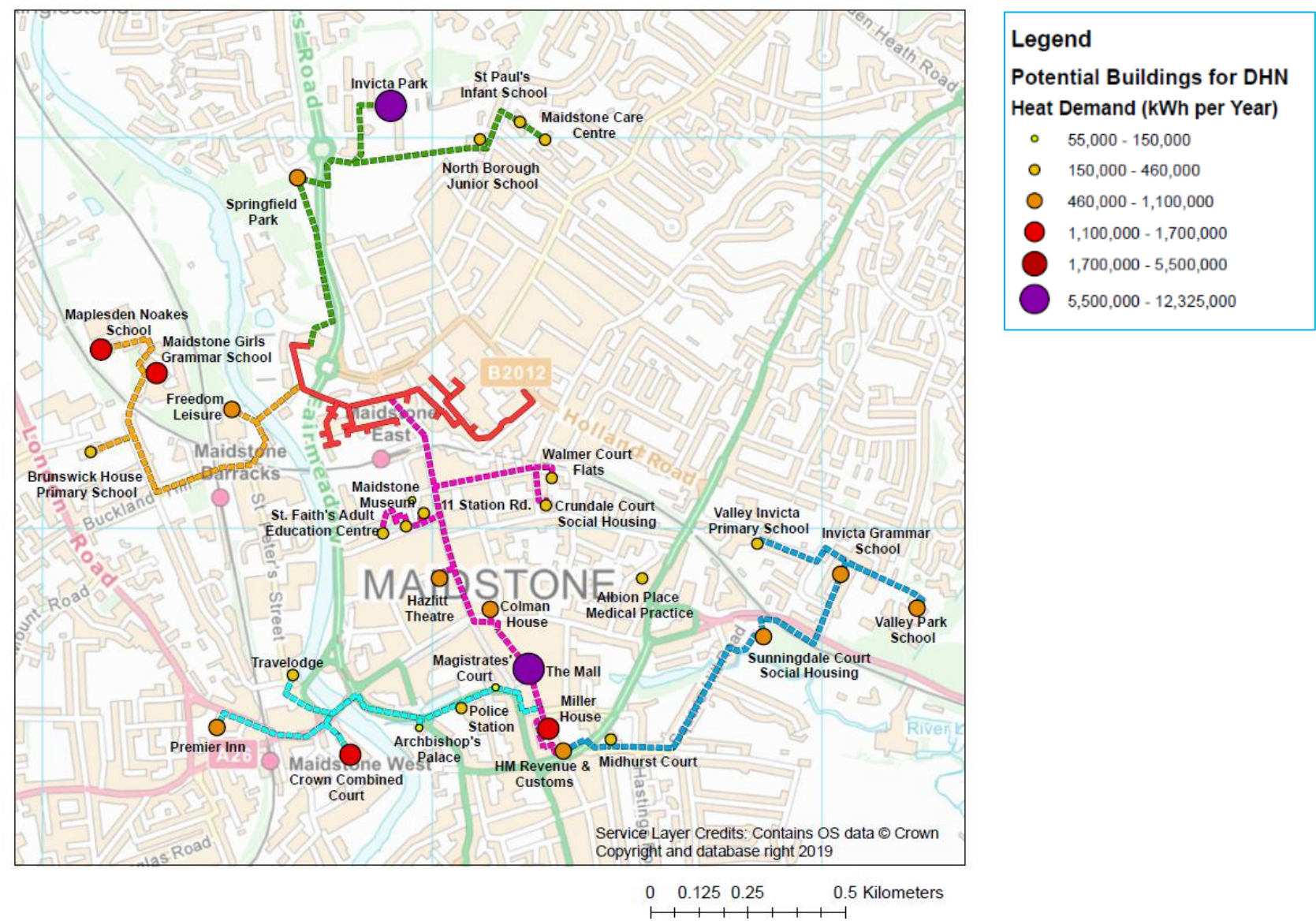
- Be a long-standing asset, with a remaining life of 30 years or more;
- Have an internal heating system which would only require minimal adaptation (i.e. a centralised water-based heating system);
- Have a significant enough annual heating load to generate enough revenue to warrant inclusion (>100,000 kWh/yr); and
- Have an un-constrained / viable network pipework route allowing for connection of the building to the proposed DHN.

A full list of the assessed buildings which were identified can be found in Appendix A.

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<sup>1</sup> <https://www.cibse.org/knowledge/energy-benchmarking-tool-beta-version>; accessed August 2019.

Figure 1: Potential Extension Routes to the Proposed Heat Network in Maidstone

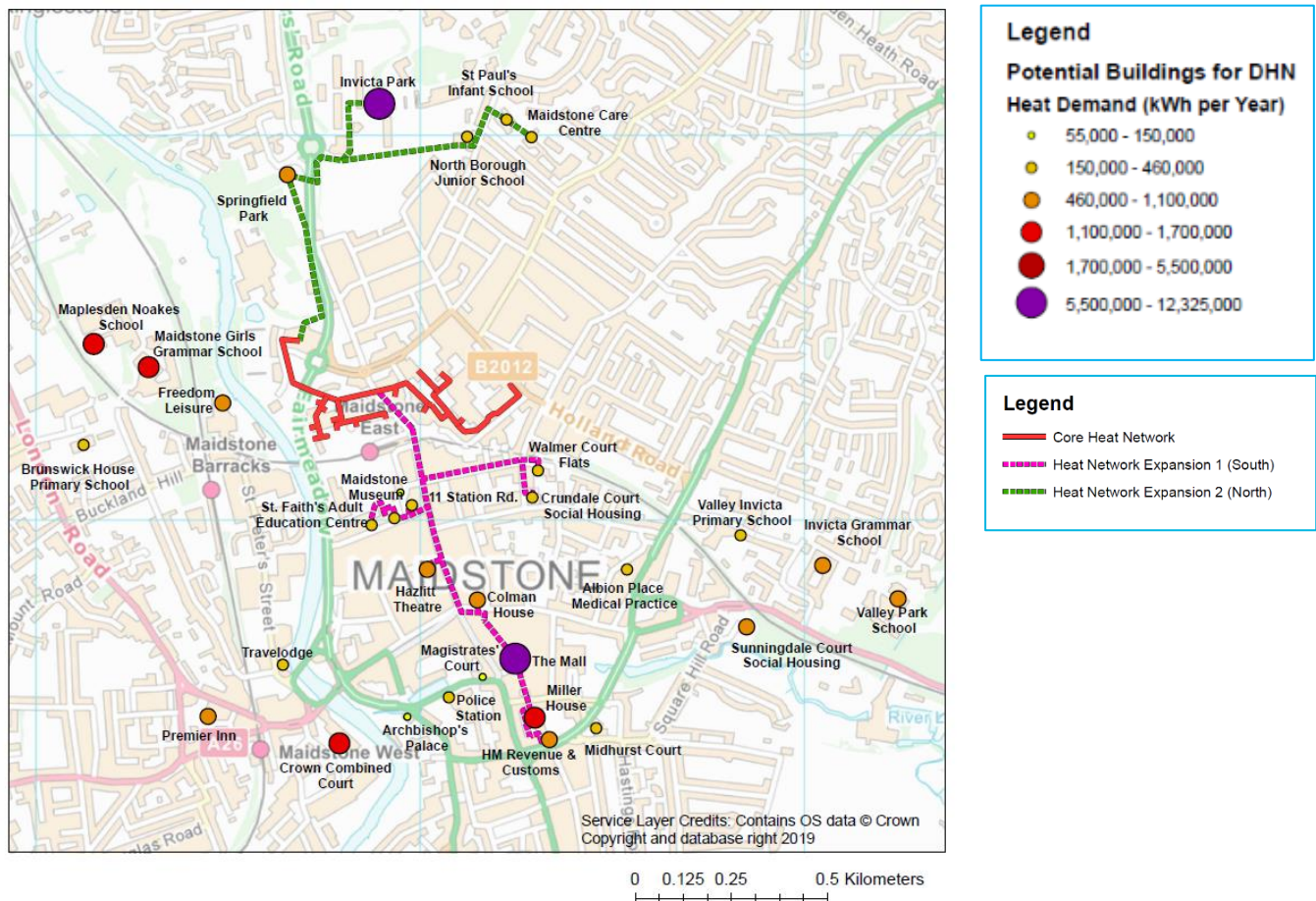


5 main routes for heat network expansions have been identified, as shown in Figure 1. Following an initial qualitative assessment into network routing viability, certain network expansion routes have been left to potentially be revisited at a later date:

Route	Heat Density (MWh/yr/m)	Difficulties
Route 3 (West)	3.05	This route requires a river crossing and rail crossing, increasing the cost and complexity of the route and the Powerhub Centre is unoccupied, decreasing the heat load of the network expansion.
Route 4 (South West)	2.96	This route requires a river crossing and has a moderately low heat density.
Route 5 (South-East)	1.90	This route requires crossing the A249 which increases the cost and complexity of this route.

**Table 1: Routes to potentially be revisited at a later date**

The qualitative assessment deemed Route 1 (South) and Route 2 (North), shown below in in Figure 2 as potentially representing the best opportunities to expand the DHN.



**Figure 2: Recommended heat network expansion routes**



Route 1 Connects to the already proposed heat network at Invicta House and travels South down Week Street, branching off to connect to a number of buildings around Brenchley Park and also to two high-rise social housing buildings on Wheeler Street. The route heads towards The Mall (Chequers) and finally connects to a number of office buildings South of The Mall. The heat density of this network extension is quite high, at 11.33 Mwh/yr/m.

The developments included in this network expansion, as well as their estimated heat loads and lengths of pipework required to serve them, are shown below in Table 2.

Building	Load (KWh/yr)	Distance added to network (m)
Walmer Court Flats	277,000	340
Crundale Court Union Social Housing	302,000	110
Colman House	1,073,000	18
The Mall	12,326,000	560
HM Revenue & Customs	850,000	65
Miller House	1,347,000	120
11 Station Road	157,000	100
Maidstone Museum	346,000	100
St. Faith's Adult Education Centre	249,000	75
Hazlitt Theatre	617,000	60
<b>Total</b>	<b>17,543,000</b>	<b>1,548</b>
<b>Mwh/yr/m</b>	<b>11.33</b>	

**Table 2: Route 1 (South) Network Expansion - Heat Demand and Route Length**

Route 2 connects to the DHN at Maidstone library and goes North to connect to the future development Springfield Park and then crosses the A229 to Invicta Park to service the future development of 1,300 new homes. There is a cycle/ foot bridge over the A229 which could potentially provide a less complex/ costly crossing route for the DHN pipework.

The developments included in this network expansion, as well as their estimated heat loads and lengths of pipework required to serve them, are shown below in Table 3.

Building	Load (KWh/yr)	Distance added to network (m)
Springfield Park	1,020,000	367
Invicta Park	5,562,000	557
Maidstone Care Centre	368,000	55
North Borough Junior School	226,000	345
St Paul's Infant School	225,000	100
<b>Total</b>	<b>7,401,000</b>	<b>1,424</b>
<b>Mwh/yr/m</b>	<b>5.20</b>	

**Table 3: Route 2 (North) Network Expansion - Heat Demand and Route Length**

This route has the additional benefit of having a large amount of un-paved landscape (termed 'soft dig' routes), which could result in lowering the capital costs of the network in comparison to paved areas (termed 'hard dig' routes).

## Conclusions & Next Steps

This initial investigation has identified an area of significant heat demand from a number of buildings that are estimated as being suitable for connection to a DHN in the vicinity of the currently proposed network area. The heat demand of the extension is around 11.3 MWh of heat demand per m of pipework, which indicates good potential (from an economic perspective) for inclusion in a DHN<sup>2</sup>.

The investigation has also identified an area of future heat demand North of the proposed heat network that includes 2 large future residential developments that are suitable to connect to the network, as well as 2 existing schools and a care centre. The heat demand of this extension is around 5.2 Mwh of heat demand per m of pipework which also indicates good potential for inclusion in a DHN.

In order to determine the feasibility of adding these buildings to the heat network, surveys should be undertaken of both the primary generation plant and distribution system. Further discussions should also be undertaken with the relevant stakeholder regarding their interest to connect, plans for any plant upgrade works and further metered and financial data to develop a techno economic assessment of the for each building individually. To inform the development of the network route, in the first instance C2 utilities data should be requested and reviewed.

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<sup>2</sup> A 'rule of thumb' lower limit for economic viability is ~4,000 kWh/year demand per m of DHN pipework.

## Appendix A – Potential & Discounted Buildings

Building Name	Post Code	Building Type	Heating Technology	Heat Demand (kWh/yr)	Can Connect to a DHN?	Route	Included in recommended network expansion? If not, why not?	Year of Completion
Walmer Court Flats	ME14 1TY	High rise flats	Gas	277,200	Likely	1 (South)	Yes	Already Existing
Crundale Court Union Social Housing	ME14 1TX	High rise flats - Social Housing	Gas	302,400	Likely	1 (South)	Yes	Already Existing
Colman House	ME14 1DN	Office Building	Gas	1,072,720	Likely	1 (South)	Yes	Already Existing
The Mall	ME15 6AT	Shopping Centre	Gas	12,325,600	Likely	1 (South)	Yes	Already Existing
HM Revenue & Customs	ME15 6AE	Office Building	Gas	849,513	Likely	1 (South)	Yes	Already Existing
Miller House	ME15 6GB	Office Building	Gas	1,346,926	Likely	1 (South)	Yes	Already Existing
11 Station Road	ME14 1QJ	Office/ Flats	Gas	157,000	Likely	1 (South)	Yes	Already Existing
Maidstone Museum	ME14 1LH	Museum	Gas	346,000	Likely	1 (South)	Yes	Already Existing
St. Faith's Adult Education Centre	ME14 1LH	College	Gas	249,000	Likely	1 (South)	Yes	Already Existing
Hazlitt Theatre	ME14 1PL	Theatre	Gas	617,000	Likely	1 (South)	Yes	Already Existing

Building Name	Post Code	Building Type	Heating Technology	Heat Demand (kWh/yr)	Can Connect to a DHN?	Route	Included in recommended network expansion? If not, why not?	Year of Completion
Springfield Park	ME14 2LP	Residential	Gas	1,020,000 (Estimated)	Likely	2 (North)	Yes	2019 (TBC)
Invicta Park	ME14 2PL	Residential	Gas	5,562,000 (Estimated)	Likely	2 (North)	Yes	Site open for development after 2027
Maidstone Care Centre	ME14 2AR	Care Centre	Gas	367,910	Likely	2 (North)	Yes	Already Existing
North Borough Junior School	ME14 2BP	School	Gas	226,439	Likely	2 (North)	Yes	Already Existing
St Paul's Infant School	ME14 2BS	School	Oil	225,202	Likely	2 (North)	Yes	Already Existing
Maidstone Police Station	ME15 6NF	Police Station	Gas	455,952	Likely	4 (South-West)	Route to be revisited at later date (See page 4)	Already Existing
Magistrates Court	ME15 6NF	Court Building	Gas	146,846	Likely	4 (South-West)	Route to be revisited at later date (See page 4)	Already Existing
Archbishops Palace	ME15 6YE	Mixed Use	Gas	116,900	Likely	4 (South-West)	Route to be revisited at later date (See page 4)	Already Existing
Crown Combined Court Centre	ME16 8EQ	Court	Gas	1,680,135	Likely	4 (South-West)	Route to be revisited at later date (See page 4)	Already Existing
Premier Inn	ME16 8HR	Hotel	Gas	890,400	Likely	4 (South-West)	Route to be revisited at later date (See page 4)	Already Existing



Building Name	Post Code	Building Type	Heating Technology	Heat Demand (kWh/yr)	Can Connect to a DHN?	Route	Included in recommended network expansion? If not, why not?	Year of Completion
<b>Travelodge</b>	ME16 0SR	Hotel	Gas	270,480	Likely	4 (South-West)	Route to be revisited at later date (See page 4)	Already Existing
<b>Sunningdale Court</b>	ME15 7TU	High rise flats - Social Housing	Gas	576,004	Likely	5 (South-East)	Route to be revisited at later date (See page 4)	Already Existing
<b>Valley Invicta Primary</b>	ME14 5DX	School	Oil & Gas	276,554	Likely	5 (South-East)	Route to be revisited at later date (See page 4)	Already Existing
<b>Invicta Grammar School</b>	ME14 5DS	School	Gas	983,801	Likely	5 (South-East)	Route to be revisited at later date (See page 4)	Already Existing
<b>Valley Park School</b>	ME14 5DT	School	Biomass, Gas & Electric	732,826	Likely	5 (South-East)	Route to be revisited at later date (See page 4)	Already Existing
<b>Midhurst Court</b>	ME15 6EH	High rise flats	Gas	319,038	Likely	5 (South-East)	Route to be revisited at later date (See page 4)	Already Existing
<b>Freedom Leisure</b>	ME16 0SX	Fitness & Health Centre	Gas	922,724	Likely	3 (West)	Route to be revisited at later date (See page 4)	Already Existing
<b>Brunswick House Primary</b>	ME16 0QQ	School	Gas	214,638	Likely	3 (West)	Route to be revisited at later date (See page 4)	Already Existing
<b>Maidstone Girl's Grammar School</b>	ME16 0SF	School	Oil, Gas & Electric	1,209,400	Likely	3 (West)	Route to be revisited at later date (See page 4)	Already Existing

Building Name	Post Code	Building Type	Heating Technology	Heat Demand (kWh/yr)	Can Connect to a DHN?	Route	Included in recommended network expansion? If not, why not?	Year of Completion
<b>The Maplesden Noakes School</b>	ME16 0TJ	School	Gas	1,136,394	Likely	3 (West)	Route to be revisited at later date (See page 4)	Already Existing
<b>Powerhub Business Centre</b>	ME16 0ST	Mixed Use	Gas	1,527,490	Likely	N/A	Unoccupied	Already Existing
<b>Albion Place Medical Practice</b>	ME14 5DY	Medical Practice	Gas	350,316	Likely	N/A	Too far away from other routes	Already Existing
<b>Fremlin Walk Shopping Centre</b>	ME14 1PS	Retail	Gas	5,446,576	Unlikely	N/A	Shops have individual boilers Unsuitable to connect to DHN	Already Existing
<b>Brenchley House</b>	ME14 1RF	Residential	Electric (Assumed)	1,582,598	Unlikely	N/A	Incompatible Heating System	Already Existing
<b>Mckenzie Court</b>	ME14 1JU	Flats	Electric	308,000	Unlikely	N/A	Incompatible Heating System	Already Existing
<b>Gallagher Stadium</b>	ME14 1LQ	Sports Grounds	Unknown	75,858	Unlikely	N/A	Small estimated heat demand	Already Existing
<b>Welcome Gym</b>	ME16 0DT	Gym	Unknown	Unknown	Unknown	N/A	Insufficient information available	Already Existing
<b>All Saints Church</b>	ME15 6YE	Church	Unknown	Unknown	Unknown	N/A	Insufficient information available	Already Existing

Building Name	Post Code	Building Type	Heating Technology	Heat Demand (kWh/yr)	Can Connect to a DHN?	Route	Included in recommended network expansion? If not, why not?	Year of Completion
<b>Concorde House (Riverhill)</b>	ME16 8QA	Flats	Electric	N/A	Unlikely	N/A	Incompatible Heating System	Already Existing
<b>Lockmeadow Centre</b>	ME16 8SF	Entertainment Centre	Electric	N/A	Unlikely	N/A	Incompatible Heating System	Already Existing
<b>Pevensey Court</b>	ME16 0GQ	Flats	Electric	N/A	Unlikely	N/A	Incompatible Heating System	Already Existing
<b>Scotney Gardens</b>	ME16 0GR	Flats	Electric	N/A	Unlikely	N/A	Incompatible Heating System	Already Existing
<b>Elizabeth House</b>	ME14 2BX	Flats	Electric	N/A	Unlikely	N/A	Incompatible Heating System	Already Existing
<b>Mandeville Court</b>	ME14 1JY	Flats	Electric	N/A	Unlikely	N/A	Incompatible Heating System	Already Existing
<b>Job Centre</b>	ME14 1FW	Office	Unknown	Unknown	Unknown	N/A	Insufficient information available	Already Existing
<b>Kent House Romney Place</b>	ME15 6LH	Office	Unknown	Unknown	Unknown	N/A	Insufficient information available Building Unoccupied	Already Existing
<b>Sainsbury's</b>	ME15 6SF	Supermarket	Unknown	Unknown	Unknown	N/A	Incompatible Heating System	Already Existing
<b>Asda Living Maidstone</b>	ME16 0SR	Supermarket	Unknown	Unknown	Unknown	N/A	Incompatible Heating System	Already Existing

Building Name	Post Code	Building Type	Heating Technology	Heat Demand (kWh/yr)	Can Connect to a DHN?	Route	Included in recommended network expansion? If not, why not?	Year of Completion
<b>B&amp;Q</b>	ME16 8DW	Shopping	Unknown	Unknown	Unknown	N/A	Incompatible Heating System	Already Existing
<b>Shipley Court</b>	ME14 1HF	Flats	Electric	N/A	Unlikely	N/A	Incompatible Heating System	Already Existing
<b>Friar's Court</b>	ME14 1ER	Flats	Electric	N/A	Unlikely	N/A	Incompatible Heating System	Already Existing
<b>London Road Retail Park</b>	ME16 0DT	Retail	Unknown	Unknown	Unknown	N/A	Insufficient information available	Already Existing