PROSPERITY HAVANT

Havant borough heat demand mapping and energy masterplanning

Havant BOROUGH COUNCIL

1. Introduction

The purpose of this report is to take an in-depth look at the opportunities for district heating in Havant.

The report will create a geospatial dataset of every building in the borough and assign specific heating demand benchmark figures to each one. Qualitative analysis will then be used to establish potential heat network options before an initial feasibility analysis is done of the potential heat loads.

The aim of this report is to highlight where full feasibility studies should be done to establish more fully whether heat networks would be feasible or viable.

Havant borough

The borough of Havant is located on the south coast of England, immediately to the east of the city of Portsmouth. Figure 1 shows the borough's boundary and the extent of the urban areas. The town of Havant is at the heart of the borough with its historic streets, fresh water springs, civic and cultural functions and new shopping facilities. Waterlooville lies on the western edge of the borough and is a thriving area of modern housing, shops and employment. To the north, Leigh Park was developed for Portsmouth's expanding population after World War II. Hayling Island is located to the south of the borough with Langstone Harbour on the western side and Chichester Harbour on the east.

The local economy has traditionally been based around manufacturing and there is a high concentration of advanced manufacturing and marine businesses in the borough.

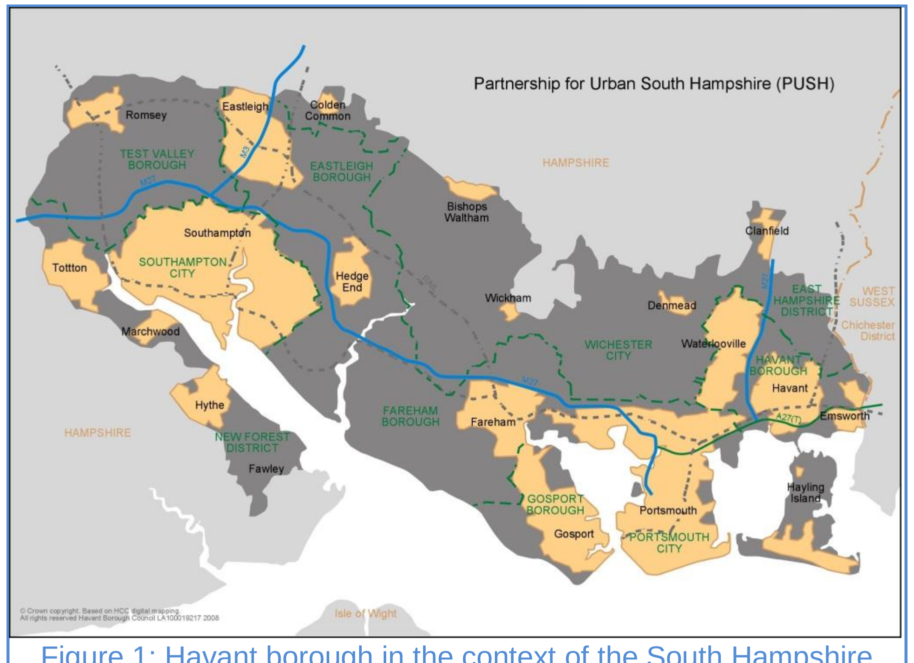

Figure 1: Havant borough in the context of the South Hampshire sub-region

Prosperity Havant

This is a borough council led initiative to increase investment and development in the borough to improve its overall prosperity. As part of Prosperity Havant, we are looking at institutional blocks to investment and measures which can be taken to improve the attractiveness of the area for investors. One such area is energy security. Before making long term financial investments in an area, firms are increasing looking to ensure that sufficient levels of cost-effective energy will be in place over the long term. As such, the provision of secure heat networks in the borough will help to provide that security and further increase the attractiveness of Havant as a place to invest.

The council is also in the process of agreeing its first energy strategy. This strategy demonstrates our aspiration to be 'Energy Smart for the future which will result in resilient and prosperous communities' and sets out our direction of travel to increase low carbon energy generation in the borough.

Previous work which has been undertaken

ICE (UK) Ltd put together an initial feasibility study for a CHP system to serve the area around the then proposed Public Service Plaza, Havant Leisure Centre and surrounding public sector buildings.

This found that there was a case for a feasible good quality gas fired CHP scheme to serve the area based on a CHP size of 185kWe. However the only delivery model assumed was ESCO finance led.

A great deal of time which has passed since this study was done. Since 2010 there have been developments at the Plaza site and improvements to the leisure centre. Furthermore, there have been changes in the gas and electricity markets together with the Renewable Heat Incentive and other public sector finance options such as Salix. As such, it is appropriate to review both the feasibility of a CHP system in this area as well as the business model of the scheme.

Existing CHP schemes

Analysis of the Department for Energy and Climate Change's (DECC's) national heat map confirms one existing 2MWe Combined Heat and Power (CHP) Plant in the borough at Budd's Farm. This is a Southern Water owned and operated wastewater treatment works.

2. Demand mapping methodology

DECC National Heat Map

The DECC National Heat Map is an interactive tool developed using data from modelled estimates of annual heat demand from every building nationwide and is designed to give an early indication to heat network developers of where potential heat networks might be viable.

The National Heat Map was initially consulted to gain an appreciation of likely heat demand in the borough and establish the areas where further assessment and potentially feasibility work is warranted. This showed that on the mainland, there are heat demand spots around Waterlooville in the west, Havant Town Centre and to a limited extent New Lane Industrial Estate. In the less urbanised areas of Emsworth and Hayling Island there is very limited heat demand.

As a result, further heat demand analysis has been undertaken to more fully understand the demand which exists in the borough.

Detailed, local heat mapping

This section explains how the geospatial heat, electricity and cooling demands for each building within Havant were calculated and mapped. This methodology is adapted with their consent from that used for Portsmouth City Council.

Energy demand values were calculated per building based on building usage, number of floors and floor space, The three datasets that enabled these calculations are:

- The Local Land and Property Gazetteer (LLPG) - a point GIS file containing a separate record for each property within the local authority's boundary. This information provided point data and an address for each property as well as its use
- Ordnance Survey Building Footprints - extracted from the latest 'Master map Topography Layer' downloaded from the Ordnance Survey (OS). This dataset contains a polygon for each building footprint, each containing a unique Topographic ID called a TOID and contained floor area values (m^2) and height values (m) for the building;
- Chartered Institute of Building Services Engineers (CIBSE) energy benchmark figures – this dataset comprised the raw annual energy consumption figures for heating, cooling and electricity (in kWh/m^2/annum format) for the 54 different building types compiled from the BLPU set for this project. These benchmark factors are also indicated in Appendix A.

Through analysis for the LLPG data, initial energy benchmark figures were first assigned to each building use. The LLPG points contained the property information needed to assign the energy values, whilst the OS Building Footprints contained the total building height and floor space. There can be multiple properties of the same class within a single building footprint such as blocks of flats, and also multiple properties with different classes within a footprint such as a flat above a shop. This meant that point property data had to first be calculated using the energy benchmarks and time regression factors before aggregated into building footprints to calculate numbers of floors and floor space.

The building footprints were then analysed by the height. The height field in meters was divided by 2.8 as an average floor height to create a new field containing the number of floors each building has. The numbers of floors for records that contained a height value of 0 or contained no data were determined by the number of LLPG points within that building, based on an assumption of a property per floor.

Building footprints were then spatially joined to the LLPG points so that each point now contained the TOID of the polygon in which it was contained, creating a link between the two datasets. The number of points per building footprint was calculated and added as an attribute to the footprint data. The BLPU class data contained within the LLPG points were grouped so that the number of unique classes within a building footprint was calculated and added as an attribute. This meant that the unique energy benchmark figures were also grouped and counted. The most common BLPU class found within a building footprint was added as an attribute to the polygons along with the most common ownership. Should there be multiple unique values contained, the first value found alphabetically was assigned. These two new fields will be used later in the analysis within the project.

The energy benchmark figures contained within the points needed to be aggregated into one value in the building footprint polygons. This value also needed to take into consideration floor space and number of floors. The number of floors within a building was multiplied by the floor space area to give the total building floor space. This total building floor space was then divided by the number of unique BLPU class features with the building. This created a temporary field detailing the floor space per each unique BLPU class property. The total energy demand figure was then calculated by multiplying the floor space per unique BLPU class by the energy benchmark figures previously calculated.

The final energy demand dataset was a polygon dataset containing the following fields; TOID, electricity demand, heat demand, cooling demand, most common BLPU class, most common ownership, number of LLPG points contained, floor space, height. A separate table was exported containing all LLPG records with a TOID field added. This meant that within the mapping system (ArcGIS), the polygons could be related directly back to the individual table records for any queries. As a final step in the workbench the building polygons were transformed into building centre points, should cartographic output require so.

Thematic map sets were created for each initial heating, cooling and electricity demand. These displayed the data using graduated colours to represent areas of low and high demand.
This methodology is suitable when dealing with such a large amount of properties (nearly 100,000) and is a commonly used technique for extracting a required metric (in this case heat demand) from such a dataset.

This methodology does have some limitations by generating estimated energy demand data based on LLPG reference information and other sets of assumptions, however this analysis uses 54 categories of building type all with specific heating, cooling and electricity demand data, compared to other studies which can have as few as three. The base data for the DECC heat map was generated using the same technique; however this study provides information at a detailed local level.

3. Key area evaluation

The heat mapping was undertaken on a borough wide basis, the results of which for heat, electricity and cooling can be seen in figures 2 and 3.

On the mainland, there are four areas which are worthy of further exploration and analysis due to a cluster of higher heat loads. However on Hayling Island, whilst there are a number of buildings with a medium to high heat demand (most notably the Langstone Hotel on the northern coast), there are no concentrations of heat demand where a network could be established.

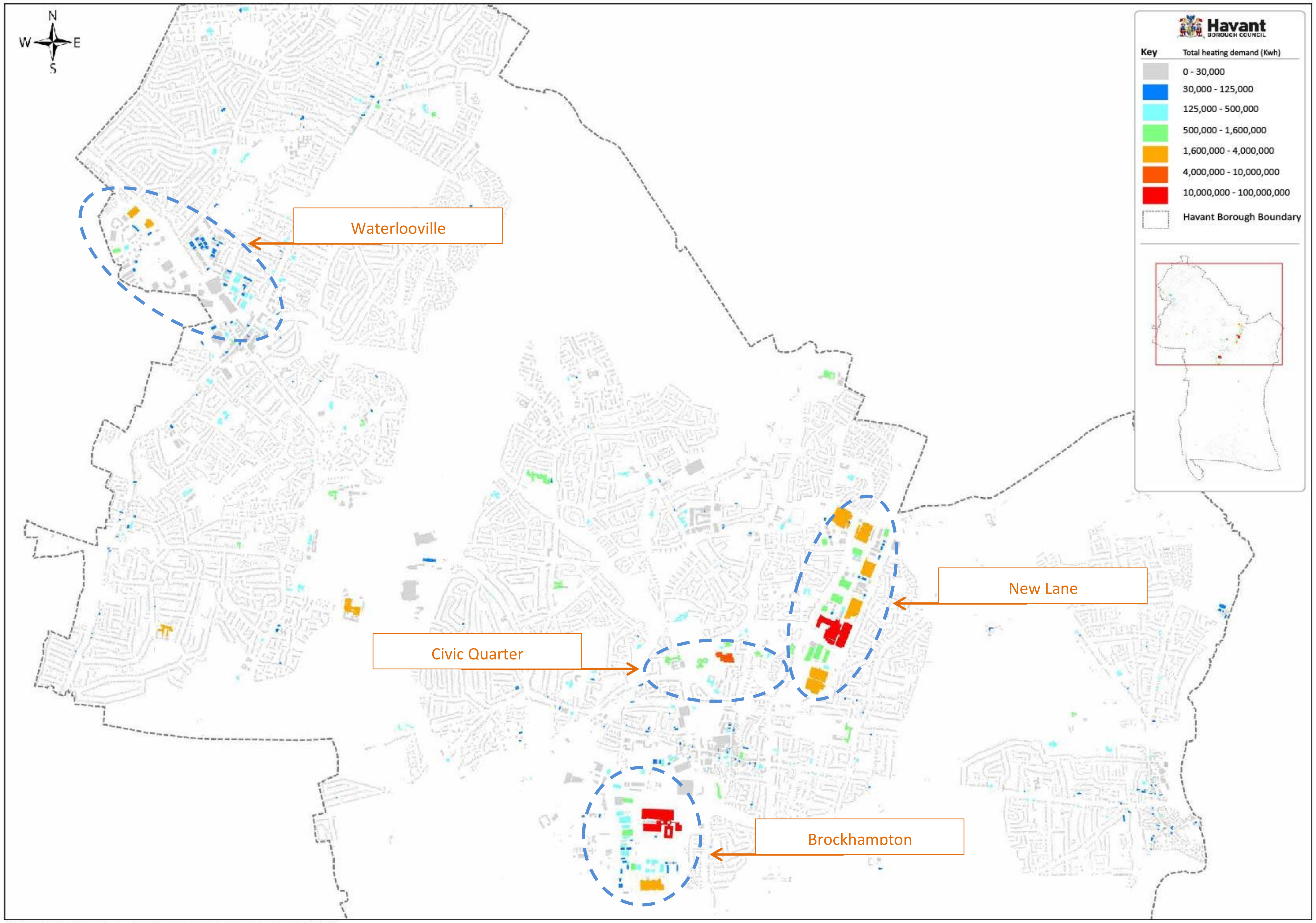

Figure 2: Havant borough (mainland) heat demand results and areas with key areas highlighted for further analysis.

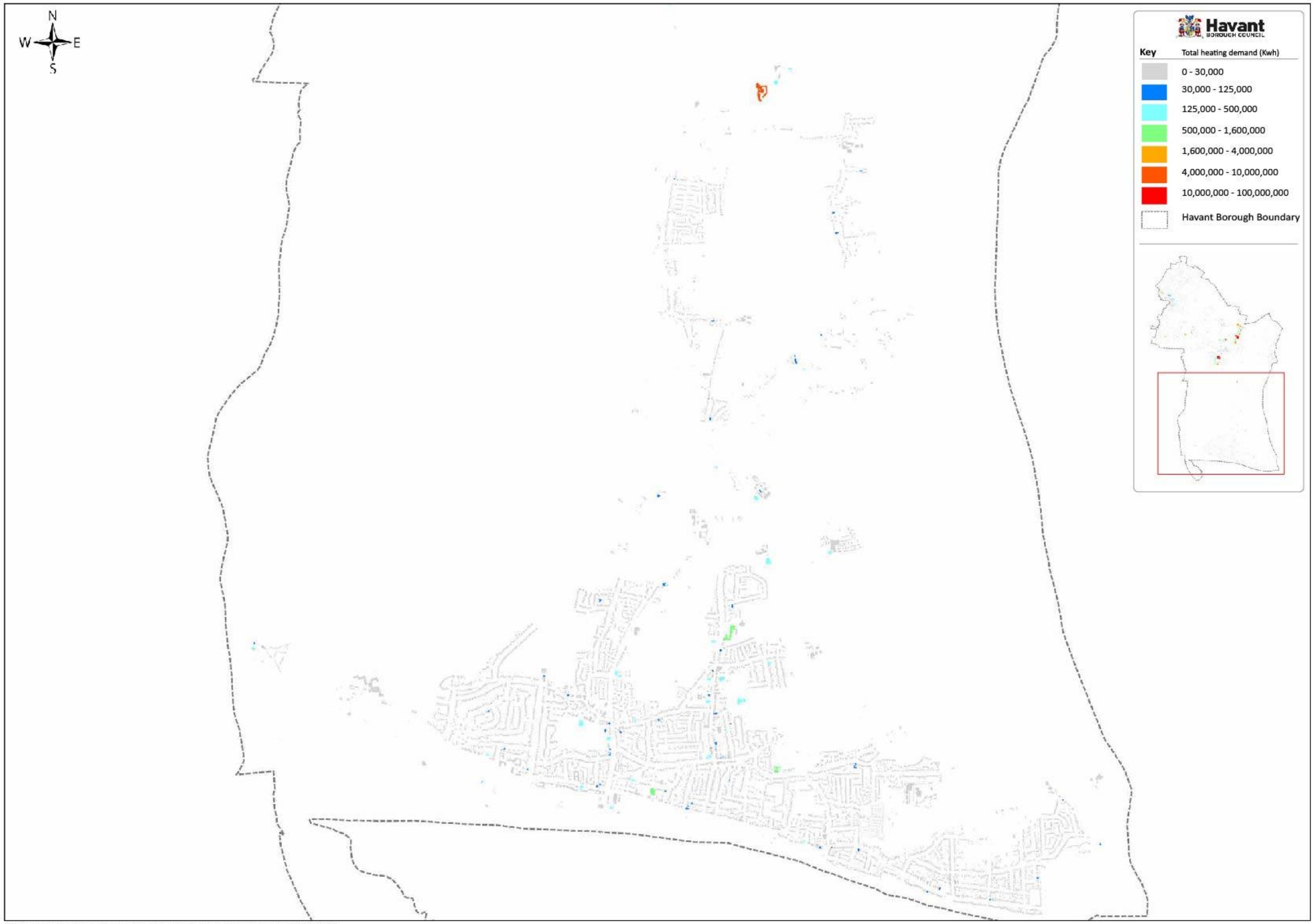

Figure 3: Hayling Island heat demand results.

Similar to the results of the heat mapping, there are four areas of Havant's mainland which show a cluster of higher electricity demand. These will be explored more fully below.

Again similarly to the heat demand mapping, there are no clusters of electricity demand on Hayling Island which would need further analysis.

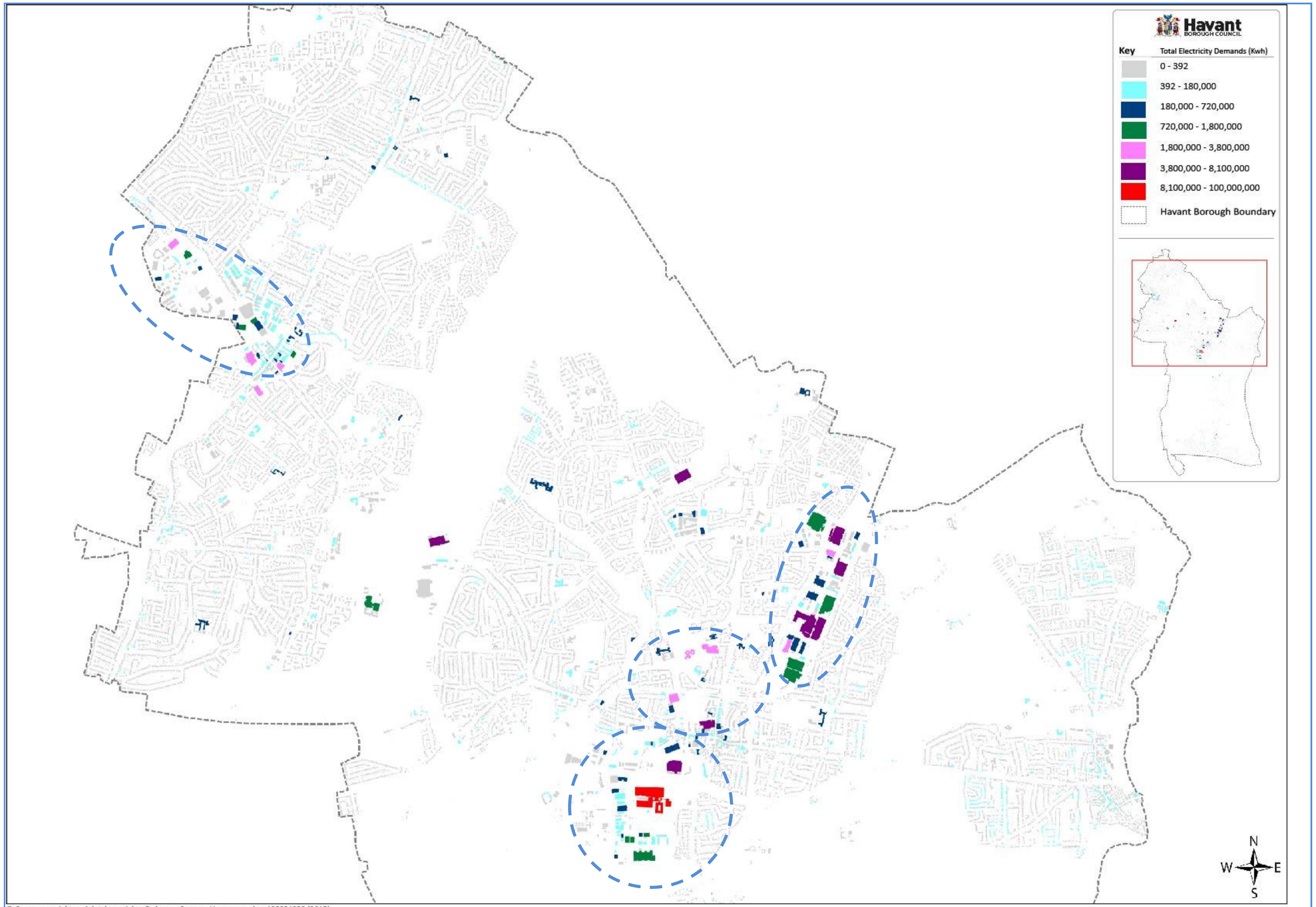

Figure 4: Havant mainland electricity demand. As with the heat demand, there are four areas which merit further exploration, including a slightly wider area than for heat..

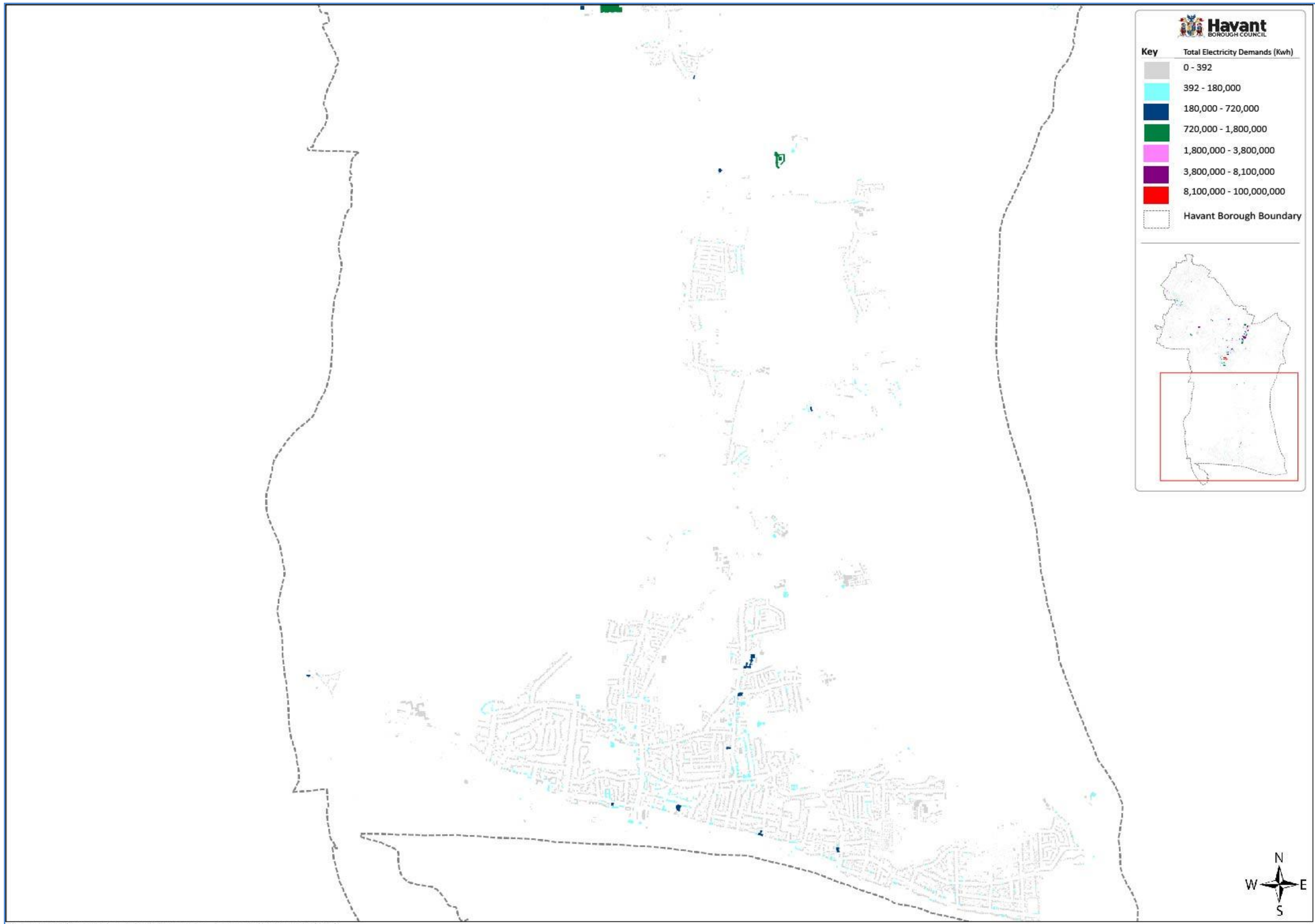

Figure 5: Hayling Island electricity demand.

As with the heat mapping, cooling mapping shows four areas where further analysis is needed.

Hayling Island once more shows no potential for a concentration of demand for cooling.

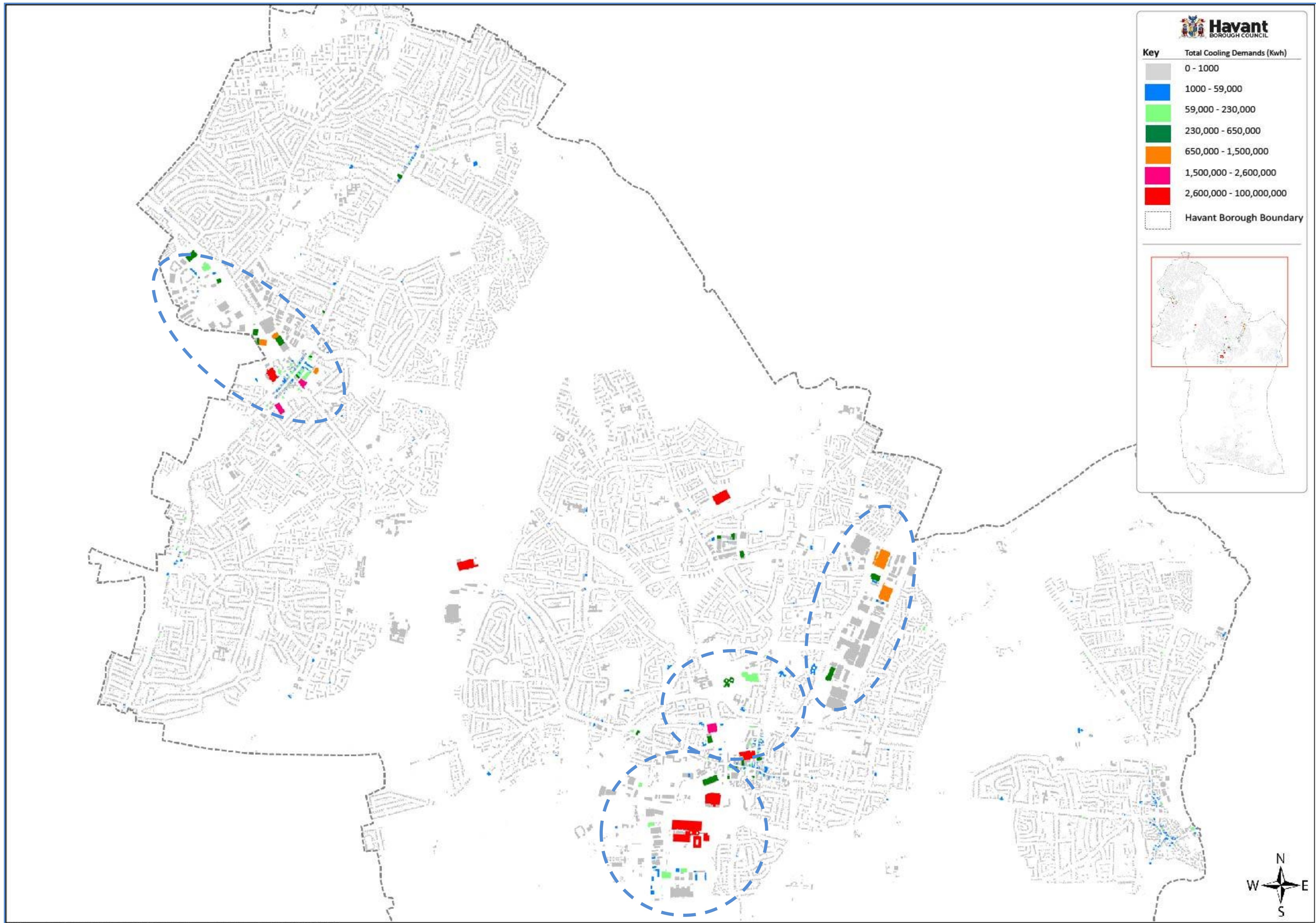

Figure 6: Havant mainland cooling demand. As with the heat demand, there are four areas which merit further exploration, including a slightly wider area than for heat..

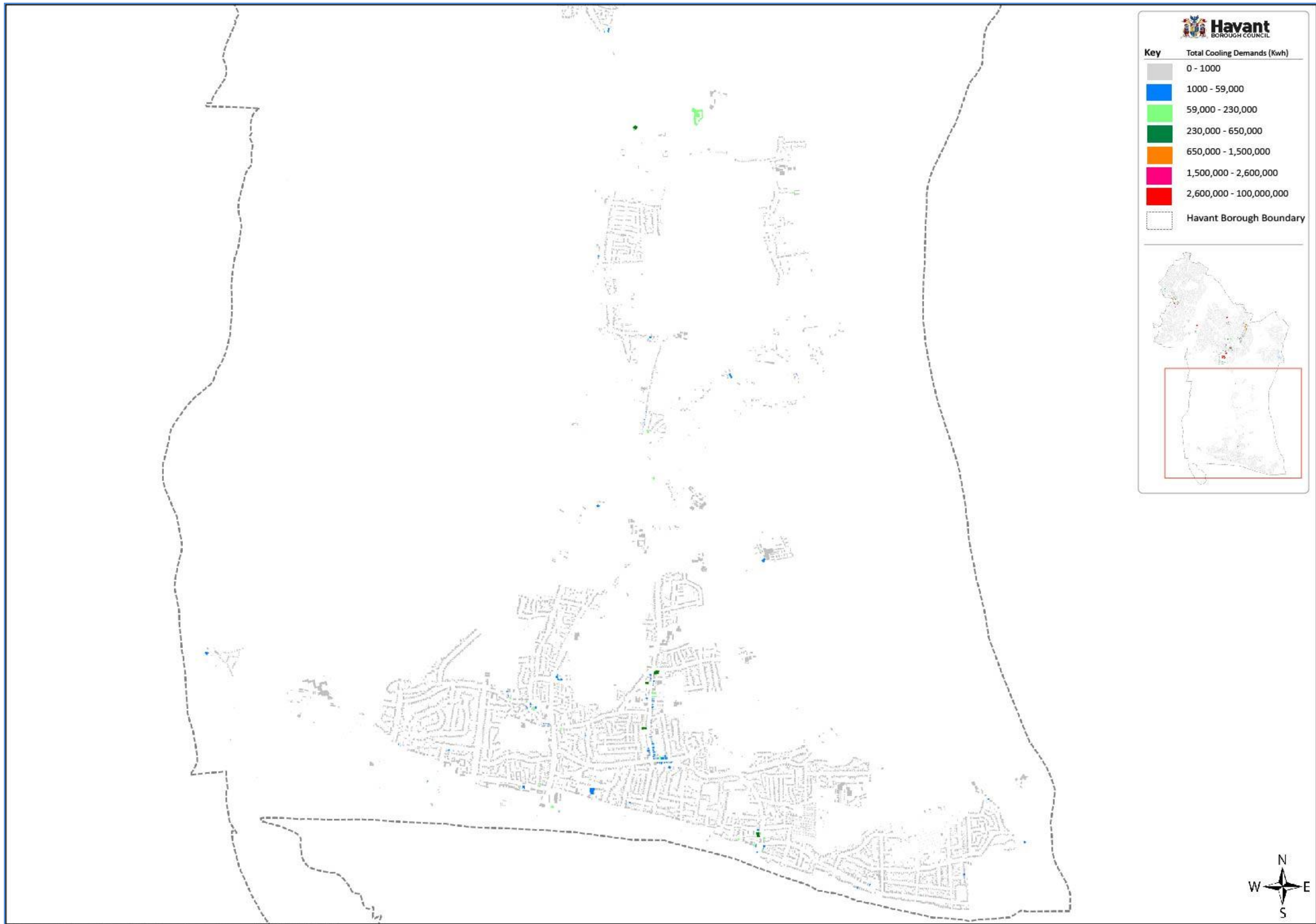

Figure 7:Hayling Island cooling demand.

Waterlooville town centre

This is a busy town centre with a pedestrianised main precinct, a retail park and a newly built supermarket. A significant urban extension of ~3,000 new homes is also under construction to the west, spreading into Winchester borough.

Heat, electricity and cooling demand maps can be found in figures 11, 12 and 13 respectively.

Waterlooville	
Demand type	**Total demand available (kWh/annum)**
Heat	6,829,300
Electricity	6,412,055
Cooling	1,038,450

There is a good balance between demand for heating and demand for electricity and cooling. Nonetheless, this demand is focussed on the main retail areas which are in private ownership, making it more difficult to initiate a heat network. Furthermore, given its predominant retail focus, the temporal peaks and troughs of demand will be very similar from all potential customers. This means that the overall base load of any district heating network would be very low.

The overall demand levels are also not particularly high with no single building exceeding 4,000,000 kwh per annum. As such, there is no real anchor to any potential scheme. Furthermore, given that the majority of the buildings are retail units or offices, the diurnal pattern of heat would be particularly ‘peaky’ and not provide a steady base load.

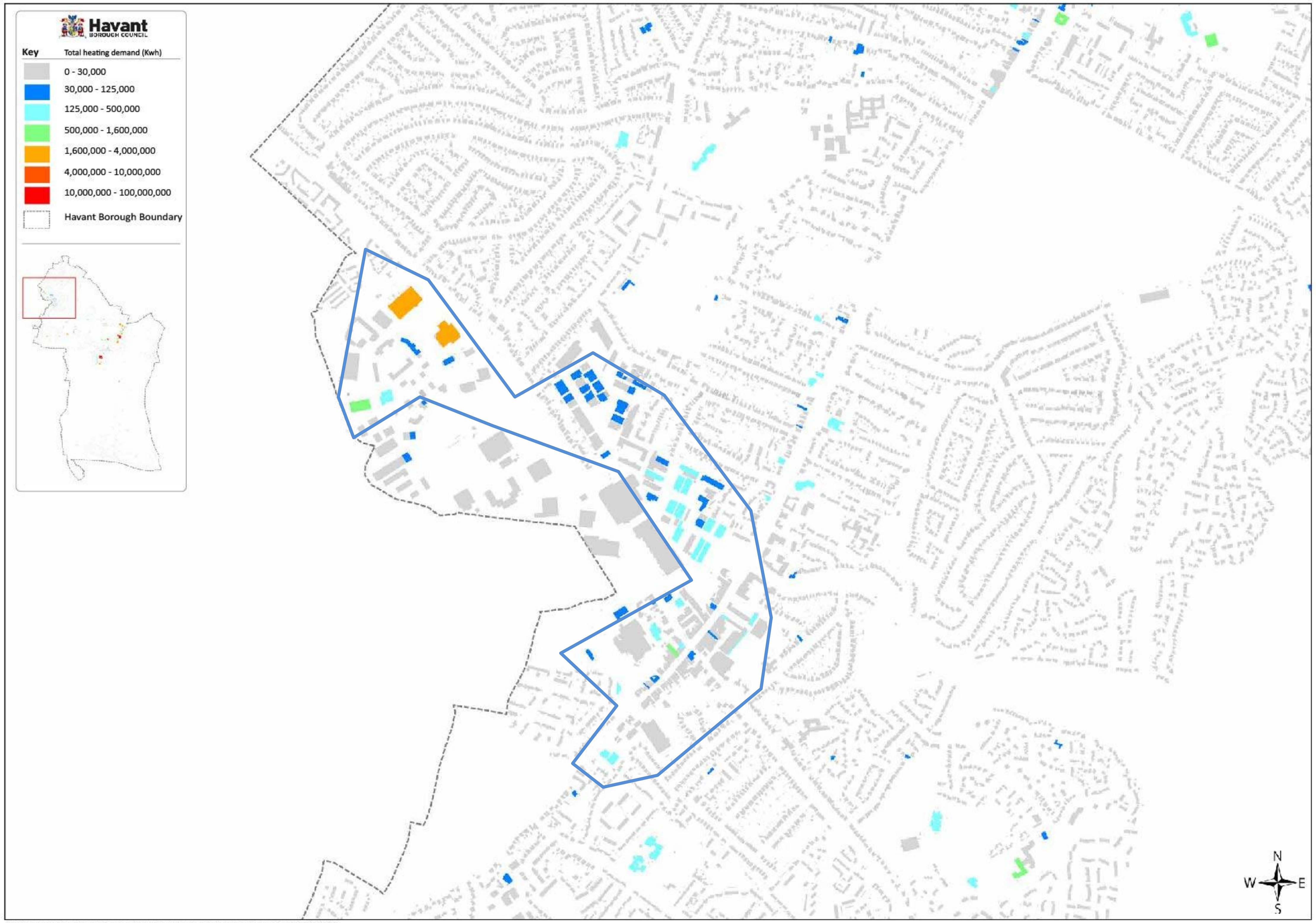

Figure 8: Waterlooville heat demand

With such challenges, it is unlikely that a district heating scheme could be made either feasible or viable in Waterlooville Town Centre. As such, the scheme will not be taken forward to masterplanning.

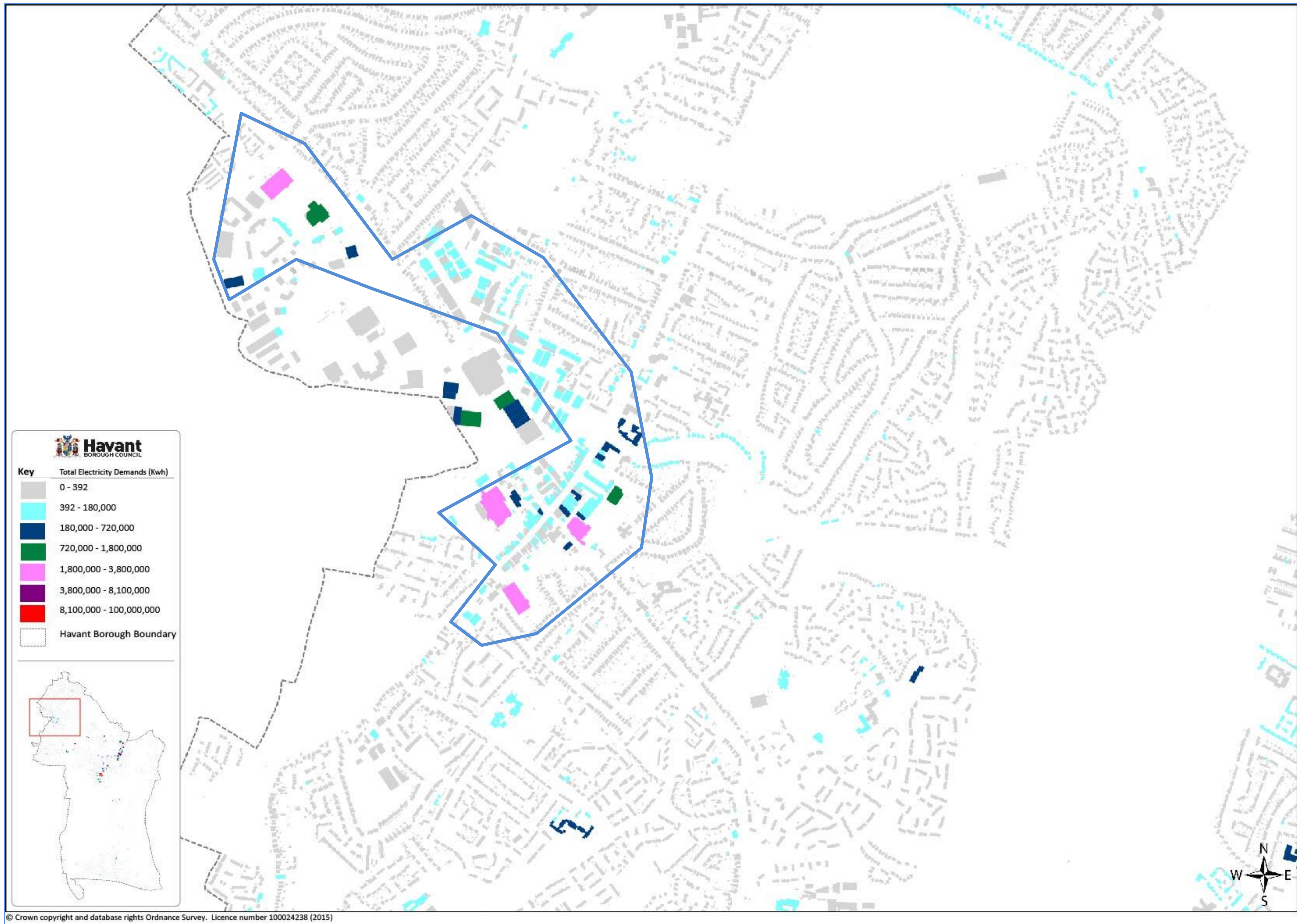

Figure 9: Waterlooville electricity demand

Figure 10: Waterlooville cooling demand

Civic quarter & New Lane

This set of buildings is located in the centre of the borough, just north of Havant's town centre.

Heat, electricity and cooling demand maps can be found in figures 11, 12 and 13 respectively.

Civic Quarter	
Demand type	**Total demand available (kWh/annum)**
Heat	11,598,310
Electricity	5,755,970
Cooling	5,755,970

As expected, the Civic Quarter contains a number of high heat loads with Havant's main leisure centre as the highest heat demand in the area. Nonetheless, there are large amounts of high heat demand buildings in the vicinity of the leisure centre, including Havant Borough Council's Public Service Plaza. A number of healthcare facilities, a job centre and a police station.

Overall, this zone contains an excellent mix of potential heat, electricity and cooling loads which could use the leisure centre as a main anchor. There is a significant cooling demand (highlighted in brown on figure 13) to the south of the core zone. This is the main town centre and retail park. However this would involve bridging the main railway line, which would add cost to any scheme in this area.

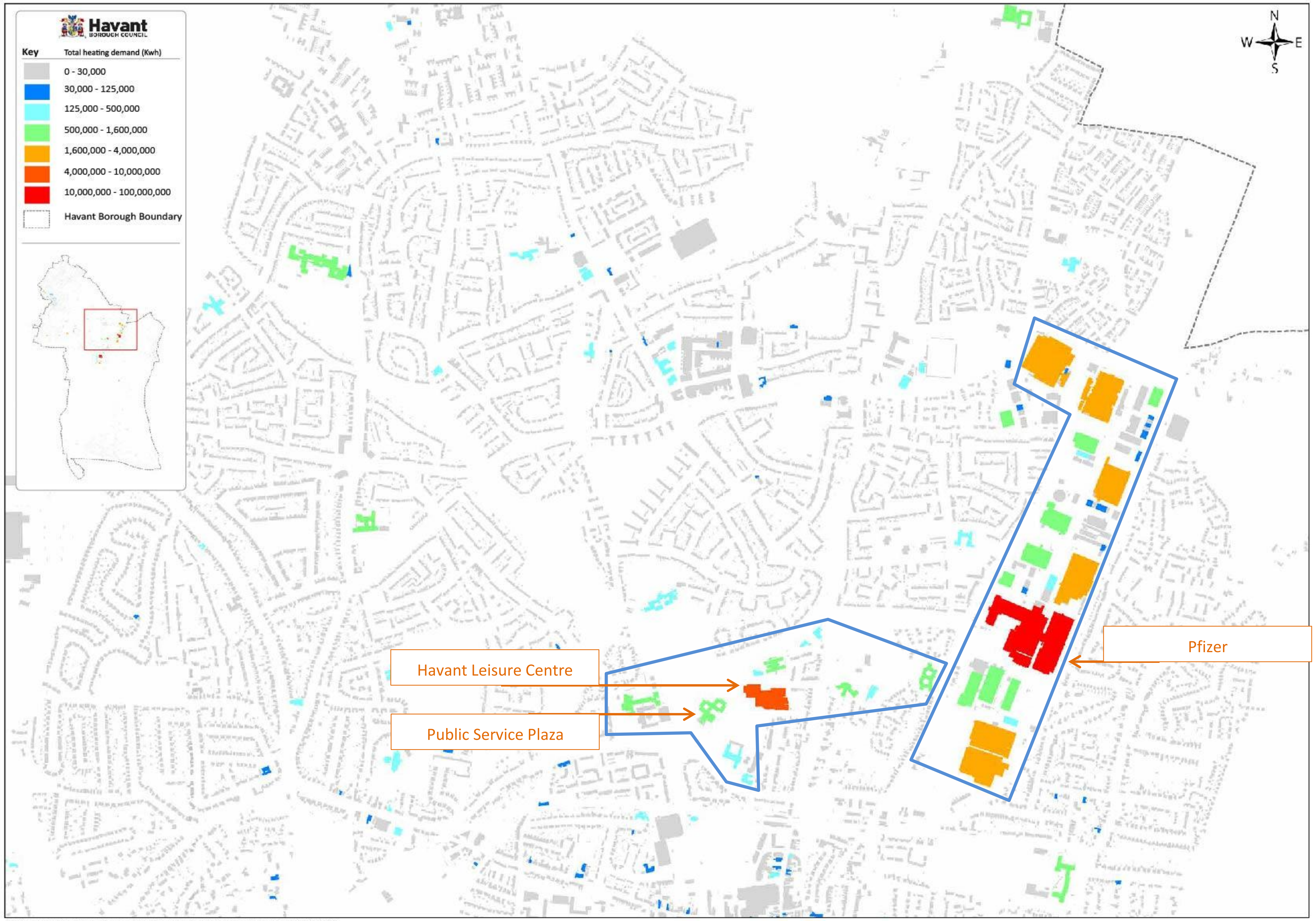

Figure 11: Havant Civic Quarter and New Lane heat demand.

In terms of land ownership, any potential scheme in this area would benefit from the fact that all identified buildings are in public sector ownership. The Public Service Plaza and leisure centre are both owned by the borough council who would look to drive forward any heat network in this area. Other public sector buildings include Havant's central police station, owned by Hampshire Constabulary, a jobcentre plus and various healthcare buildings. The western-most building is Havant College which, whilst in public ownership, would have a very seasonal demand for energy. As such, particularly given that the network would have to cross a duel carriageway, it may well not be viable to connect the college to any scheme, although this should be explored in any future feasibility. Overall though, generally speaking, public sector bodies are more likely to connect to a heat network, thus increasing the potential deliverability of a scheme in this area.

New Lane	
Demand type	**Total demand available (kWh/annum)**
Heat	37,856,600
Electricity	27,165,670
Cooling	4,620,180

New Lane contains a high number of significant heat and electricity loads. This is principally due to the cluster of manufacturing in this area. Electricity and cooling loads do not show up particularly strongly in the south of the area; however this is due to the assumed nature of the analysis at this point.

It is particularly pertinent to highlight Pfizer's facility, which is highlighted on figure 11. This site is Pfizer's global supply site and is home to a highly set of sophisticated production lines. These provide state-of-the -art packaging of vaccines and specialist injectable products in highly secure refrigerated conditions ready for distribution. In 2014, the site packaged in excess of 65 million doses with an increase to a potential of 99 million targeted by 2017. Whilst access to metered heat, electricity and cooling data has not been possible for this analysis, it is clear that the facility has the potential to be a significant anchor load to any heat network in this area and there would be a considerable benefit for the company in seeking efficient, low-cost energy solutions.

Given the demand for cooling from Pfizer in particular but also the other buildings which the modelling shows, a tri-generation solution should be explored in this area.

Relying solely on manufacturing businesses carries the risk of a low base load due to the fact that all users would require energy at the same time. However due to the need for cold storage on the Pfizer site and the 24/7 of some of the operations in this area, the diurnal variance should be less than would otherwise

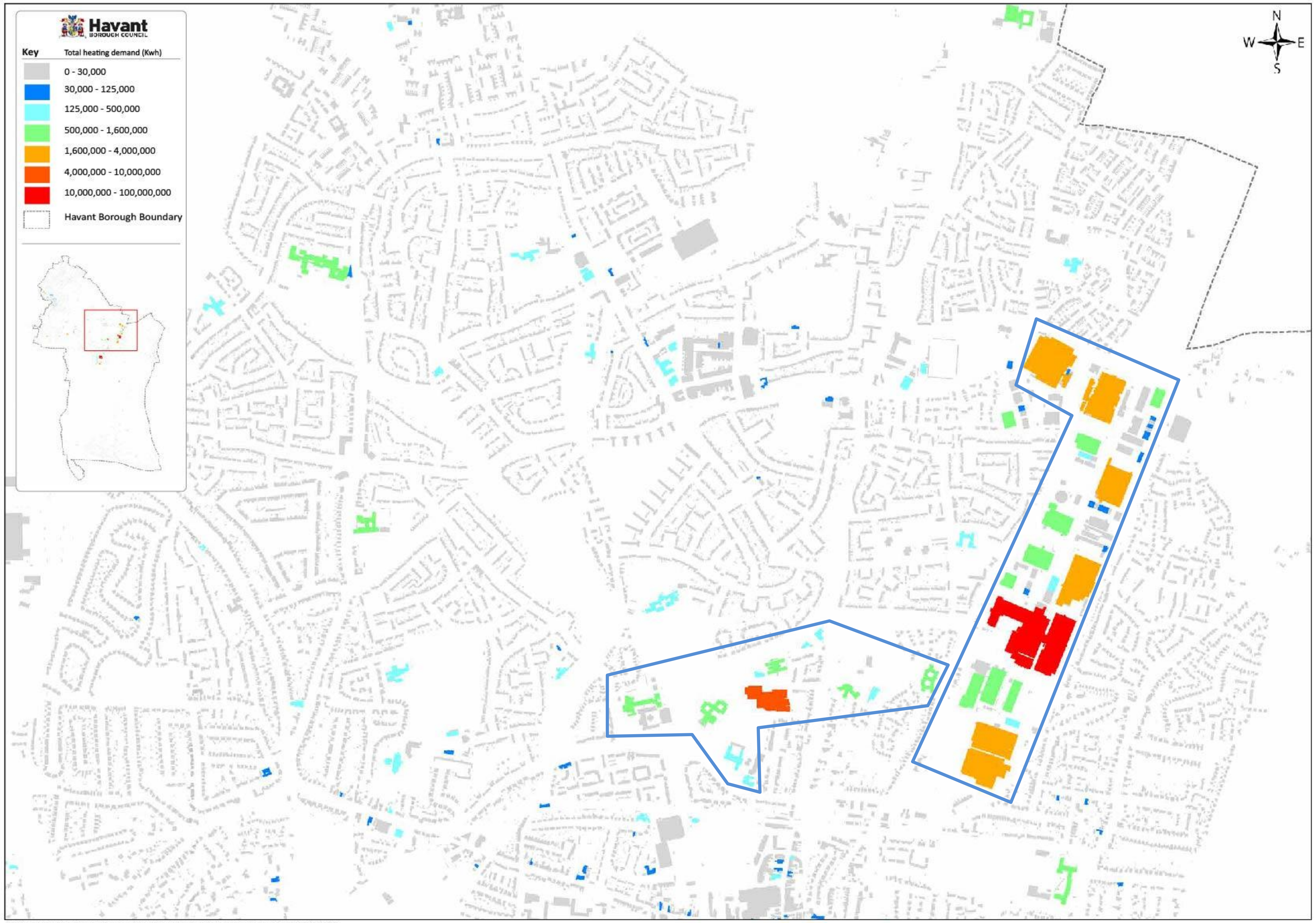

Figure 12: Havant Civic Quarter and New Lane electricity demand.

be the case. As such, this should not threaten the overall feasibility and viability of the scheme.

One constraint with establishing this scheme is the fact that it would be purely based on private businesses. However the heat, cooling and electricity demands of this cluster of buildings are sufficiently high that this could well provide the incentive for those companies to sign up to a heat network energy solution. Whilst there are no public sector organisations based in this area, the borough council does own the northern section of the site, which has benefits in terms of locating an energy centre (see below).

Both areas have benefits and drawbacks. Whilst the Civic Quarter has a single high heat load, which could act as an anchor, the potential customers are spread out across the area. However all of the potential customers of the scheme are public sector based, making any scheme more deliverable than if relying on the private sector. Nonetheless, whilst the New Lane scheme would be reliant on the private sector as its base, the level of heat demand in the area makes this worthy of exploration. As such, both schemes should progress to the masterplanning stage.

Figure 13: Havant Civic Quarter and New Lane cooling demand.

Brockhampton

This set of buildings is located in the centre of the borough, just north of Havant's town centre.

Heat, electricity and cooling demand maps can be found in figures 11, 12 and 13 respectively.

Brockhampton	
Demand type	**Total demand available (kWh/annum)**
Heat	37,856,600
Electricity	27,165,670
Cooling	4,620,180

The most notable feature of this area is an existing 2MWe CHP plant at Southern Water's Budds Farm Wastewater Treatment works (indicated by a purple star). The existing industrial units together with the offices at the Langstone Technology Park also provide a reasonable cluster of heat demand in the area. Furthermore, two allocations for further employment development are in place immediately to the north of the existing CHP plant, which are highlighted on figure 14.

Ideally, any scheme in this location should utilise the existing CHP plant, expanding it to serve a wider heat network. However, subject to compatibility of flow and return temperatures, it would also be possible to supplement the existing scheme through a new gas, biomass or water source heat pump energy centre. Southern Water has indicated that they are open to exploring the expansion of their CHP plant into a wider district heating network.

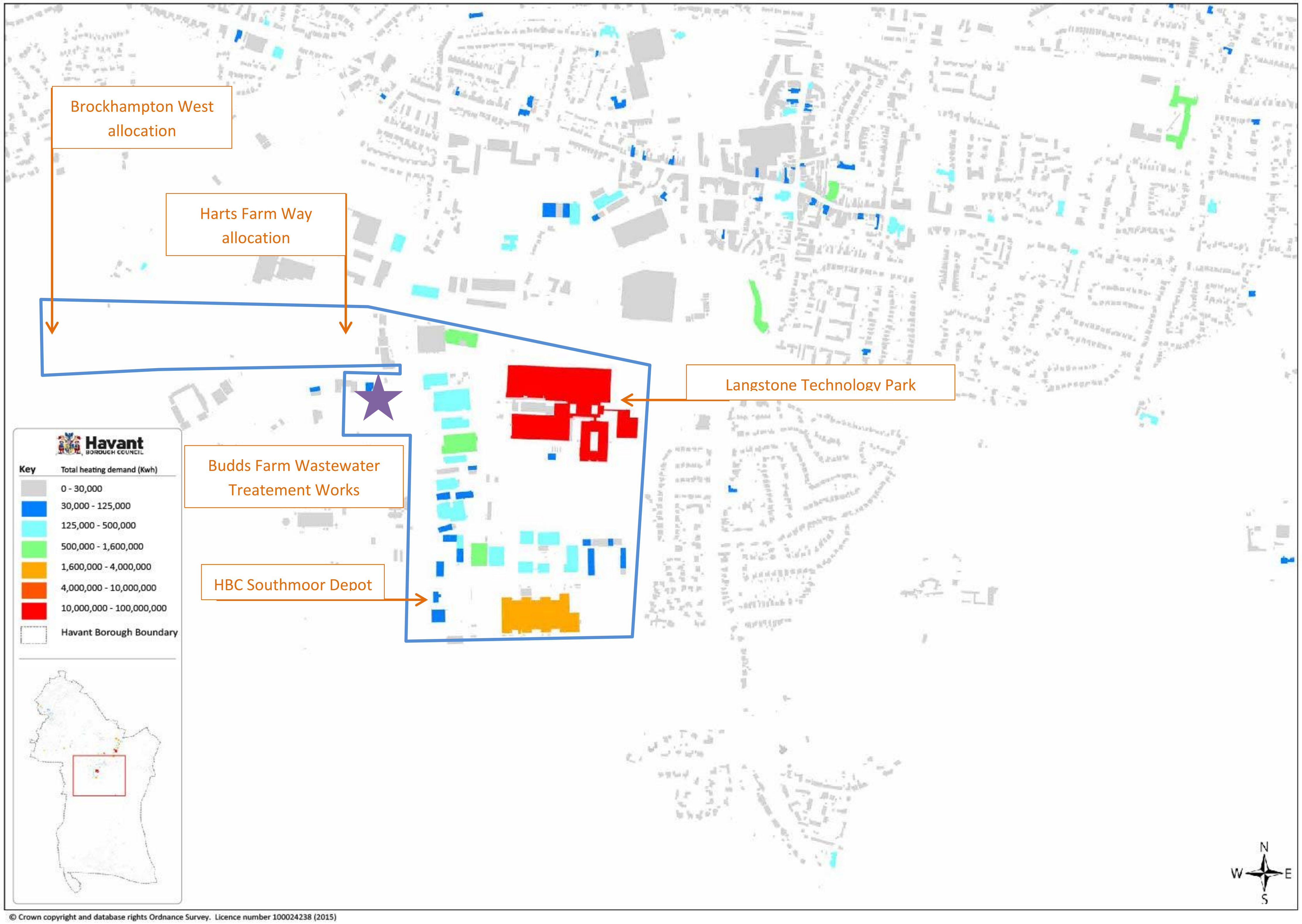

Figure 14: Brockhampton heat demand.

The Harts Farm Way North allocation already has planning permission for 16,275m^2 of employment floor space in a mix of industrial and warehouse buildings. The Brockhampton West allocation would provide a further 23,400m^2 of new employment floor space. Together these would add considerable demand for a mix of heat, electricity and cooling whilst installing the necessary infrastructure would be far simpler and cheaper during the initial construction process than as a retrofit project.

Also in this area is the borough council's existing Southmoor depot, which houses a lot of council services. This provides a key initial anchor load for a heat network, which could initially grow to include Langstone Technology Park before expanding further north to include the new development. This also provides a key early customer in the public sector to drive the scheme forward.

Overall, there is a high heat demand in the area, above the DECC requirements for a viable heat network. There is a degree of public sector presence to help kick start a scheme as well as an existing CHP facility. As such, this potential network should be progressed to the masterplanning stage.

Figure 14: Brockhampton electricity demand.

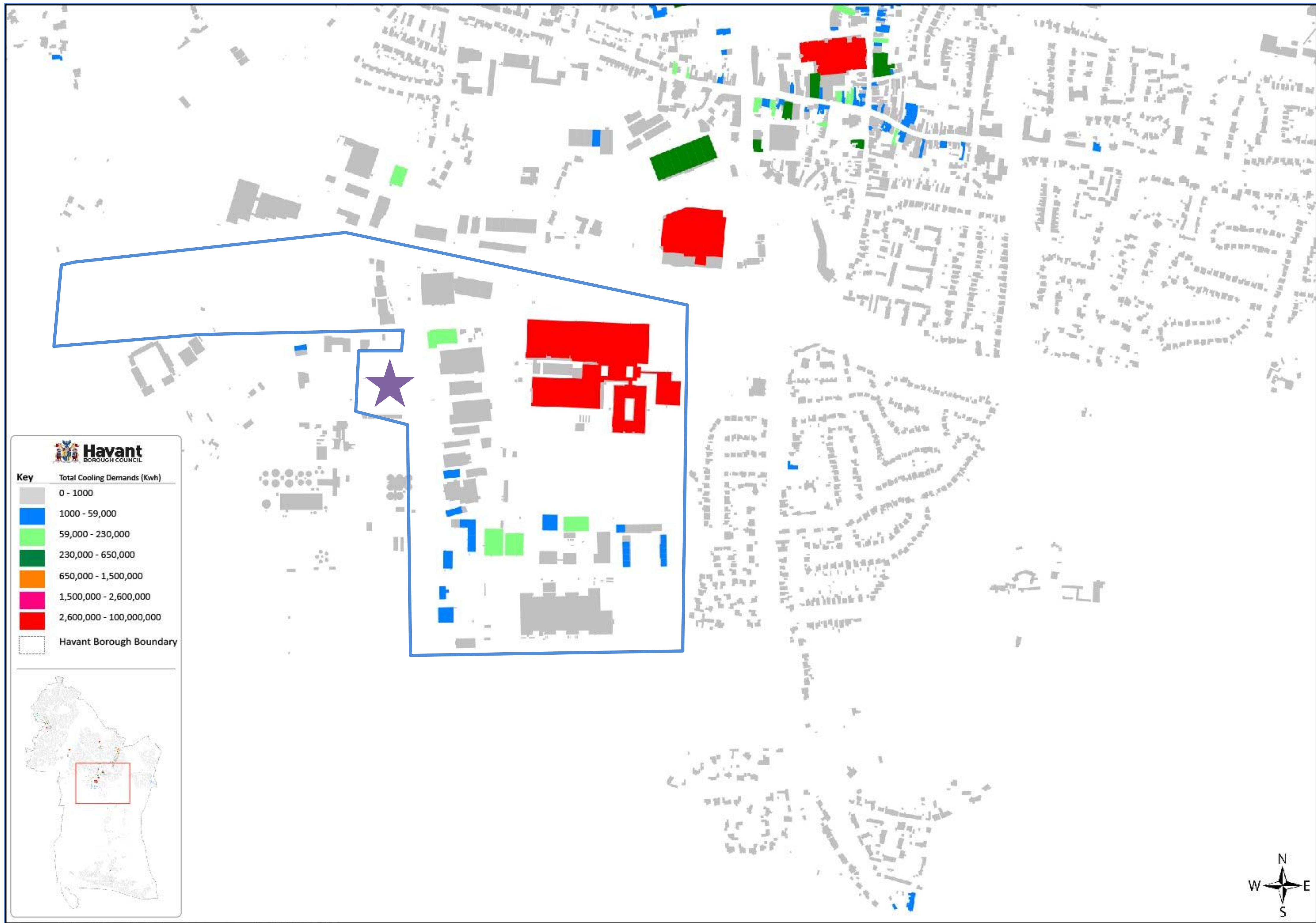

Figure 14: Brockhampton cooling demand.

Heat network masterplanning

There are three potential heat network schemes which the initial qualitative analysis showed should be progressed to the masterplanning stage:

- Civic Quarter
- New Lane
- Brockhampton

This section will explore how a heat network could potentially be set up, including pipework routing options and energy centre location. These will then be assessed against known benchmarks to establish whether a heat network could potentially be viable in the area. This will show whether a full feasibility study should be undertaken for any of the three areas.

In order to compare each network option, three simple metrics will be used. These are:

- Connected heat load. As indicated previously a minimum load is needed irrespective of the other metrics for a network to be viable.
- Linear heat density, based on connected load compared to network length. Various international standards[1] suggest a minimum heat density of 1,000kWh/m/yr for a connection to be feasible in Scandinavia, where significant infrastructure and district heating supply chain already exists. In the UK this is likely to be slightly higher[2] (particularly in city centre areas with predominantly hard dig), with a benchmark up to circa 1,500kWh/m/yr.
- Area density, which is determined by calculating the area enclosed by the anchor load buildings (system area) and comparing to the connected load. The benchmark minimum as quoted by DECC for a viable network for the area density calculation is 26kWh/m^2.

There are many factors that go into site selection for an energy centre, so in order to determine the most optimal place to locate a centre a site selection exercise was undertaken.

A total of five different criteria were considered for this exercise. The first three are environmental criteria (flood risk, air quality, and natural environment) which were considered on an exclusionary basis. The next criteria is land ownership, which was also considered on an exclusionary basis. The final category was proximity to the network, which was considered on both discretionary and exclusionary basis. A full description of each of the criteria is listed below.

Environmental Constraints

- **Flood Risk**

Flood Risk mapping data for Havant was examined. For the evaluation, it was considered too high a risk to build within a flood zone; therefore any area within the zone is designated as 'cannot build' and taken out of the set. The only area where this has an impact is at Brockhampton where the southern half of the site is susceptible to flood risk.

- **Air Quality Management Area**

An Air Quality Management Area (AQMA) is created by a local authority where it is thought that national air quality objectives are not likely to be achieved. There is one AQMA in Havant, located in the town centre. This is not near any of the potential heat networks.

- **Natural Environment**

This category contains many different criteria. Any areas protected for are removed from the set as these should not be built on. Open space and land not classified is likewise removed from the set. There are no listed buildings or other heritage assets identified in the potential heat network areas, nor are there any areas protected for biodiversity. Brockhampton is located in close proximity to Langstone Harbour, which is heavily protected. This would need to be considered in detailed feasibility and design stages.

Land Constraints

- **Land Ownership**

Only land belonging to Havant Borough Council is considered for energy centre locations.

- **Proximity from Listed Buildings**

Consideration should be given to the proximity of any energy centre to designated heritage assets such as registered parks and gardens, listed buildings and conservation areas. Furthermore, any non-designated heritage assets should be considered as well.

However there are no heritage assets in the potential heat network areas.

Network Constraints

- **Proximity from network**

The last category was proximity to the heat network itself as this is particularly important in terms of minimising capital costs. The standard benchmarks for installing a pipe network range from £1,500 to £3,500 per metre depending on the ground conditions, with a typical cost of £2,000 per metre, therefore the closer the building is to the energy centre, the less capital cost is involved in installing the system. As such, only sites adjacent to the preferred pipework routing would be considered for the energy centre location.

[1] International Energy Agency (http://www.iea.org/techinitiatives/end-use-buildings/districtheatingandcooling/)

[2] VTT Technical Research Centre of Finland (http://www.districtenergy.org/assets/pdfs/2011Annual_Conf/Proceedings/B45-SIPILAEIDEA-2011-Kari-Sipilae-ConferenceTorontoIEA-Annex-IXVTT27-29062011.pdf)

Civic Quarter

Connected load	11,598,310 kWh/annum
Network Length	2,800m
Linear Density	3999.42 kWh/annum/m
System Area	41,816 m^2
Area Density	277.37 kWh/annum/m^2

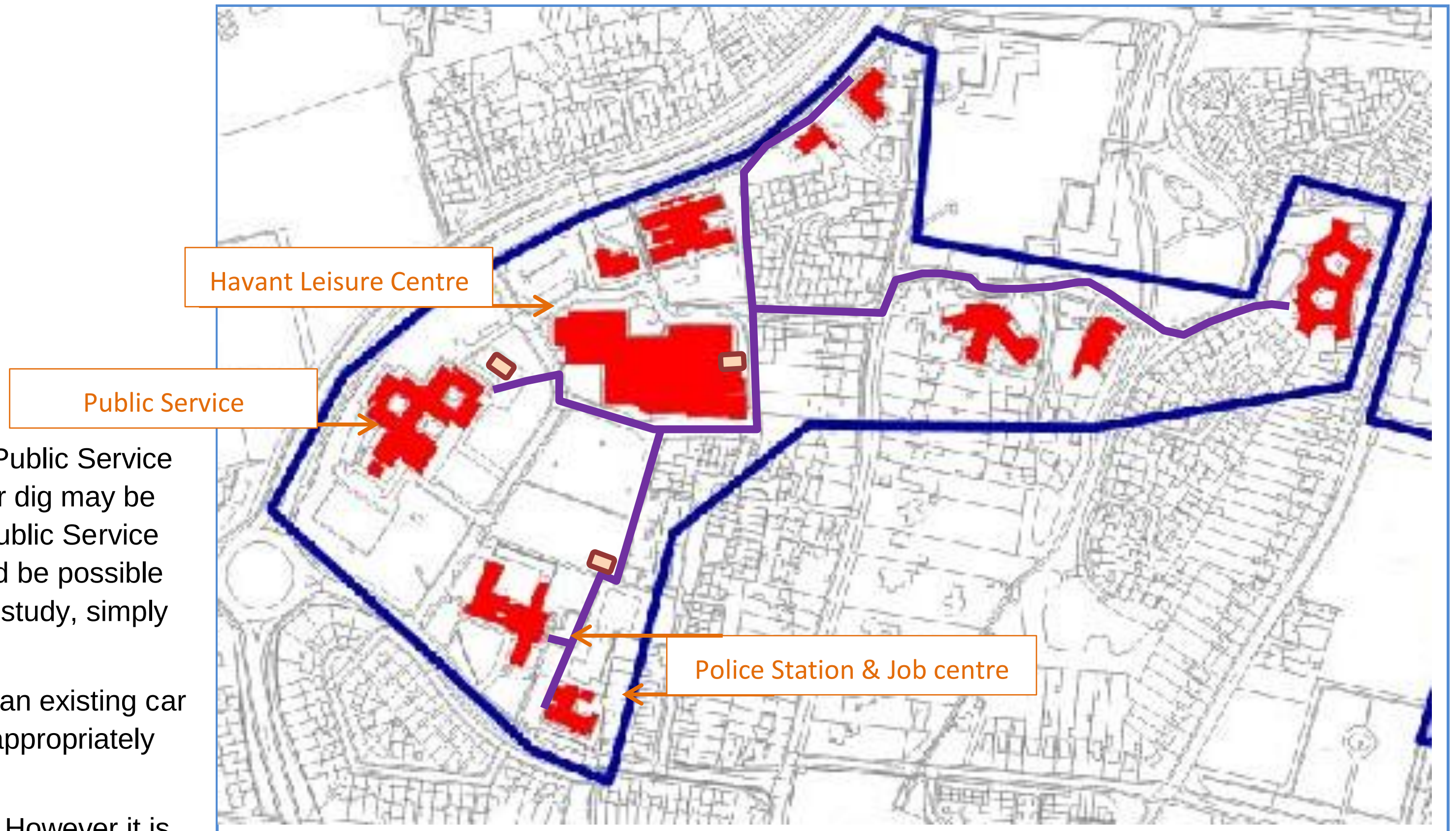

Figure 15: Civic Quarter pipework routing options and possible energy centre locations

For the Civic Quarter, a central spine route would be possible from either Havant College to the west or the Public Service Plaza, along either existing highways or across landscaped areas surrounding these buildings where a softer dig may be possible, although care would need to be taken to avoid the large number of mature trees surrounding the Public Service Plaza. A branch would need to be created to connect to the police station and job centre. However this would be possible to route through the existing car parks. This is a very similar route to that proposed in the previous feasibility study, simply utilising existing car parks as well as the public highway.

Energy centres could either be located on the Public Service Plaza site, the leisure centre site or use part of an existing car park. This would ensure that the energy centre is on Havant Borough Council land ownership and could be appropriately designed. It would also be directly on the pipeline route.

Overall, the metrics clearly show a high linear and area density, showing clear potential for a viable scheme. However it is the fact that all of the buildings are in public sector ownership, all of the customers would be public sector and the routing of the pipe network would use only public sector land or highway. As such, this is considered a particularly deliverable scheme. This should be considered and high prioritisation given to taking forward a feasibility study.

New Lane

Connected load	37,856,600 kWh/annum
Network Length	2,400m
Linear Density	15,773.58 kWh/annum/m
System Area	398,405 m^2
Area Density	95.02 kWh/annum/m^2

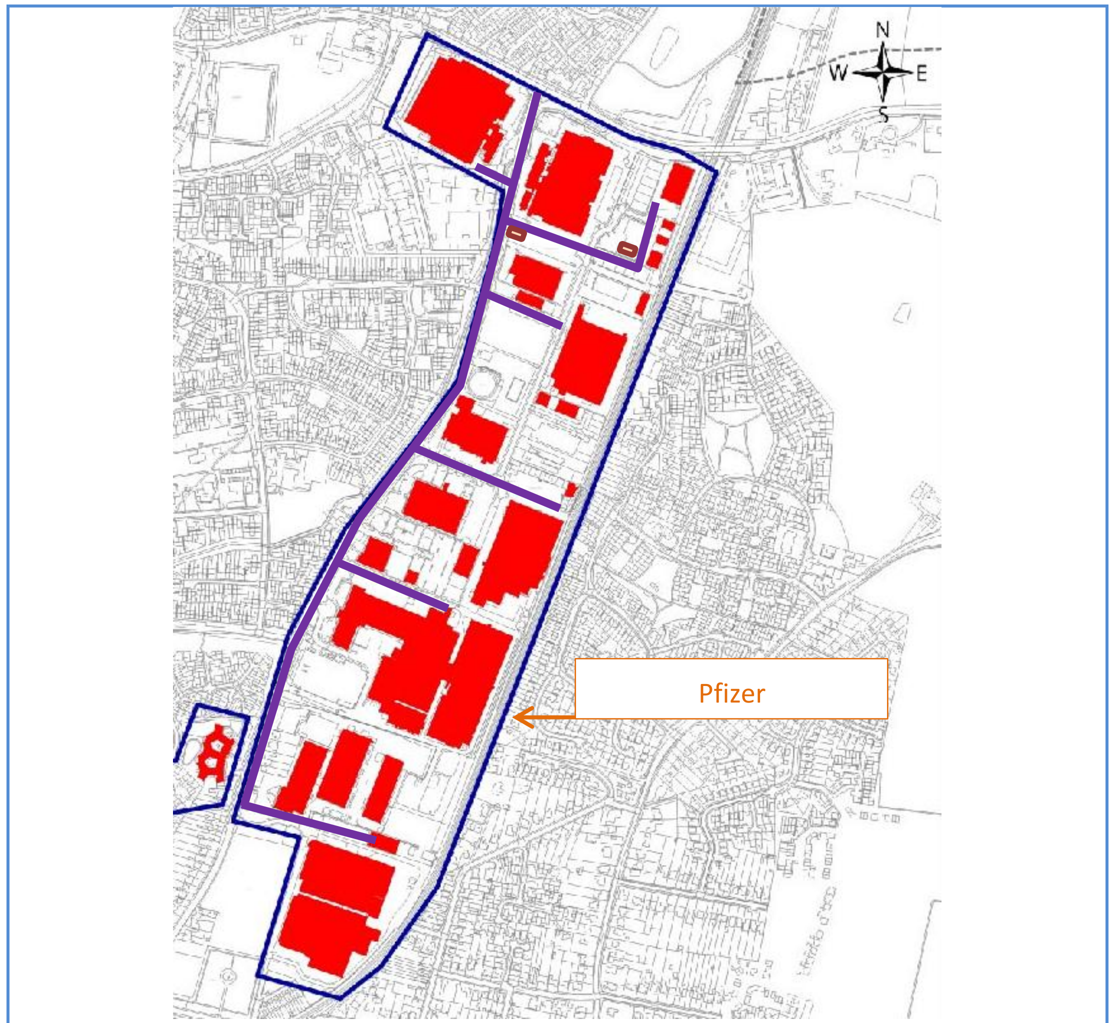

Figure 16: New Lane pipework routing options and possible energy centre locations

At New Lane, again a central spine could be created along New Lane itself, with individual spurs connecting to specific buildings as required. This would keep all pipework within the adopted highway. The highway itself benefits from being particularly wide in this location, with a soft landscaped verge between the road and the pavement. As such, pipework could be installed on a softer dig along part of the route potentially, thus reducing cost. However this would obviously have to be reconciled with the location of other utilities in the area.

The energy centre should be located within the borough council's land ownership at the north of the site. It would be possible to use part of an existing car park, service area or potentially the landscaped area at the front of the buildings, fronting onto New Lane. The exact location would depend on the size required for the energy centre which in itself would be dependent on the loading which is necessary. Within the scope of this report, due to its reliance on assumed data it is not possible to accurately size this energy centre in particular.

The metrics show a very good linear and area density, well in excess of DECC minimum standards. It is possible to use borough council land to create the energy centre, which would enhance the deliverability of the scheme. Creating a network providing low-carbon cost effective heat, electricity and cooling in the area would also fit in with the borough council's economic development aspirations and enhance our 'open for business' attitude which is enshrined in the Prosperity Havant initiative. However it would be reliant on bringing together multiple private sector companies at the same time to kick-start the network in the first place. Whilst the borough council could act as facilitator and the overall owner of any district heating network, contractually signing up sufficient private sector clients could potentially hamper the deliverability of the scheme as a whole. As such, a feasibility study should be pursued to sound out the relevant businesses in the area, however this should treated as a lower priority than other projects.

Future expansion and connection of Civic Quarter and New Lane networks

Given the close proximity between the two schemes, there is clearly the potential for them to connect in the future. However in terms of creating a core scheme, it is unlikely that a scheme stretching from the Public Service Plaza to the northern end of New Lane could be established from the start. It is more likely that a core scheme comprising most of the public service buildings would take place with a separate scheme serving a select number of the industrial businesses. However decisions on pipework routing, fuel and flow and return temperatures should be taken with the potential to connect the schemes in mind.

Brockhampton

Connected load	21,753,920 kWh/annum
Network Length	2,900m
Linear Density	7501.35 kWh/annum/m
System Area	214,755m^2
Area Density	101.30 kWh/annum/m^2

This area again benefits from being able to use the adopted highway. However as a constraint, particularly to connecting the Brockhampton West allocation is the River Hamble, which divides the allocation from the rest of the site. There is however an existing road bridge over the river which could be used to connect the allocation to the rest of the heat network. There is also a smaller waterway to the east, however this has largely been culverted and built over. Nonetheless, it could add to the capital cost of setting up the heat network.

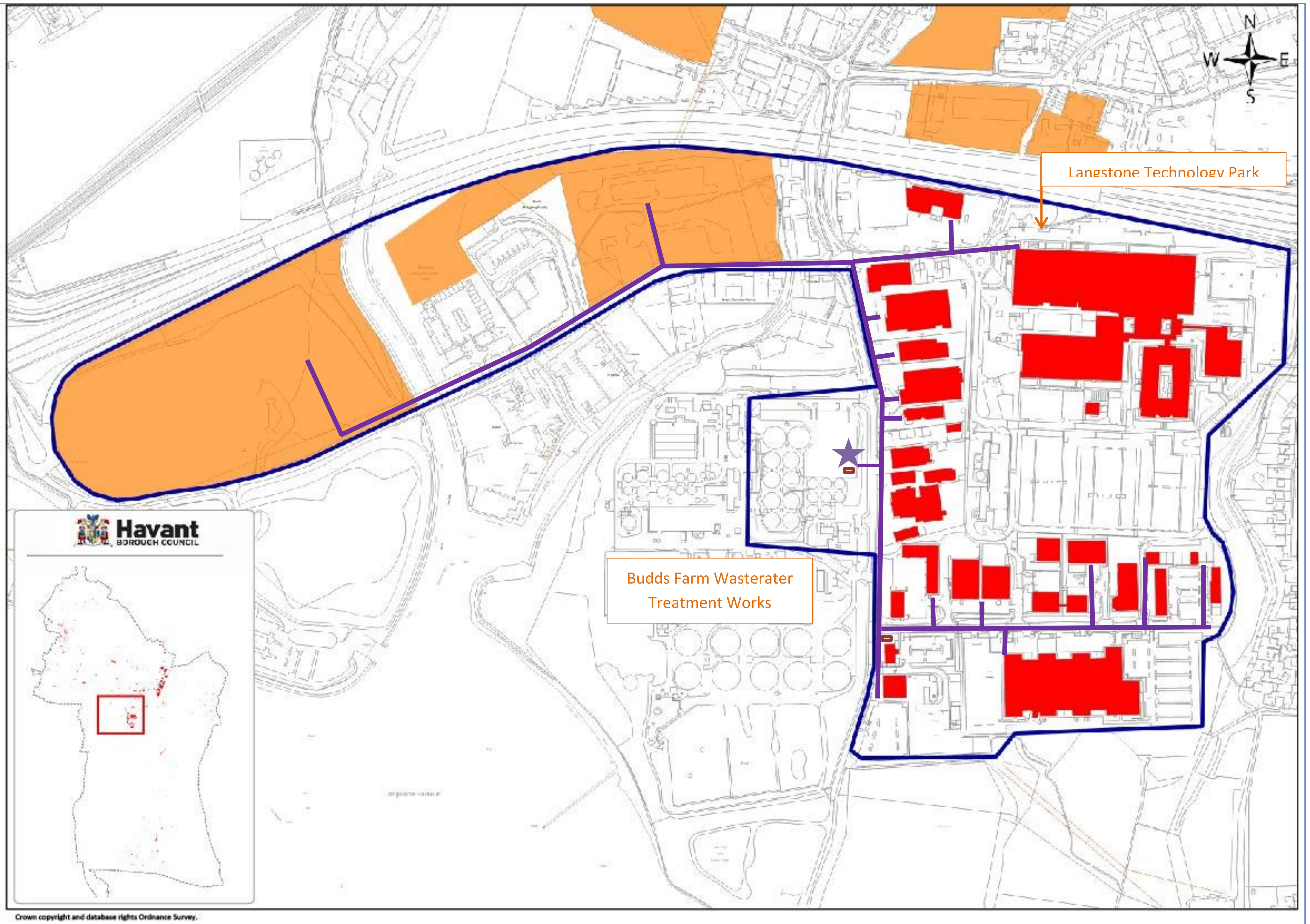

Figure 14: Brockhampton cooling demand.

In terms of energy centre location, if an extension to the existing facility at Budds Farm is progressed then this would need to be on Southern Water's land. However if a second energy centre is built to supplement the existing one as part of the network, then it could be located on the borough council's Southmoor Depot site which is highlighted on figure 14. As with the other sites, there is likely sufficient incidental landscaping surrounding the car park that it could be possible to achieve without losing car parking capacity. However alternatively, a degree of car parking could potentially be lost to provide the energy centre.

Again, the metrics show that a viable network is theoretically possible in this area. It also uses an extension to the Budds Farm CHP as the preferred basis for the network, which would be preferable to creating a new network from scratch. The delivery of the scheme benefits from having the borough council as a first client through the Southmoor Depot facility. The network would then be reliant on private sector businesses to succeed. Nonetheless, there is a large heat demand within Langstone Technology Park which would be a single customer. The two allocations represent easy extensions which are cost-effective to install when new development is being created. A feasibility study should certainly be progressed with a medium level of prioritisation.

Conclusions and next Steps

Heat, electricity and cooling mapping has been undertaken for the entirety of Havant Borough. Of the four clusters of demand that the mapping showed, three were worthy of further consideration and masterplanning. These were:

- **Civic Quarter** which focussed on provision to the cluster of public sector buildings and services in the area, focussing on the deliverability of this scheme
- **New Lane**, focussed on the high demand resulting from the manufacturing which takes place in this area.
- **Brockhampton** focusses on an extension of an existing CHP plant linked to the Southern Water wastewater treatment works at Budds Farm.

The three potential schemes were subjected to metric tests to establish the initial viability of the scheme, which were positive in all cases. Initial analysis has shown that pipework routing would be possible along existing highway routes and across borough council owned land. Furthermore, all of the potential networks benefit from being able to site an energy centre on Havant Borough Council owned land.

However this analysis has relied on assumed energy benchmark figures to model predicted demand for heat, cooling and electricity. The next step would be to commission full feasibility studies for each of the potential heat networks. These must use metered data to fully and more accurately model the energy use in these three specific areas. Following this analysis, business cases should be developed for the preferred plant and network options.

Overall, there are three opportunities to further explore heat networks in Havant, all of which are achievable and attractive for different reasons. Feasibility studies should be completed on each one, although if this is not possible for whatever reason, the sites have been prioritised to ensure that the networks with the highest prospect of delivery are explored first.
These can be presented as:

1. **Civic Quarter** – a viable network that uses purely public sector land and clients representing a very high prospect of delivery.
2. **Brockhampton –** an extension of an existing CHP facility to create a heat network. Southern Water has agreed in principal to explore expanding the current CHP and the borough council would become a first customer.
3. **New Lane –** one of the borough's key employment sites with a particular demand for cooling, meaning that a tri-generation scheme is worthy of exploring. However whilst the borough council could provide land for an energy centre, the customers for the scheme would need to be entirely private sector based.