Local Area Energy Planning: Detailed Energy Infrastructure Analysis for Growth Areas (Greater Cambridge)

2026

Cambridgeshire County Council

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Document History

Revision	Purpose	Author	Date Finished	Reviewed	Date Reviewed
1.0	First draft for comments	RU	12/03/2026	GCSP, UKPN	13/03/2026 - 20/03/2026
2.0	Final draft	RU	27/03/2026	GCSP, UKPN	27/03/2026- 30/03/2026
3.0	Final report	RU	31/03/2026	n/a	n/a

Contents

1. Summary

This report provides high-level energy network modelling for sites in the emerging Greater Cambridge Local Plan (GCLP). The report helps to assess the level of energy demand in Greater Cambridge region coming forwards in GCLP period (2024-2045), to help inform electricity infrastructure needs in the region. It focuses on seven major growth sites included in the emerging GCLP, which have not previously been included in regional energy modelling.

This analysis provides energy infrastructure analysis for planned growth areas in Greater Cambridge, refining Local Area Energy Plan (LAEP) assumptions to identify actual grid capacity, required upgrades so that local plan policies, viability assessments, and infrastructure planning are based on accurate, deliverable evidence.

It should be noted that this is based on high-level estimates only based on information known at the time of this study; as the developments progress, more information is expected to come forward, and this information would be expected to be refined and shared with UK Power Networks to inform their business plans either as part of updates to the LAEP or shared directly by developers.

This modelling builds on work completed by Mott MacDonald for the Cambridgeshire Local Area Energy Plan (LAEP). This included modelling of future energy demand scenarios for Cambridgeshire as transition to net zero. This also accounted for a potential growth scenario, as indicated in the Cambridgeshire & Peterborough Combined Authority (CPCA) Local Growth Plan.

The latest version of the Greater Cambridge Local Plan (Draft Regulation 18, published late 2025) came forward after the LAEP modelling was completed. This analysis and report model any further uplift on top of the existing network modelling completed as part of the LAEP.

The current LAEP identifies broad infrastructure needs but does not account for specific growth locations from the CPCA Local Growth Plan. This additional work maps growth areas in detail and identifies where headroom and infrastructure are needed for major sites such as Grange Farm and Cambourne North. It will refine LAEP assumptions and provide evidence to inform the Greater Cambridge Local Plan, and support UK Power Networks' case for grid reinforcement as part of the ED3 period (2028-2033).

The seven growth sites focused on in this report are: Land adjacent to A11 and A1307 at Grange Farm, Cambourne (including Cambourne West and Cambourne North), Cambridge Biomedical Campus expansion, Cambridge East, West Cambridge and North East Cambridge. These are all in Greater Cambridge, which covers the districts of Cambridge City and South Cambridgeshire.

2. Acronyms

- ADMD - After Diversity Maximum Demand
- ASHP - Air source heat pump

- CCC - Cambridgeshire County Council
- CPCA - Cambridgeshire & Peterborough Combined Authority
- DNO - Distribution Network Operator
- ED2 - Electricity Distribution 2, OFGEM price control period for Distribution Network Operators, running from 1 April 2023-31 March 2028
- ED3 - Electricity Distribution 3, OFGEM price control period for Distribution Network Operators, running from 1 April 2028-31 March 2033
- EV – Electric vehicle
- GCLP - Greater Cambridge Local Plan
- GCP – Greater Cambridge Partnership
- GCSP - Greater Cambridge Shared Planning
- GIA – Gross internal area
- IDF - Infrastructure Delivery Framework, report produced by Stantec on behalf of CPCA in 2024
- IDNO - Independent Distribution Network Operator
- LAEP - Local Area Energy Plan
- NESO – National Energy System Operator
- Ofgem - Office of Gas and Electricity Markets
- tRESP – Transitional Regional Energy Strategic Plan
- UK Power Networks - United Kingdom Power Networks (DNO for region)

Acronyms used for units:

- kV – kilo Volt
- kVA - kilo Volt Ampère
- kW - kilowatt
- m^2 – metres squared, or square metres (for example of floorspace)
- MW – Megawatt, 1 Megawatt is equal to 1000 kilowatts

3. Methodology & Key Assumptions

As outlined in Section 1, this analysis and report models further uplift from the GCLP on top of the existing network modelling completed by Mott MacDonald as part of the Cambridgeshire LAEP. The existing network modelling and assumptions within this are unchanged. The below sections set out the methods and assumptions for the additional uplift network modelling, and notes where this deviates from prior work.

Residential Demand Assumptions

After Diversity Maximum Demand (ADMD) is a concept that takes into account the likelihood that not all electrical components for dwellings and business will be operating at the same time. The peak demand is typically less than the total demand of all components. This diversity effect is commonly referred to as After Diversity Maximum Demand (ADMD). This diversity of usage - where appliances and systems are not all operating at full capacity at the same time - allows network planners to design infrastructure more efficiently, avoiding unnecessary oversizing while still ensuring reliability.

For example, while a single dwelling may have a peak electrical demand of 6kW, the ADMD for nine dwellings is closer to 2kW; therefore, the peak demand for the nine dwellings taken is only 18kW. In general, the greater the number of dwellings added to the network, the lower the ADMD. The ADMD generally plateaus after a certain point. ADMD values are an overestimation of the coincident peak load a network is likely to experience over its lifetime.

For this analysis an ADMD of 3.9 kW has been used for a new build dwelling with a heat pump.

Several assumptions and uncertainties underpin this ADMD figure:

- It is assumed all new dwellings are fully electric (mix of heat pumps and other electric heating)
- It is assumed that a proportion of new dwellings will have an electric vehicle (EV) charging point. The Gone Green assumption is approximately equivalent to 30% of homes having a 7kW charger, with a diversity of 0.3 applied. For the GCLP, it is thought that a higher proportion of dwellings are likely to have EV chargers.
- The average size of new dwellings are 2-4 bedrooms, based on projected delivery of units in the GCLP.

For dwellings with heat pumps there is uncertainty across the sector as to the appropriate ADMD level. Below compares the 3.9 kW figure to other reports and studies being undertaken in the region (Tables 1 and 2). The 3.9 kW figure balances what seems reasonable, without being overly high (risk of over-engineering grid upgrades required) or low (risk of underestimating future reinforcement need required).

Note, Table 1 and Table 2 present figures in a mix of kVA and kW, as used in each referenced report. To convert from kVA to kW, a power factor is applied. This factor value can also vary between different studies. Within this high-level analysis, an approximation has been made: the power factor is 100% (this is an over-estimate).

Not all DNOs currently have a set methodology for heat pump heated dwellings. These are summarised below in Table 1. In previous studies, different consulting organisations have considered Northern Powergrid's approach to be the most developed and have used these figures for projects in Cambridgeshire and across the UK.

Table 1

DNO	1-Bed	2-Bed	3-Bed	4-Bed
Scottish and Southern	n/a	n/a	n/a	n/a
SP Energy Networks	2.0 kW	2.4 kW	2.8 kW	4.0 kW
Electricity North West	n/a	n/a	n/a	n/a
Northern Powergrid	1.4 kW	1.4 kW	1.4 kW	1.4 kW
Western Power	1.9 kW	2.7 kW	3.5 kW	4.5 kW
UK Power Networks[1]	2.1 kW	2.1 kW	2.6 kW	3.4 kW

[1] EDS 08-2000 LV Network Design, Table 6.1; UK Power Networks confirmed kVA units can be replaced with kW for domestic properties

Using SP Energy Networks (SPEN) and Scottish & Southern Electricity Networks (SSEN) ADMD calculator[2] get values circa 6-10 kW per dwelling (up to 100 customers). This is expected to plateau at higher customer numbers, though it is unclear at what value this might plateau at (trend line plateaus at 0 kW, which seems unlikely).

Roadnight Taylor assumes a similar 3.9 kVA average per dwelling, though only 30% of homes have an EV charger - this is likely lower than may be the case for some of these developments.

Table 2

Publication	Demand Assumptions (per dwelling)	Comments
UK Power Networks Feasibility Assessment (2019)	3.0 kVA - 3.9 kVA	Considered Moderate, High and Gone Green scenarios
North East Cambridge Energy Masterplan (WSP 2021)	1.33 kVA (excludes EV charging)	High density development site; being built to enhanced energy efficiency standards
GCP Local Network Analysis (Asset Utilities 2019)	10.5 kVA	Several scenarios considered. 10.5 kVA assumes all properties have EV charger & heat pump.
Cambridgeshire LAEP (Mott MacDonald 2026)	1.3 kVA	Based on measured experimental data (Customer Led Network Revolution trial in early 2010s)
GCP Electricity Demand Requirements (Roadnight Taylor 2021)	3.9 kVA	Based on Gone Green UK Power Networks scenario; 30% of homes with EV charger.
NESO tRESP (2026)	0.4 kW (EV charging) 1.4 kW (heat pump)	Averaged by 2021 Census data for proportion of different types of dwellings across England and Wales. Published in January 2026 to improve consistency and standardised figures for DNOs when estimating impacts.

In this analysis, a mid-range estimate of demand from existing studies in the region is used (3.9 kVA); although this is at the higher end of what DNO's estimate (Table 1) so could be seen to present a 'worst-case scenario'.

In this analysis it is assumed that an average of 50% of dwellings will have EV charging. This is based on information given for North East Cambridge in the Greater Cambridge Local Plan Regulation 18 October 2025 version on the expected proportion of properties with EV chargers (maximum average of 0.5 parking spaces per residential dwelling, with

[2] ADMD calculator - LCT Ready Housing Developments - SP Energy Networks

100% EV charging, minimum 7kW per space). None of the other key growth sites have the proportion of parking spaces or EV charging specified in the GCLP, so it is assumed this proportion level applies to all sites. This is higher than the 30% estimated in the Gone Green scenario, but lower than other reports' figures where 100% of properties are estimated to have EV chargers.

At a high level, the over-estimate of the power-factor approximately balances out for the higher proportion of dwellings with EV chargers for the average energy demand per dwelling (kW).

Some of the sites overlap the City of Cambridge heat network zone. It has currently been assumed all dwellings and buildings for the seven sites will be heated by heat pumps. There is the possibility that some future demand might be absorbed by future heat network zoning; the figures presented here therefore present a worst-case scenario.

Non-residential Demand Assumptions

Power demands for non-residential commercial sites have been calculated based on the floorspace and primary use of the development, as given in the planning policies (Site Allocations in the Greater Cambridge Local Plan Regulation 18 October 2025 version).

This takes the industrial classification and floor space, as given in the planning policies, and maps that to the CIBSE land use type. This assumes there are 2000 operating hours in a year.

An overall diversity factor of 60% has been applied when calculating the electrical demand for each building use type, in line with Electricity North West's Code of Practice 279[3]. Heating and cooling loads were converted to an electrical equivalent assuming that all developments are heat-pump led, and with a worst-case Coefficient of Performance of 2.0 on coldest winters' day. This is consistent with the diversity factor used in the Cambridgeshire LAEP; is slightly lower than used by Roadnight Taylor in GCP Demand Requirements report (80%); and WSP which stated that diversity is not applied to non-domestic loads in the NEC Energy Study Masterplan.

Table 3 below shows the electrical demand assumptions for each use type.

Table 3

Use case description	CIBSE Land use type	Total Diversified Load (kW/m^2)
Business	Category 1 - General office	0.0813
General industrial	Category 27 - Workshop	0.1638
Storage / distribution	Category 28 - Storage facility	0.0102
Shops	Category 3 - General retail	0.1380
Financial & professional services	Category 1 - General office	0.0813
Restaurants & cafes	Category 7 - Restaurant	0.2130
Drinking establishments	Category 8 - Bar, pub or licenced club	0.2130

[3] Network Design General Requirements

Use case description	CIBSE Land use type	Total Diversified Load (kW/m^2)
Hot food takeaways	Category 7 - Restaurant	0.2130
Non-residential institutions	Category 19 - Clinic	0.0810
Assembly and leisure	Category 11 - Entertainment halls	0.1620
General office	Category 1 - General office	0.0813
Research and development	Category 24 - Laboratory or operating theatre	0.1698
Industrial processes	Category 27 - Workshop	0.1698
Learning & non-residential institutions	Category 17 - Schools and seasonal public buildings	0.0516
Local Community & Learning	Category 17 - Schools and seasonal public buildings	0.0516

Accounting for other developments across Greater Cambridge

Alongside the seven key growth sites, there are multiple other sites earmarked for development in the Greater Cambridge Local Plan.

Any sites in the Greater Cambridge Local Plan that already have planning permission, have been excluded from the modelling presented here. This is as it is assumed UK Power Networks will already be aware and planning for the connection of the most significant sites, so the energy demand does not also need to be modelled here.

Dwelling and non-residential employment floorspace uplift from the Regulation 18 GCLP have been added on top of the growth figures in the 'Core growth' scenario in the Cambridgeshire LAEP. The 'Core growth' scenario relates to that in the CPCA Local Growth Plan.

The full extent of some of this 'Core growth' across Cambridgeshire and Peterborough was not publicly available at the time of the Cambridgeshire LAEP modelling. The overall growth headline figures (15% more residents by 2035; 48% more residents by 2050[4]) have been split in the same spatial distribution of growth as the forecast for dwellings produced by Cambridgeshire County Council (CCC) (and used to inform the headline population growth figures).

The network modelling figures presented in later sections include all the below:

- Holistic transition (scenario for net zero transition pathway of existing domestic & commercial stock from Cambridgeshire LAEP)
- Core growth scenario (from CPCA Local Growth Plan) – additional 53,355 dwellings estimated for Greater Cambridge by 2045
- GCLP figures ('GCLP scenario') – additional 18,619 dwellings by 2045

The holistic transition scenario includes the full current solar pipeline, such as Sunnica, Kingsway, East Park and Len Fen Drove. The impacts of these on headroom are therefore already considered within headroom figures presented later. Should other large scale energy projects come forwards, including community energy projects, these may have

[4] CPCA Local Growth Plan

further alignment and synergies with the headroom figures and infrastructure options presented in later sections of this report.

In the Cambridgeshire LAEP modelling, the dwelling figures referenced in the CPCA Infrastructure Delivery Framework (IDF) Report (Stantec, 2024)[5] were uplifted by Mott MacDonald to align more closely with the dwelling forecast produced by CCC. The dwelling forecasts use CCC's mid-2023 dwelling stock estimates as the starting point. Housing trajectories published by the city and district councils (details available in Appendix 2) are used to inform the dwelling stock forecasts. These include expected completions of all sites regardless of size. This uplift of IDF figures to more closely align with dwelling forecasts therefore accounts more fully for expected growth levels, and an understanding of which years this is likely to occur in.

To ensure figures are not double counted in the analysis for this report, the variance between the uplifted IDF figures and allocations in the GCLP has been used in this modelling.

Sites that were included in the IDF were included in the original Cambridgeshire LAEP and the energy network modelling. For any of these sites with further uplift in GCLP compared to the IDF, the same assumptions have been made for building uses of employment floorspace and phasing as in the Cambridgeshire LAEP modelling.

Dwelling phasing figures have been sourced from the GCLP Development Strategy Topic Paper (2025)[6]. Where sites have no dwelling phasing information available, all dwellings have been assumed to be built in 2035 (mid-plan period of 2024-2045). For these sites, some units allocated in the Local Plan will be delivered after 2045.

For any new sites in the GCLP (other than the seven growth sites elsewhere covered in greater detail), employment floorspace usage and phasing has been based on information provided by Greater Cambridge Shared Planning from site allocations in the Greater Cambridge Local Plan Regulation 18 October 2025 version.

For any site where it is unknown what quantity of floorspace relates to each building use class, the total unknown floorspace for that site has been averaged between the building uses.

For sites located across the boundary of a substation distribution area, it is assumed that half the floorspace and dwellings relates to each substation area. Only substations within Cambridgeshire have been included in this modelling.

This report only considers sites within Greater Cambridge as outlined above. Development might also occur on sites around the periphery of Greater Cambridge that might connect to substations used by development in South Cambridgeshire. This would additionally impact on headroom at some substations.

[5] Infrastructure Delivery Framework Full Report
[6] Topic cover - Development Strategy Topic

Infrastructure options & high-level costings

Projected phased loads from the domestic and non-domestic sectors of the seven growth sites have been produced and used to estimate projected substation demand headroom. These projections have been discussed with UK Power Networks, and for the seven sites, infrastructure options and high-level costings discussed.

For some substations there is not enough capacity available to accommodate the growth anticipated at these sites (outlined further in sections below). For the substations to meet the additional demand, reinforcement works or new substations are needed to increase the available capacity and improve the efficiency of the network. Below explores options which UK Power Networks advise are likely for these sites, and early indicative costs. To note, any proposed ED3 projects are subject to regulatory approval by Ofgem.

These works will form part of UK Power Networks' ED3 submission to Ofgem, which will be submitted later in 2026. At present the proposal is to seek funding for these works from the regulator, and this report will help to provide justification for that funding. If this approach is approved by the regulator, developers will need to pay for connection to this infrastructure, which is standard practice for all new connections. This report does not consider developer connection costs, as these cannot be estimated accurately at this stage.

If there are substantial changes to phasing (for example a point load completed in one year) or land uses, what is indicated below may change.

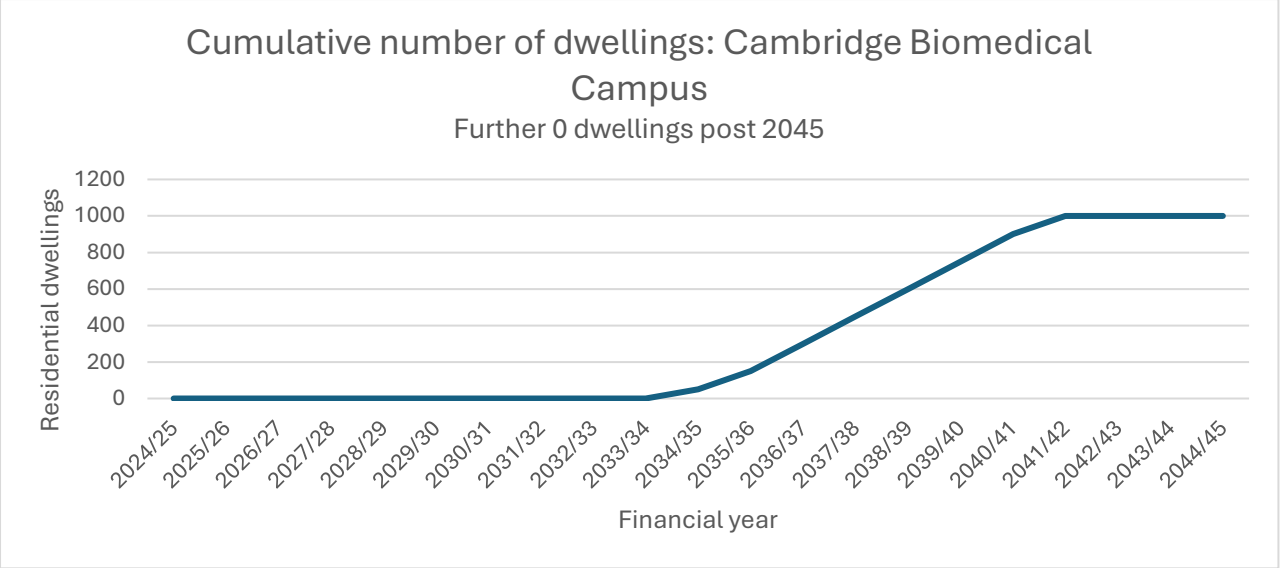
It is important to note that power cannot be 'reserved' in advance of a formal application for the load required, which would occur after planning consent is granted. This report sets out high-level indicative network modelling, but it is expected that this would be refined as more details about these sites are known as the development progresses.

4. Cambridge Biomedical Campus

Cambridge Biomedical Campus includes Addenbrookes Hospital and is in the southern part of Cambridge, where it is surrounded by established neighbourhoods and ongoing housing developments. The site is adjacent to the M11 motorway which provides direct links to London and Stansted airport and well served by dedicated busways which puts Cambridge train station 10 minutes away. Cambridge South train station is expected to open on the east of the site during 2026.

It is proposed this site will have approximately 1000 additional homes on the campus, and approximately 687,000 net additional square metres (Gross Internal Area, GIA) of research and development floorspace (specifically related to biomedical and biotechnology uses and clinical healthcare and hospital facilities). 461,045 square metres of this is an uplift compared to previous figures in the IDF report and has been modelled in this analysis.

This uplift relates to phase 4 of the Cambridge Biomedical Campus redevelopment. The first housing completions at this site are anticipated from 2034/35 onwards, with some employment floorspace perhaps requiring connection before housing. It has been assumed that from 2031 to 2045 the 461,045 square metres of employment floorspace has equal phasing for being built.



Type	Quantum in plan period	Total peak demand in plan period (MW)
Domestic	1000 dwellings	3.90
Non-domestic (total: 461,045 m^2)	Research and development – 461,045 m^2	78.29

UK Power Networks have indicated that this site would likely connect to the reinforced Radnor Primary, and a new substation Trumpington Primary[7]. Close by, Cambridge University has an existing primary substation (Addenbrookes Primary) and an adjacent 33kV/11kV Independent Distribution Network Operator (IDNO) Primary that could be used. This is also fed from UK Power Networks' network upstream. In this modelling this site has been modelled to connect to the Radnor Primary substation.

Radnor Primary is projected to breach 6 years earlier when consider growth coming forwards in the GCLP and the CPCA core growth scenario, than the holistic transition scenario alone (2031 rather than 2037).

UK Power Networks have advised there is no expectation that any reinforcement will be required for this site, though this depends on the scale of power that is eventually requested.

This site will be covered by the already reinforced Radnor Primary substation, and the new Trumpington Primary, which is under construction for the remainder of ED2.

Developers will need to pay new infrastructure (extension assets) to the point of connection to the network; the cost will depend on power requirements.

[7] Cambridge energy grid set for boost as substation project gets funding

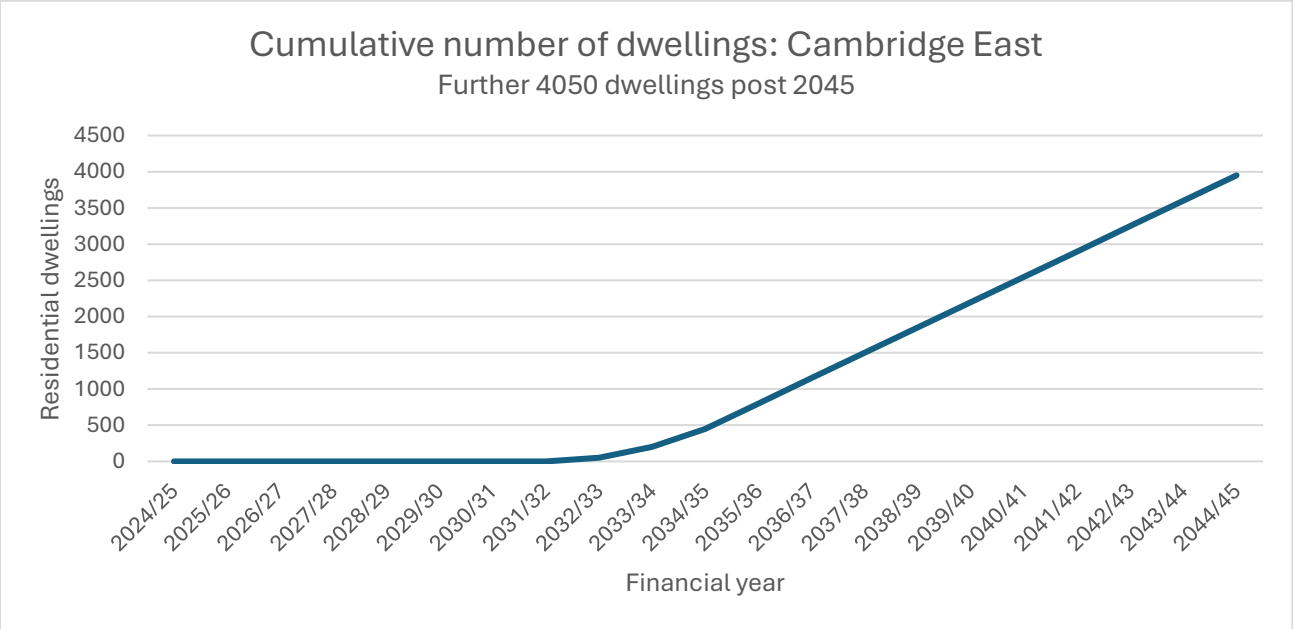
5. Cambridge East

Cambridge East is located on the eastern edge of Cambridge and is bisected by Newmarket Road. It contains within it most the Cambridge airport site. The A14 is to the north of the site, with the Cambridge-Newmarket railway running to the south of the site.

It is proposed this site will have approximately 8000 dwellings, split between two sites: Marleigh and Springstead Village. The site will have a range of supporting services and facilities, including education, health, community and retail uses.

For the Cambridgeshire LAEP, 4168 dwellings were modelled. GCSP have advised these have all been completed, and the 8000 dwellings is a further uplift on top of this. Of these 8000 dwellings, 3950 are included for completion in the plan period (2024-2045), with the remaining 4050 due for completion after the plan period.

It has been assumed there is an equal split of employment floorspace phasing during the plan period for each year 2026-2045.



Type	Quantum	Total peak demand in plan period (MW)
Domestic	3950 dwellings	15.41
Non-domestic (total: 140,450 m^2)	General industrial - 10,000 m^2 Storage / distribution – 10,000 m^2 General office – 1600 m^2 Learning & non-residential institutions – 115,000 m^2 Non-residential institutions – 200 m^2 General office – 2550 m^2 General office, learning & non-residential institutions, assembly & leisure – 3000 m^2 Assembly & leisure – 1400m^2	8.52

It has been modelled that this site would connect to the Fulbourn Primary substation. Fulbourn Primary is projected to breach 5 years earlier when consider growth coming forwards in the GCLP and the CPCA core growth scenario, than the holistic transition scenario alone (2032 rather than 2037).

UK Power Networks have advised this site will need to be supplied with a new substation in this area. UK Power Networks already have advanced plans for a 'Teversham substation' which will serve this area. This is expected to be built adjacent to the new Newmarket Road Travel Hub. This new substation is expected to form part of UK Power Networks' ED3 submission as part of the Engineering Justification Paper covering North East and East Cambridge; and is anticipated deliverable for ED3. Please note that all ED3 submissions are subject to regulatory approval by Ofgem.

Indicative cost of new substation: £10m-£15m

Further, there will be connection costs for the developer.

6. Cambourne

Cambourne is located south of the A428 which links Cambridge and St Neots. This site includes the whole town of Cambourne which is a purpose-built residential area with a large nature reserve.

It is proposed this site will have an additional 2720 dwellings and 34,600 m^2 gross internal area of employment floorspace. The site is made up of:

- Cambourne West, where it is proposed there will be up to a further 2350 homes; and employment uses up to 30,625 square metres (GIA) of mixed employment, with an additional primary school, community facilities, retail, indoor and outdoor leisure provision, allotments, and open space.
- Cambourne Business Park, a mixed-use development including up to 256 homes; approximately 4000 square metres (GIA) office floorspace.
- Cambourne Town Centre, a mixed-use development, including up to 120 homes; and a range of retail units, community, cultural, dedicated faith and commercial leisure uses.

From the existing modelling in the Cambridgeshire LAEP, with the uplifted figures from the IDF report, greater than the full uplift of dwellings, and floorspace has already been included within the Cambridgeshire LAEP. No additional analysis has therefore been completed for this site. If these are now proposed to be slightly lower, the existing modelled figures give a 'worst-case scenario'.

Summary of figures for Cambourne:

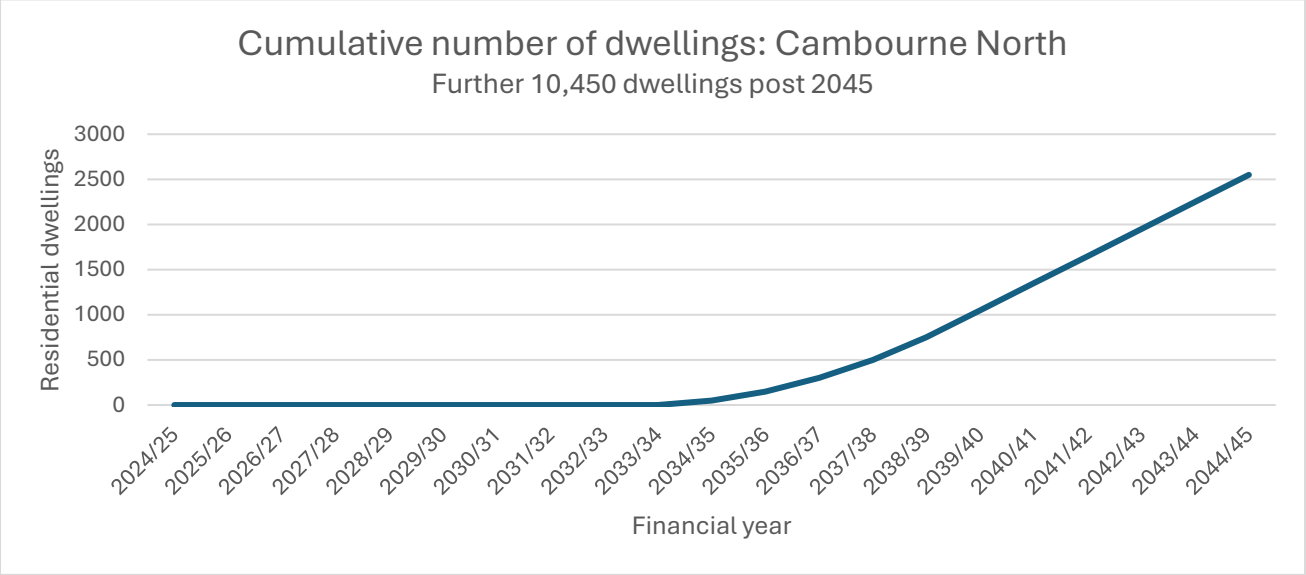
Property type	GCLP figures	Figures included in Cambridgeshire LAEP	Variance
Domestic	2720 dwellings	3515 dwellings	-795 dwellings
Non-domestic	34,600 m^2	35,603 m^2	-1003 m^2

7. Cambourne North

Cambourne North is a proposed new settlement, located north of Cambourne and the A428, and to the south of Elsworth and Knapwell. It is proposed this site will have 13,000 dwellings, and 108,000 m^2 gross internal area of employment floorspace, with a range of supporting services and facilities, including retail, community, cultural, faith, leisure, education and sports and open space uses.

Of the 13,000 dwellings, 2550 are planned to be built during the plan period (2024-2045), with a further 10,450 after the plan period (after 2045). The phased trajectory for cumulative dwellings built during the plan period is as below. This is based on the GCLP Development Strategy Topic Paper (2025).

The analysis assumes that employment floorspace completion mirrors the proportion of dwelling completions within and after the plan period, with 21,168 m^2 built in the plan period (assumed equal split between years 2026-2045), and 86,832 m^2 built after the plan period.



Type	Quantum	Total peak demand in plan period (MW)
Domestic	2550 dwellings	9.95
Non-domestic (total: 21,185 m^2)	General retail – 7062 m^2 Non-residential institutions – 7062 m^2 Assembly and leisure – 7062 m^2	2.69

The proposed East West Rail (EWR) station has not been separately modelled within the figures presented above.

It has been modelled that this site would connect to the Bourn Primary substation. As outlined in Section 6, no additional modelling has been undertaken within this modelling for Cambourne, however the anticipated figures for Cambourne (included within Cambridgeshire LAEP and also modelled to connect to the Bourn Primary substation) and the Cambourne North figures are significant. Bourn Primary is projected will breach 7 years

earlier when consider growth coming forwards in the GCLP and the CPCA core growth scenario, than the holistic transition scenario alone (2030 rather than 2037).

UK Power Networks advised the development coming forwards for Cambourne and Cambourne North will require the reinforcement of Bourn Primary with large transformers. To fully use large transformers, UK Power Networks will need to change the way the network runs, which will be facilitated by the establishment of the new West Cambridge Grid and the laying of multiple new circuits.

This is expected to be included as part of the ED3 Engineering Justification Paper for West Cambridge, which is subject to regulatory approval.

Indicative cost of Bourn transformer reinforcement (in isolation): £5m-£10m

This has dependency with other parts of the same West Cambridge paper to ensure the full benefit of reinforcement in this location can be realised.

Further, there will be connection costs for the developer.

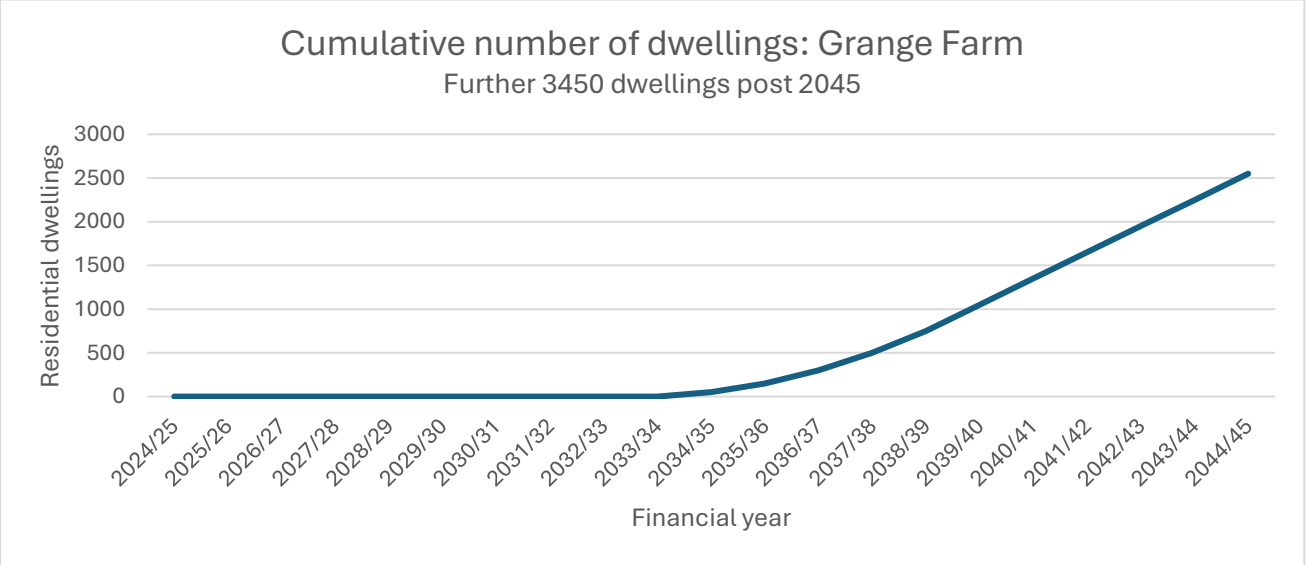
8. Grange Farm

Grange Farm is proposed to be a new settlement, on land adjacent to the A11 and A1307 at Grange Farm. This area is located southeast of Cambridge, and north of Great Abington.

It is proposed this site will have approximately 6000 homes, 20,000 square metres for provision of a local last-mile logistics hub/warehousing, 15,000 square metres floorspace to meet the local needs generated by the new settlement, with a mix of retail, commercial, educational, healthcare and community facilities.

For residential dwellings, it has been assumed the same proportion of these are completed each year as the figures in the GCLP Development Strategy Topic Paper (2025), with 2550 dwellings completed in the plan period, and a further 3450 dwellings after the plan period.

For employment floorspace, it has been assumed there is an equal split of phasing during the plan period for each year 2026-2045.



Type	Quantum	Total peak demand in plan period (MW)
Domestic	2550 dwellings	9.95
Non-domestic (total: 35,000 m^2)	General office - 15,000 m^2 General industrial - 10,000 m^2 (assumed area) Storage/ distribution - 10,000 m^2 (assumed area)	2.96

It has been modelled that this site would connect to the Linton Primary substation. Linton Primary is projected to breach 2 years earlier when considering growth coming forwards in the GCLP and the CPCA core growth scenario, than in the holistic transition scenario alone (2024 rather than 2026). Note this projected breach year includes estimated growth from the CPCA core growth scenario. Due to the lack of phasing included within the Local Growth Plan for this growth, in the Cambridgeshire LAEP modelling this growth was projected to start from 2023 and hence may have estimated greater projected growth in early years than may have actually occurred. This explains why this network modelling projects a headroom breach in the past.

UK Power Networks have advised initial supplies will be able to be provided from Sawston Primary during ED3 (2028-2033). As this substation is relatively far away and on the other site of the A11 to Grange Farm, however, UK Power Networks would need to perform optioneering assessments to assess whether to continue supplying from Sawston Primary or reinforce Linton Primary for longer term action in this area. Linton Primary is located closer to the site and on the same side of the A11 as Grange Farm.

There may be the possibility of connecting approximately 300 homes in the early phase to Fulbourn Primary or Linton Primary. The Fulbourn network is routed within the site on overhead lines so offers a closer local connection.

If Linton Primary were to be reinforced (installation of larger transformers), other changes in the feeding arrangements to the primary would also be required.

Given the uncertainty in best future option for this site, as yet indicative costs are not estimated.

However, given the distance and need to cross the A11, connection costs may be relatively high for connection to Sawston for developers.

If there is further activity coming to this area (such as the GCP Cambridge South East Travel (CSET)[8] hub), this will also need to be factored into these considerations. Network modelling for the travel hub is not included within the analysis for this report, and the network connections required will be developed separately to the Grange Farm development.

[8] Cambridge South East Transport

9. North East Cambridge

The North East Cambridge site is situated between the A14 to the north and west, the Cambridge to King's Lynn railway line to the east and residential areas to the south. It is bisected by Milton Road which then continues north as the A10 towards Waterbeach and Ely.

It was initially proposed this site will have 8350 new homes: including 5500 homes on the existing Cambridge Waste Water Treatment Plant (CWWTP) site. In August 2025 the Government announced that it will not be funding the relocation of the CWWTP through its Housing Infrastructure Fund, which means that there is uncertainty as to whether the delivery of the Councils' vision for North East Cambridge can be realised in full, including the assumed delivery of housing within the plan period. Given this uncertainty, just the 2850 homes which sit outside of the odour control zone for the CWWTP[9] have been included within this modelling.

It has been assumed the same proportion of these are completed each year as the figures in the GCLP Development Strategy Topic Paper (2025), with 1421 dwellings in the plan period, and a further 1429 dwellings after the plan period.

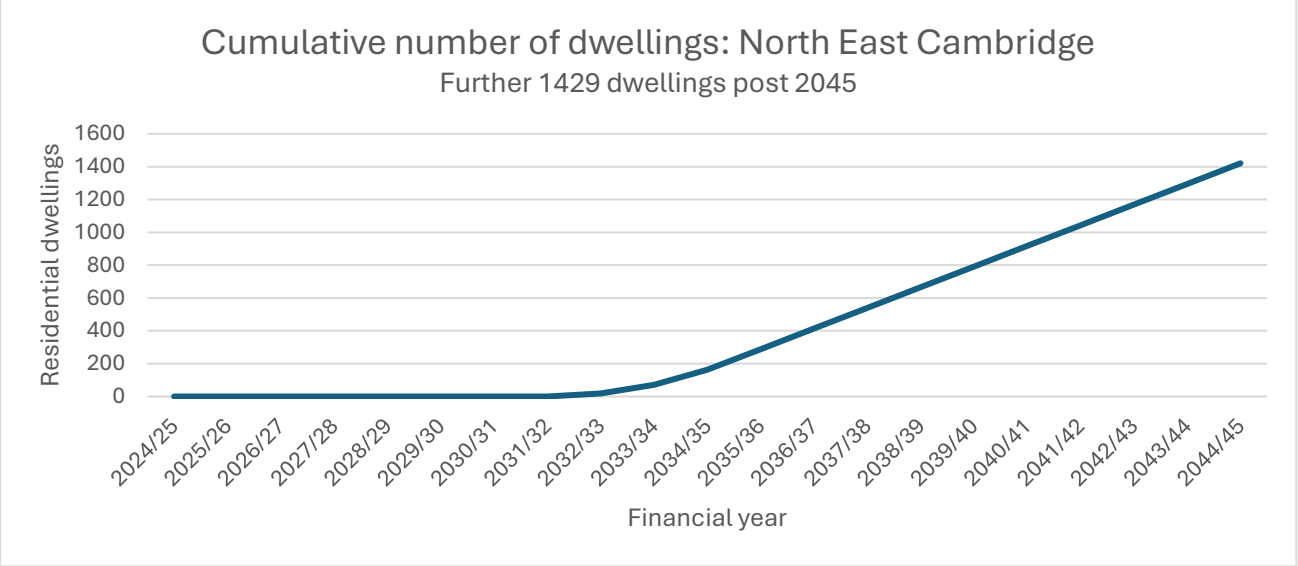
Other details about this site are assumed to still stand, such as the proposal to have site-wide maximum average of 0.5 parking spaces per residential dwelling, with 100% EV charging (minimum 7kW per space).

This site is also proposed to have up to 320,000 square metres of additional business floorspace, 27,300 square metres of industrial floorspace, a new district centre, with provision of community and cultural uses.

Where the employment floorspace figures have not been provided in the GCLP policy for this site, this employment floorspace has not been included in this analysis (for example a new district centre around Cowley Road has no associated estimates of employment floorspace and is understood to be separate from other employment floorspace figures provided).

It has been assumed there is an equal split of phasing during the plan period for each year 2026-2045.

[9] Odour control zone shown in Technical note on interpretation of Odour Impact Assessment for Cambridge Water Recycling Centre (page 7)



Type	Quantum during plan period	Total peak demand in plan period (MW)
Domestic	1421 dwellings	5.54
Non-domestic (total: 347,300 m^2)	General offices - 320,000m^2 General industrial - 27,300 m^2	30.49

It has been modelled that this site would connect to the Milton Road Primary substation. Milton Road Primary is projected to breach 7 years earlier when consider growth coming forwards in the GCLP and the CPCA core growth scenario, than the holistic transition scenario alone (2026 rather than 2033).

UK Power Networks have advised there is sufficient capacity in the reinforced Milton Road Primary for an initial phase at Milton Road Primary, but not at its expected fullness.

To cover the site in its fullness will require a new substation (tentatively called 'Hartree substation'). This will link up with Milton Road primary, to achieve maximum use of infrastructure. It is currently anticipated 'Hartree substation' will be included as part of the Engineering Justification Paper for North East and East Cambridge in UK Power Networks' ED3 submission, which is subject to Ofgem's regulatory approval.

Based on current phasing and volume of dwellings, the Engineering Justification Paper will focus on enablers for the substation to be built (for example site selection and early design) as well as reinforcement of the supplying circuits.

Indicative cost of new substation: £10m-£20m

Alongside this, interaction works required on the 132kV overhead lines traversing the area and the establishment of new infrastructure will influence the solution and costs.

Further, there will be connection costs for the developer.

10. West Cambridge

West Cambridge is located directly south of Madingley Road which connects Cambridge to Cambourne and is east of the M11; Madingley Park and Ride site is directly to the north of the site.

It is proposed this site will be a mixed-use development, with an extension of up to 370,000 square metres of academic floorspace, commercial research and development floorspace; of which up to 170,000 square metres will be for commercial use and other supporting development (for example a nursery, retail, food and drink, assembly and leisure).

Only the 170,000 square metres is additional uplift compared to earlier plans and modelling. Based on the non-residential trajectory, 113,333 m^2 are anticipated to be completed during the plan period (equal split for each year in 2026-2035), with the remaining 56,666 m^2 expected to be completed after the plan period (after 2045). It has been assumed that the phasing for each building use type is the same, and that an equal split of employment

Type	Quantum during plan period	Total peak demand in plan period (MW)
Domestic	n/a	n/a
Non-domestic (total: 113,333 m^2)	Research & development – 56,666 m^2 Non-residential institutions – 56,666 m^2	14.21

It has been modelled that this site would connect to the Madingley Road Primary substation. Notably, Madingley Road Primary is projected to breach at least 19 years earlier when consider growth coming forwards in the GCLP and the CPCA core growth scenario, than the holistic transition scenario alone (2032 rather than after 2050).

UK Power Networks have advised, when considered in isolation, there is available capacity at Madingley Road Primary for these developments in the anticipated phasing. When considered with other developments to the West of Cambridge, this will require the establishment of a new grid substation (West Cambridge Grid) and laying several circuits to ‘tie in’ the network in the area. This is expected to part of an ED3 Engineering Justification Paper for West Cambridge, which is subject to Ofgem’s regulatory approval.

Indicative cost of new substation and associated circuit laying: £20m

Further, there will be connection costs for the developer.

11. Substation Demand Headroom

The Cambridgeshire LAEP includes analysis for of substation demand headroom under a Holistic Transition scenario, with analysis on how much sooner this might be breached under the CPCA ‘core growth’ scenario. The analysis here looks at how much sooner substation headroom might be breached with the additional growth coming forwards in the emerging GCLP (Regulation 18 October 2025 version).

In the sections above this is outlined for each of the seven key growth sites.

Other substations may breach earlier than projected under the holistic transition scenario alone (summarised in Table 4) however infrastructure options and indicative costs for these are outside the scope of this report.

Figures 1-5 show the projected substation demand headroom in Greater Cambridge spatially for five-year intervals throughout the plan period: 2024, 2029, 2034, 2039 and 2044. These are overlaid with the proposed growth development sites, with peak demand expected during the plan period (up to 2045). Note, as covered in Section 6, no additional peak demand has been modelled for Cambourne, hence this site is not shown on the map.

The projected demand headroom figures for each substation for each year are shown in Figure 6.

From Figures 1-6 it can be seen that in the early years of the plan most substation areas in Greater Cambridge have more than 5% headroom (green). A few areas have negative or zero headroom (red). In 2029, most areas in the north and east of Greater Cambridge continue to have more than 5% headroom; however, more areas elsewhere have less than or equal to 5% headroom (amber) or negative/zero headroom (red). As the years progress, more substation areas move to breached headroom (red). Small numbers of substation areas with positive headroom (green) remain: in central and north Cambridge and the far outskirts in Greater Cambridge in 2034; shifting to just north Cambridge and the western outskirts in 2039; and limited to the far western outskirts only by 2044.

Table 4

Primary substation	Projected year to breach under holistic transition scenario	Projected year to breach under combined holistic transition, CPCA core growth, and GCLP growth scenario	Years sooner that headroom will be breached
Barnwell Primary 11kV	2038	2033	5
Storeys Way Primary 11kV	2038	2032	6
Histon Primary 11kV	2035	2031	4
Arbury Grid 11kV	Post-2050	2042	9
Sleaford St Primary 11kV	Post-2050	2036	15
St Anthony St Primary 11kV	2028	2024	4
Haverhill Primary 11kV	Post-2050	2038	13
Longstanton Primary 11kV	2037	2030	7
Bassingbourn Primary 11kV	2042	2033	9
Sawston Primary 11kV	2031	2026	5
Shepreth Primary 11kV	2036	2028	8
Sandy Primary 11kV	Post-2050	Post-2050	0
Croydon Primary 11kV	2023	2023	0
Melbourn Primary 11kV	2023	2023	0
Landbeach Primary 11kV	2047	2036	11
Thompsons Ln Primary 11kV	2051	2039	12

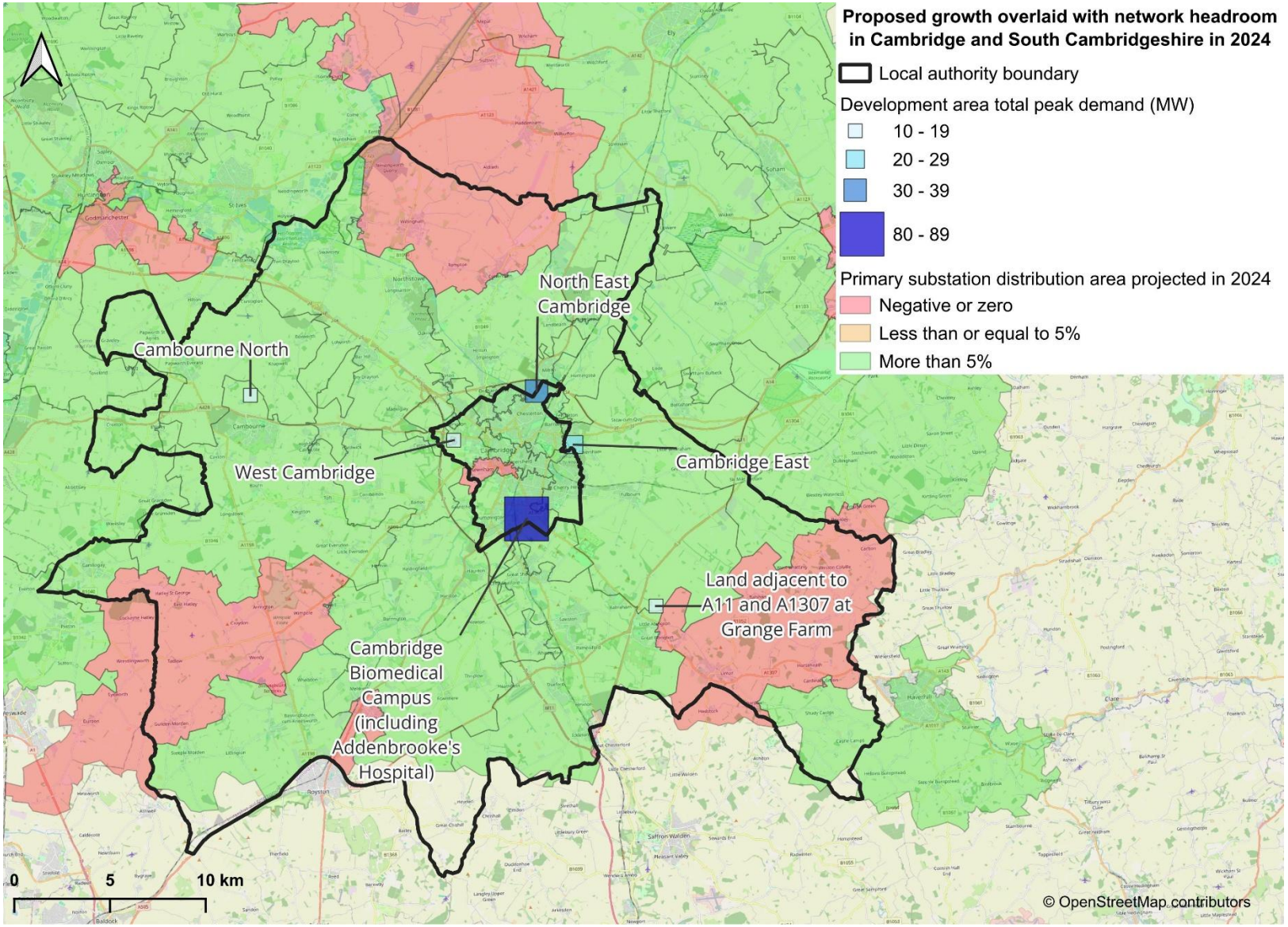


Figure 1 Proposed growth overlaid with projected network headroom in Greater Cambridge in 2024. Note developments are shown as a point (square) sized by total peak demand, the actual area of the development is different.

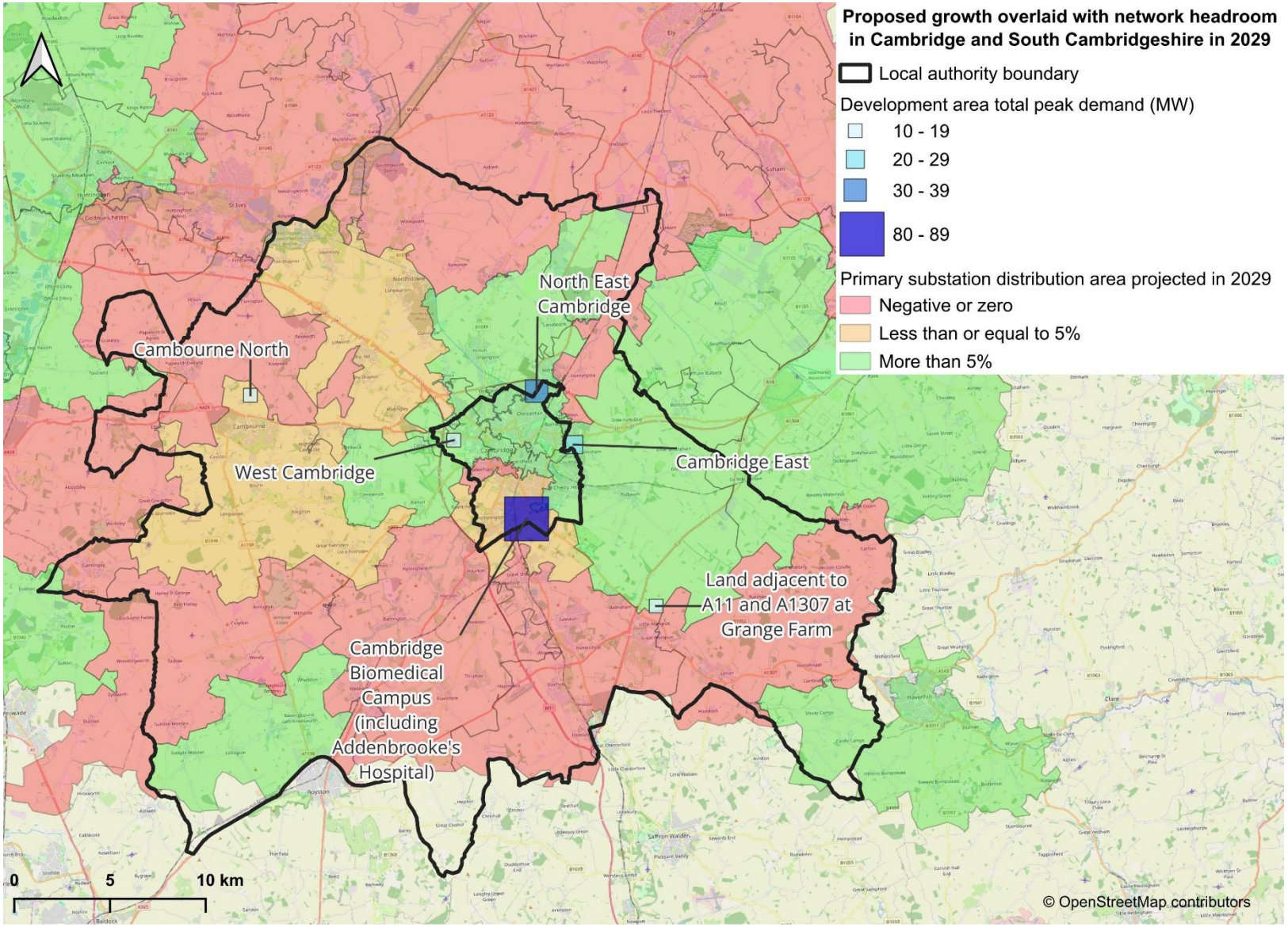


Figure 2 Proposed growth overlaid with projected network headroom in Greater Cambridge in 2029. Note developments are shown as a point (square) sized by total peak demand, the actual area of the development is different.

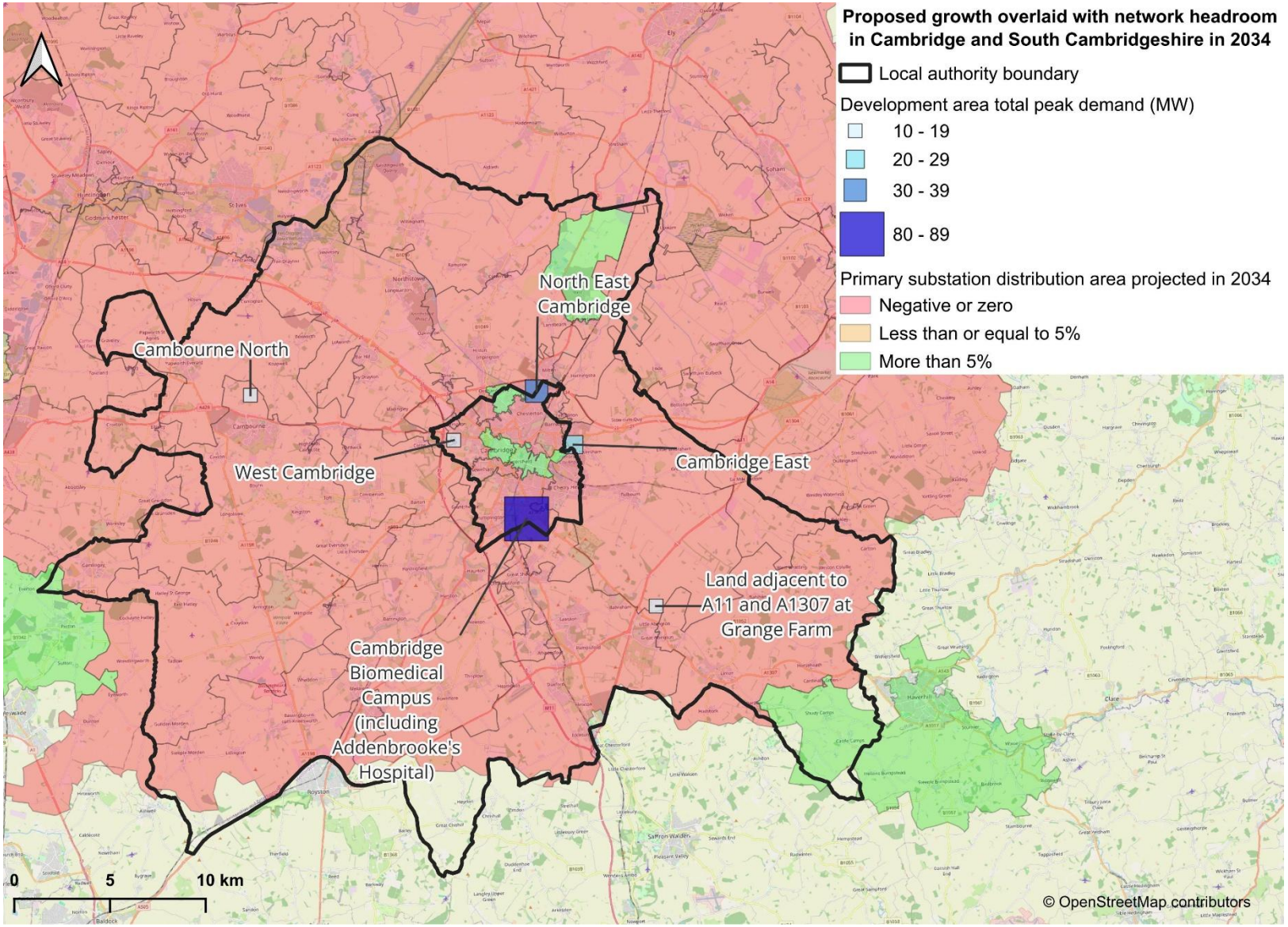


Figure 3 Proposed growth overlaid with projected network headroom in Greater Cambridge in 2034. Note developments are shown as a point (square) sized by total peak demand, the actual area of the development is different.

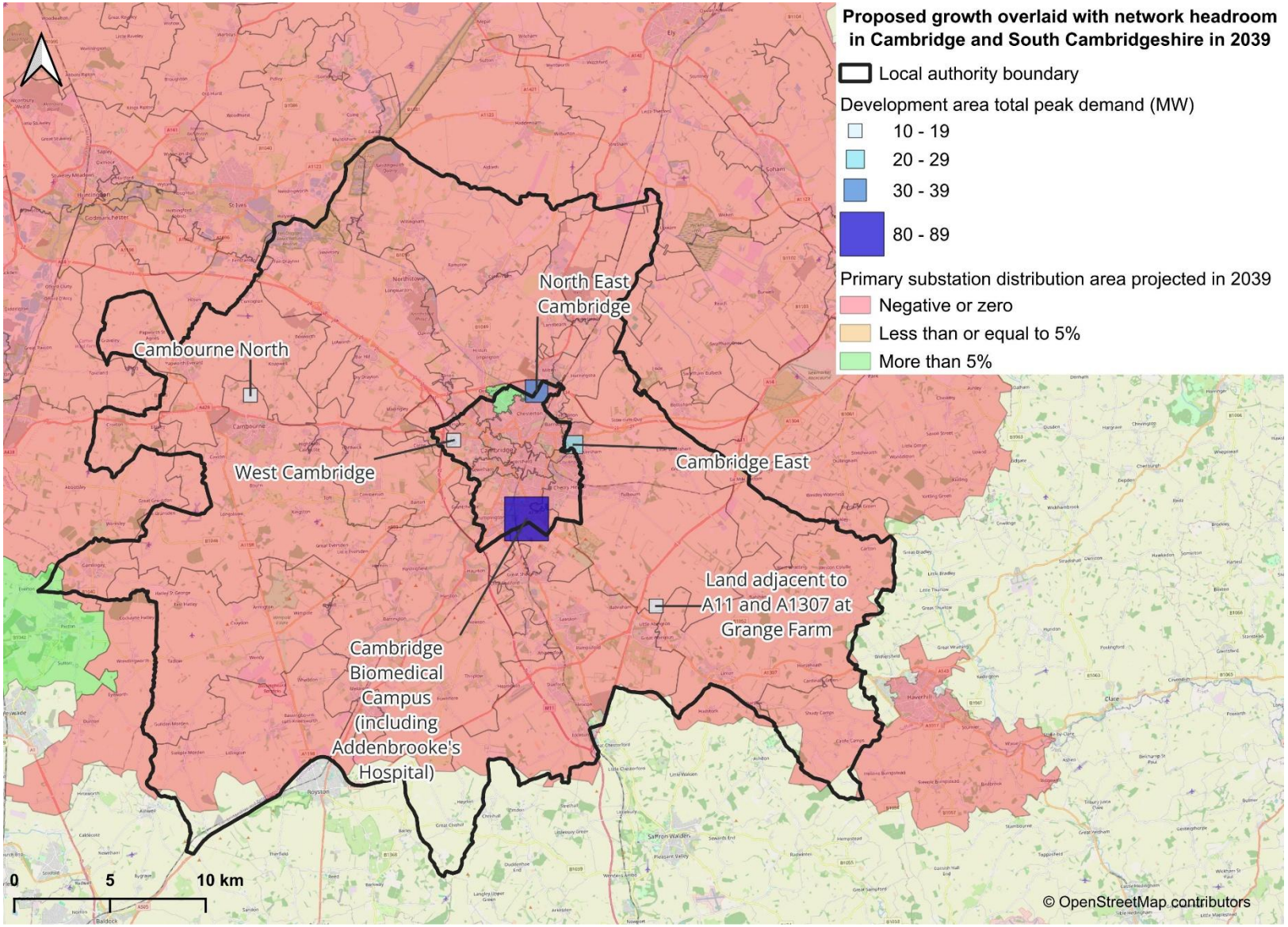


Figure 4 Proposed growth overlaid with projected network headroom in Greater Cambridge in 2039. Note developments are shown as a point (square) sized by total peak demand, the actual area of the development is different.

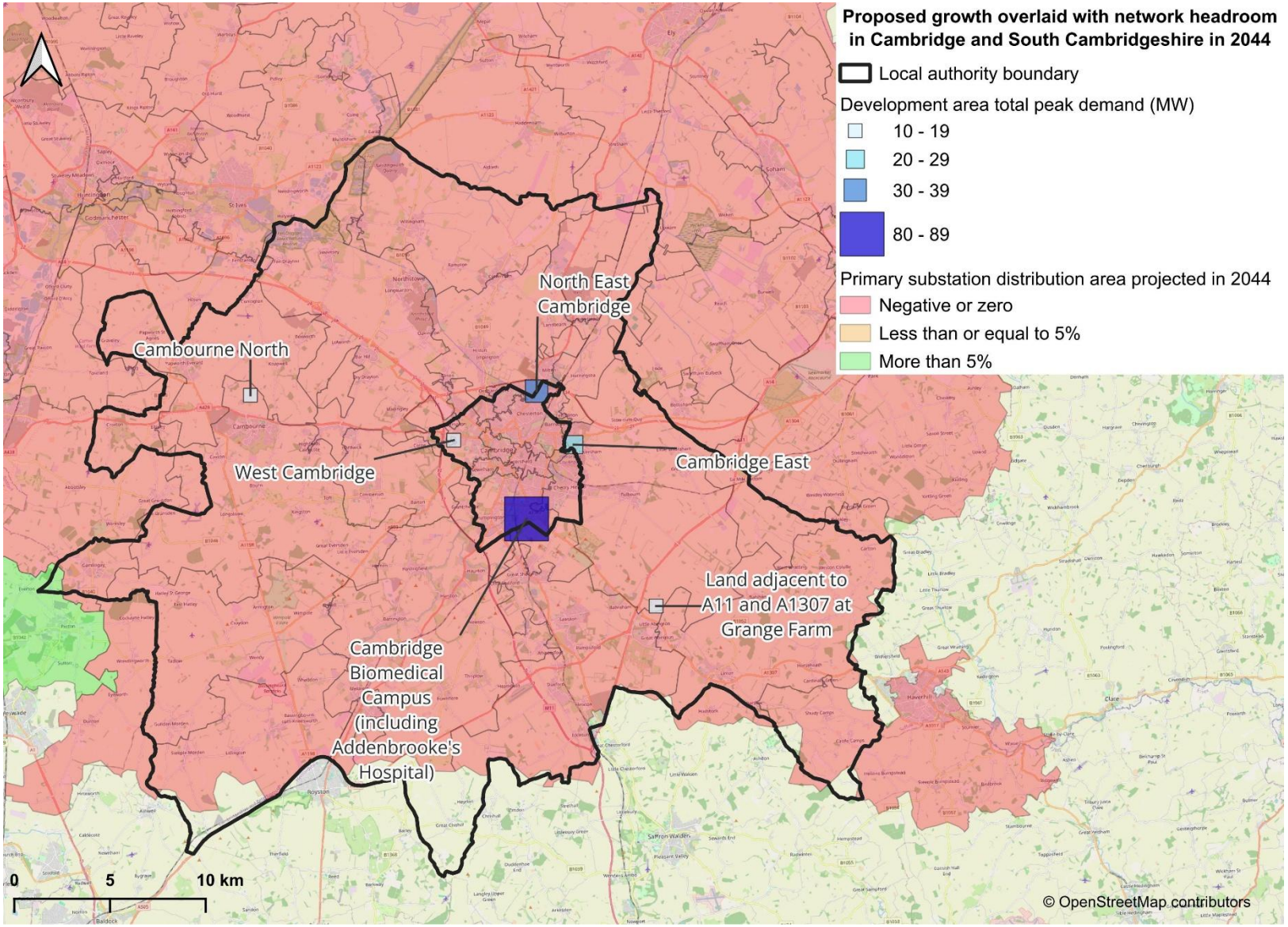


Figure 5 Proposed growth overlaid with projected network headroom in Greater Cambridge in 2044. Note developments are shown as a point (square) sized by total peak demand, the actual area of the development is different.

Local Authority	Primary Substation - LTDS Name	GSP Substation	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045
Cambridge	Arbury Grid 11kV	Burwell	15.9	15.7	15.3	14.9	14.4	13.9	13.4	12.8	12.3	12.0	11.5	10.9	9.7	8.2	6.5	4.9	3.2	1.8	0.3	-1.3	-2.7	-4.3	-5.7
Cambridge	Barnwell Primary 11kV	Burwell	6.8	6.48	5.86	5.27	4.94	3.89	2.80	2.04	1.22	0.07	-0.97	-1.78	-4.53	-7.21	-10.0	-12.7	-15.6	-18.2	-20.9	-23.5	-26.1	-28.7	-31.2
Cambridge	Fulbourn 11kV	Burwell	13.5	12.7	11.5	10.0	8.2	6.3	4.3	2.3	0.4	-1.8	-4.4	-7.3	-12.6	-18.6	-25.1	-31.5	-37.9	-44.1	-50.4	-56.6	-62.7	-68.8	-73.6
Cambridge	Histon Primary 11kV	Burwell	7.4	6.7	5.9	5.1	3.9	2.8	1.7	0.4	-0.8	-2.0	-3.2	-4.5	-7.0	-10.4	-13.8	-17.3	-20.8	-24.1	-27.5	-30.8	-34.1	-37.3	-40.5
Cambridge	Milton Rd Primary 11kV	Burwell	1.7	1.3	0.7	-1.3	-3.7	-5.9	-8.3	-10.6	-12.9	-15.3	-17.9	-20.4	-24.2	-28.9	-33.3	-37.9	-42.4	-46.7	-51.2	-55.4	-59.7	-64.0	-67.7
Cambridge	Radnor Primary 11kV	Burwell	9.5	9.0	7.7	6.3	4.8	3.1	1.8	0.3	-6.0	-12.6	-19.2	-25.7	-33.9	-43.2	-52.4	-61.5	-70.6	-79.5	-88.3	-96.7	-105.0	-113.0	-121.3
Cambridge	Sleaford St Primary 11kV	Burwell	13.9	13.5	12.8	12.1	11.1	10.2	8.8	7.8	6.8	5.8	4.9	3.8	1.3	-1.9	-5.0	-7.9	-10.7	-13.3	-15.7	-18.0	-20.3	-22.1	-24.1
Cambridge	St Anthony St Primary 11kV	Burwell	0.1	-0.0	-0.3	-0.6	-0.3	-1.5	-1.9	-2.2	-2.6	-2.9	-3.4	-3.7	-4.6	-5.6	-6.6	-7.7	-8.7	-9.7	-10.7	-11.6	-12.5	-13.4	-14.2
Cambridge	Storeys Way Primary 11kV	Burwell	6.1	5.7	5.2	4.6	3.8	3.1	2.3	1.5	0.8	-0.0	-0.7	-1.6	-3.3	-5.4	-7.7	-10.0	-12.1	-14.3	-16.4	-18.3	-20.4	-22.3	-24.3
Cambridge	Thompsons Ln Primary 11kV	Burwell	13.3	12.8	12.3	11.8	11.2	10.5	9.8	9.0	8.4	7.7	7.0	6.3	5.3	3.7	2.0	0.3	-1.2	-2.6	-4.1	-5.5	-6.8	-8.1	-9.4
South Cambridgeshire	Bassingbourn Primary 11kV	Pelham and Wymondley	7.1	6.5	5.7	5.0	4.3	3.6	2.8	2.0	1.3	0.4	-0.3	-1.1	-2.2	-3.6	-5.0	-6.4	-7.7	-9.1	-10.5	-11.9	-13.2	-14.5	-15.7
South Cambridgeshire	Bourn Primary 11kV	Eaton Socon	8.7	7.6	6.4	5.0	3.4	2.0	0.4	-1.3	-2.8	-4.5	-6.2	-8.0	-10.7	-14.1	-17.6	-21.3	-25.2	-28.9	-32.8	-36.5	-40.2	-43.8	-46.2
South Cambridgeshire	Croydon Primary 11kV	Eaton Socon	-0.8	-1.1	-1.4	-1.7	-2.0	-2.4	-2.7	-3.1	-3.4	-3.8	-4.1	-4.5	-4.9	-5.5	-6.1	-6.6	-7.2	-7.7	-8.3	-8.8	-9.3	-9.8	-10.4
South Cambridgeshire	Haverhill Primary 11kV	Pelham and Wymondley	3.4	3.2	3.1	2.9	2.7	2.5	2.3	2.1	1.9	1.7	1.5	1.3	1.0	0.6	0.2	-0.1	-0.5	-0.9	-1.3	-1.6	-2.0	-2.3	-2.7
South Cambridgeshire	Landbeach Primary 11kV	Burwell	22.4	21.1	19.7	18.1	16.7	14.9	13.2	11.6	10.0	8.2	6.5	4.9	2.2	-1.2	-4.4	-7.7	-10.8	-14.1	-17.2	-20.2	-23.0	-25.9	-28.9
South Cambridgeshire	Linton Primary 11kV	Burwell	0.4	-0.4	-1.5	-2.6	-3.8	-5.1	-6.4	-7.7	-9.0	-10.2	-11.5	-12.9	-15.2	-18.3	-21.4	-24.6	-28.1	-31.6	-35.1	-38.4	-41.7	-45.0	-47.2
South Cambridgeshire	Longstanton Primary 11kV	Burwell	8.5	7.4	6.1	4.8	3.2	1.9	0.4	-1.2	-6.7	-12.2	-17.6	-23.2	-29.3	-32.8	-36.1	-39.3	-42.5	-45.8	-49.1	-52.2	-55.2	-58.2	-61.3
South Cambridgeshire	Madingley Rd Primary 11kV	Burwell	15.8	15.3	14.8	12.7	10.8	8.8	6.8	3.8	1.0	-2.1	-5.3	-8.4	-12.0	-14.3	-16.6	-18.4	-20.0	-21.2	-22.3	-23.4	-24.5	-25.5	-26.6
South Cambridgeshire	Melbourn Primary 11kV	Pelham and Wymondley	-0.2	-0.8	-1.4	-2.1	-2.8	-3.5	-4.3	-5.1	-5.9	-6.7	-7.4	-8.2	-9.5	-11.0	-12.5	-13.9	-15.4	-16.9	-18.4	-19.8	-21.1	-22.4	-23.8
South Cambridgeshire	Sandy Primary 11kV	Eaton Socon	9.1	8.9	8.7	8.5	8.2	8.0	7.8	7.6	7.4	7.1	6.9	6.6	6.2	5.8	5.3	4.8	4.3	3.9	3.4	2.9	2.5	2.0	1.6
South Cambridgeshire	Sawston Primary 11kV	Burwell	3.6	2.2	0.5	-1.3	-3.3	-5.4	-7.5	-9.6	-13.0	-16.5	-19.9	-23.3	-27.8	-31.9	-35.8	-39.7	-43.8	-47.5	-51.4	-55.1	-58.7	-62.3	-65.7
South Cambridgeshire	Shepreth Primary 11kV	Pelham and Wymondley	6.9	5.7	4.4	3.0	1.4	-0.1	-1.8	-3.4	-4.8	-6.4	-8.0	-9.6	-12.0	-15.1	-18.0	-21.0	-23.9	-26.8	-29.9	-32.6	-35.3	-38.0	-40.8

Figure 6 Projected primary substation demand headroom (MW) in Greater Cambridge with combined GCLP growth, CPCA core growth and holistic transition scenarios. Red (less than or equal to 0), amber (less than or equal to 5% headroom), green (more than 5% headroom) shown.

Appendix 1 – Planning policies for non-residential assumptions

The floorspace and primary use of the developments have been taken from the below planning policies, from the Greater Cambridge Local Plan Regulation 18 October 2025 version:

- Policy S/CBN: Cambourne North | Greater Cambridge Shared Planning
- Policy S/CB: Cambourne | Greater Cambridge Shared Planning
- Policy S/CBC: Cambridge Biomedical Campus (including Addenbrooke's Hospital) | Greater Cambridge Shared Planning
- Policy S/CE: Cambridge East | Greater Cambridge Shared Planning
- Policy S/GF: Land adjacent to A11 and A1307 at Grange Farm | Greater Cambridge Shared Planning
- Policy S/NEC: North East Cambridge | Greater Cambridge Shared Planning
- Policy S/WC: West Cambridge | Greater Cambridge Shared Planning

Appendix 2 – Reports referenced

Below are details of all reports mentioned throughout this report.

Greater Cambridge Local Plan Regulation 18 October 2025 version Draft Greater Cambridge Local Plan for consultation | Greater Cambridge Shared Planning

Cambridgeshire County Council dwelling forecasts, Cambridgeshire & Peterborough Insight – Population – Local Population Estimates and Forecasts; methodology available Methodology-note-for-CCCs-mid-2023-population-and-dwelling-stock-estimates-and-forecasts.pdf

CPCA Infrastructure Delivery Framework, 2024, Infrastructure Delivery Framework Full Report

CPCA Local Growth Plan, 2025, CPCA Local Growth Plan

EDS 08-2000 LV Network Design, 2024, EDS 08-2000 LV Network Design

Electricity North West's Code of Practice 279, 2024, Network Design General Requirements

GCLP Development Strategy Topic Paper, 2025, Topic cover - Development Strategy Topic

GCP Electricity Demand Requirements, 2021. Not published.

GCP Local Network Analysis, 2019. Not published.

NESO tRESP, 2026, tRESP Consistent Planning Assumptions Value Workbook

North East Cambridge Energy Masterplan, 2021, North East Cambridge Site Wide Energy and Infrastructure Study and Energy Masterplan

Odour Impact Assessment for Cambridge Water Recycling Centre, 2021, Technical note on interpretation of Odour Impact Assessment for Cambridge Water Recycling Centre

UK Power Networks Feasibility Assessment, 2019. Not published.