BRAMLEY (AMESBURY-THATCHAM) GRID SUPPLY POINT: STRATEGIC DEVELOPMENT PLAN

Our network serving communities across West Berkshire and East Wiltshire

Draft for consultation

October 2025

Scottish & Southern
Electricity Networks

CONTENTS

1. EXECUTIVE SUMMARY

SSEN is taking a strategic approach in the development of its distribution networks. This will help to enable the net zero transition at a local level to the homes, businesses, and communities we serve. Our Strategic Development Plans (SDPs) take the feedback we have received from stakeholders on their future energy needs from today out to 2050 and translate these requirements into strategic spatial plans of distribution network needs. This helps us transparently present our future conceptual plans and facilitate discussion with local authorities and other stakeholders. The overall methodology and how it fits into our wider strategic planning process is presented in the Strategic Development Plan methodology. The focus area of this SDP is the area that is supplied by Bramley (Amesbury-Thatcham) Grid Supply Point (GSP), shown below in Figure 1.

This report documents the stakeholder led plans that are driving net zero and growth in the local area, the resulting electricity demands, and the network needs arising from this. Plans across Basingstoke and Deane, Swindon, Test Valley, West Berkshire, Wiltshire, Vale of White Horse, Hampshire County Council, and Oxfordshire County Council have been considered in preparation for this plan. Some reinforcement work has been triggered in this area through the Distribution Network Options Assessment (DNOA) process.

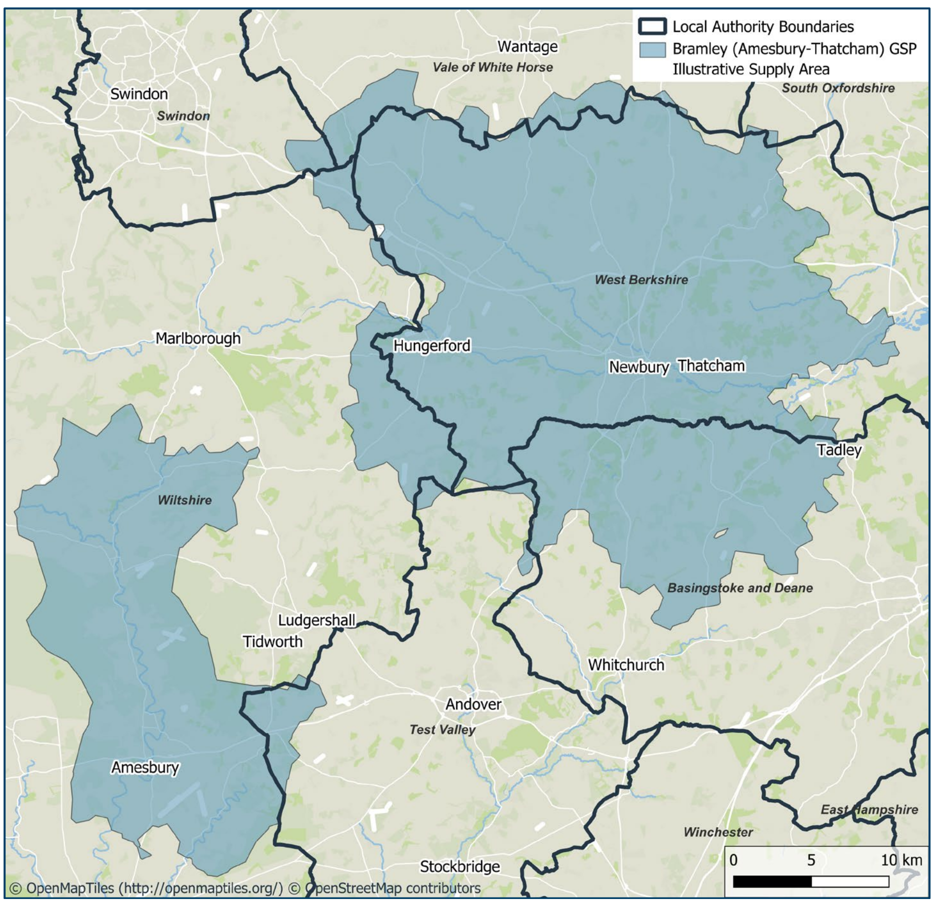

Figure 1 - Area of focus for this SDP.

This SDP utilises the Distribution Future Energy Scenarios (DFES) to understand the pathways to a 2050 network that can support net zero and growth in the local economy. Recommendations from this report outline the initial steps that we believe should be taken on that pathway to develop the network in an efficient and stakeholder-led way.

2. INTRODUCTION

The aim of this report is to demonstrate how local, regional, and national targets align with stakeholder ambitions in the area to provide a robust evidence base for load growth out to 2050 across the area served by Bramley (Amesbury-Thatcham) Grid Supply Point (GSP). A GSP is an interface point with the national transmission system where SSEN Distribution then takes power to local homes and businesses within a geographic area. Context for the area this represents is shown above in Figure 1.

To identify the future requirements of the electricity network, SSEN commissions Regen to produce the annual Distribution Future Energy Scenarios (DFES). The DFES analysis is based on the National Energy System Operator (NESO) Future Energy Scenarios (FES), while incorporating more granular stakeholder insights from agencies such as local authorities and new demand and generation connection applications. The DFES provides a forward-looking view of how demand and generation may evolve under different scenarios as we move towards the national 2050 net zero target. These scenarios are summarised in Figure 2. SSEN uses Holistic Transition as the central case scenario, reviewing this position annually. Any more recent unforeseen demand changes, for example customer connection requests, are also considered in our forecasts to ensure that the projected load more accurately reflects what we expect to see in the future.

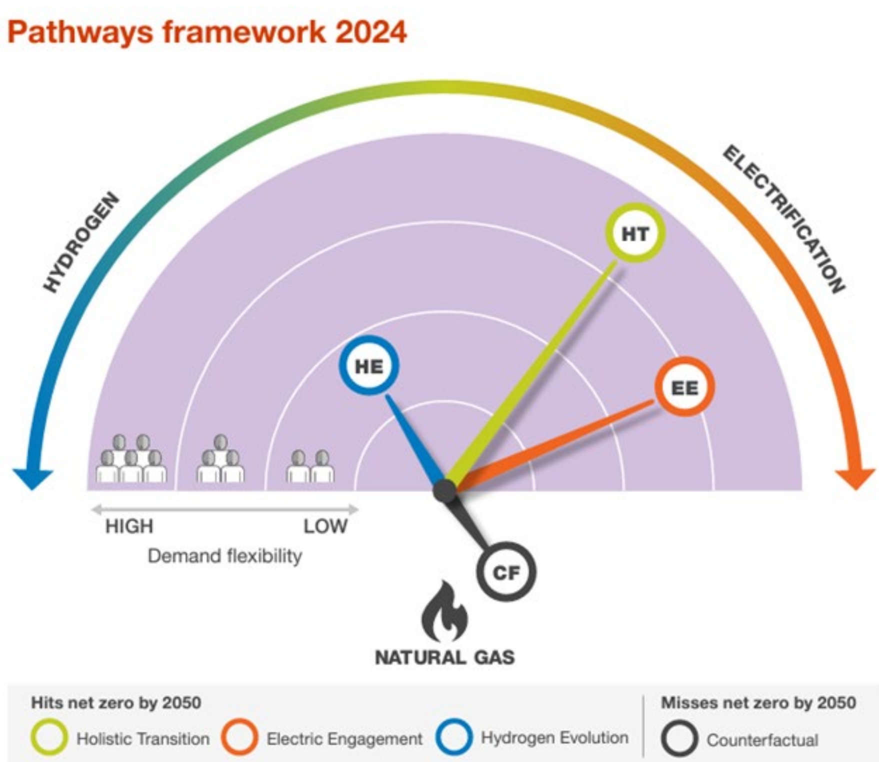

Figure 2 - The FES Scenario framework (source: NESO)

Using the DFES, power system analysis has been carried out to identify the future system needs of the electricity network. These needs are summarised by highlighting the year the need is identified under each of the scenarios, and the projected 2050 load. We also model across the other scenarios to understand when these needs arise and what network capacity should be planned for in the event each scenario is realised.

The DNOA process will provide more detailed optioneering for each of these system needs, improving stakeholder visibility of the strategic planning process. Opportunities for the procurement of flexibility are also highlighted in the DNOA to cultivate the flexibility markets.

Further information on the FES framework can be found in the DFES 2024 introductory report.

3. STAKEHOLDER ENGAGEMENT AND WHOLE SYSTEM CONSIDERATIONS

3.1. Local Authorities and Local Area Energy Planning

The local authorities that are supplied by Bramley (Amesbury-Thatcham) GSP include Basingstoke and Deane, Swindon, Test Valley, West Berkshire, Wiltshire, Vale of White Horse, Hampshire County Council, and Oxfordshire County Council as shown in Figure 3. The development plans for these local authorities will have a significant impact on the potential future electricity load growth on SSEN's distribution network. As such, it is vital for SSEN to engage with these plans when carrying out strategic network investment.

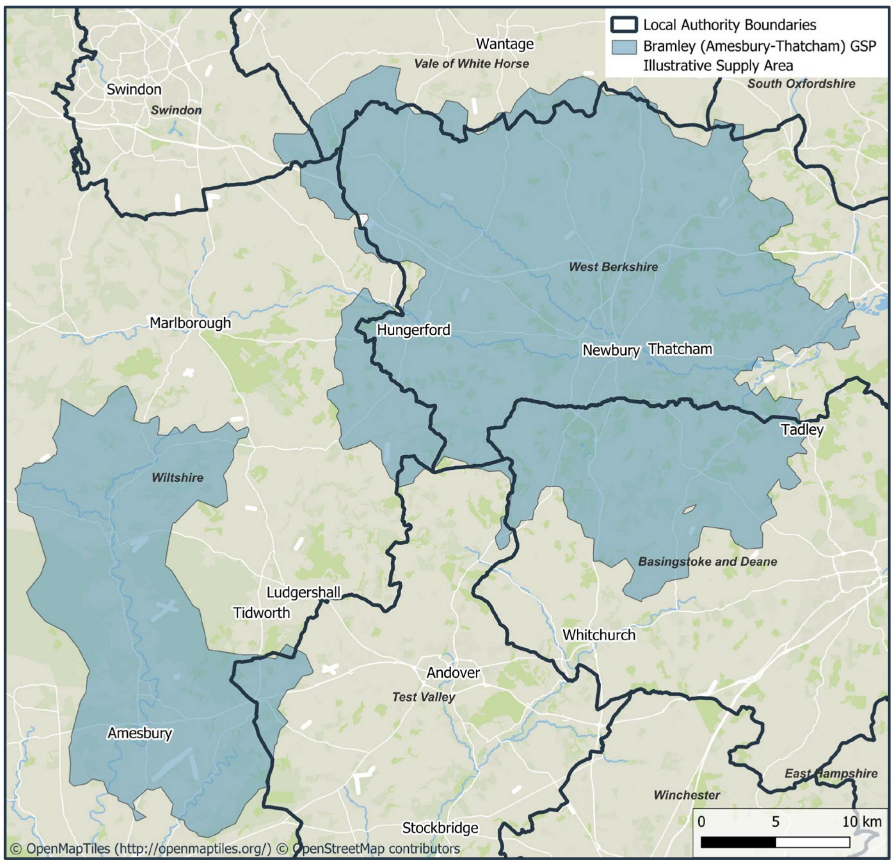

Figure 3 - Bramley (Amesbury-Thatcham) GSP supply area and local authority boundaries.

3.1.1. Basingstoke and Deane

Basingstoke and Deane are in the process of updating their Climate Change and Air Quality Strategy which explores possible pathways to Net Zero and the strategy sets out its aim to be a net zero borough by 2045.

The Council has recently adopted its EV Charging Strategy and has been rolling out chargers in car parks, with a proposal for a facility to be operated by Gridserve on Council land. The Council is also working with the County Council for delivery of on-street chargers and is doing a phased electrification of their vehicle fleet and working with public transport operators to look at the longer-term electrification of their fleets.

The Council has undertaken sustainability audits of their building assets and are rolling out decarbonisation plans. This included commissioning a [Solar Panel Study] of PV potential for all non-domestic rooftops larger than 30 m^2. They are also carrying out domestic energy surveys and signposting support for retrofit[1]. There are three community energy companies in the borough who have received grant funding to help get projects off the ground, and the council has been rolling out Solar Together schemes.

The Council is in the process of developing their updated local development plan which identifies a number of strategic development locations across the borough. As part of the draft plan, they have included a policy to support the installation of renewable energy and are in the process of identifying the areas that may be suitable for renewables. The draft local plan also sets a requirement for all new homes to have a 'net zero' operational energy balance, which means that they are required to generate as much energy as they would use to achieve a 'net zero' balance.

3.1.2. Swindon

Swindon Borough Council is currently developing a new Local Plan which sets out development to 2043 with a further view out to 2055. At present, they are out for consultation on the draft Plan until mid-October 2025. Within the draft plan, the Council notes the role the Planning system has to play in facilitating renewable energy generation in the area.

In July 2024, the Swindon Plan was approved which sets out three priority missions to 'Build a Fairer Swindon', 'Build a Better Swindon', and 'Build a Greener Swindon' and provide a performance tracker against each to demonstrate progress. Within the priority to 'Build a Greener Swindon', the objective is set to transition fleet and depot to net-zero carbon operations.

3.1.3. Test Valley

Test Valley Borough Council declared a climate emergency and committed to investigate clear and effective options to become a carbon neutral organisation. The Council was awarded funds through the UK Shared Prosperity Fund to support decarbonisation projects in partnership with Community Energy South and part of this is set to be used for a Net Zero Business Service to support rural businesses to decarbonise. Additionally, the Council has secured funding through the Public Sector Decarbonisation Scheme to decarbonise heating in council-owned buildings.

The Council are developing their new local plan with development for the most part split between the Andover area in the North and the Romsey area in the South. They anticipate the largest site allocation to be approximately 1,100 dwellings. They have also received funding to progress feasibility studies for a heat network in Andover town centre and are looking at the possibility of a wider heat network zone.

3.1.4. West Berkshire

West Berkshire Council has a declared net zero ambition for both its own organisation and the district by 2030 which is supported by their Environment Strategy. As part of this, they are progressing with building their own solar farm and are keen to explore further opportunities of renewable generation in the borough.

1 Climate change and what we are doing

The Council has an Ultra Low Emission Vehicle Strategy and is rolling out off-street and on-street electric vehicle charge points via the LEVI scheme.

The Council is creating a Heat Decarbonisation Strategy and is applying for funding to decarbonise a leisure centre.

3.1.5. Wiltshire

In 2022, Wiltshire Council introduced a series of delivery plans to support the implementation of its Climate Strategy. These included the Carbon Neutral Council Plan 2022–24 and the Climate Strategy Delivery Plan 2022–24. Both plans underwent a review in 2024 to assess progress in reducing carbon emissions, adapting to climate impacts, and delivering on the council's stated actions.

The updated plan outlines the council's climate priorities for 2025. While it focuses on short-term objectives, it also incorporates medium- and long-term actions necessary to stay aligned with Wiltshire's broader climate ambitions, including the pathway to achieving net zero emissions by 2050.

The Climate Strategy identifies the following objectives for becoming a carbon-neutral council:

- Achieving organisational carbon neutrality by 2030;
- Providing leadership at both local and national levels by reducing direct emissions (Scope 1 and 2); and
- Addressing indirect emissions (Scope 3) through the evaluation of outsourced services and procurement practices.

3.1.6. Vale of White Horse

Vale of White Horse District Council has seen population growth of 14.8% from around 121,000 in 2011 to around 138,900 in 2021[2]. To meet the expected growth in population, in South Oxfordshire's and Vale of White Horse's Joint Local Plan 2041 (submitted for examination December 2024), the council has a target of building 14,490 new homes between 2021 and 2041. It has a Climate Action Plan for 2022-2024, which sets plans to become carbon neutral council by 2030, with a 75% reduction by 2025, and become a net zero district by 2045. The operational emissions of the Council have decreased by 49% since 2009 and is set to decrease further as a total of £6,354,662 in Public Sector Decarbonisation Scheme funding has been secured to decarbonise council buildings such as leisure centres. Actions include installing EV charge points in council depots and other locations to meet the needs of the council's vehicle fleet, as well as a plan to install public EV charging points.

3.1.7. Hampshire County Council

Hampshire County Council has two targets: to be carbon neutral by 2050 and to build resilience to a two-degree rise in temperatures. The Council has published a strategy, action plan and strategic framework for action to achieve its carbon neutral aims and details numerous steps it has planned to electrify various sectors of the local economy.

In its strategic framework, the Council lays out plans to develop and roll out an electric vehicle strategy across the county and development of an electric vehicle charge point strategy is underway, supported by the LEVI fund. In terms of its own estates, the Council aims to transition to fossil-fuel-free heating and install solar PV on

2 Census 2021, January 2023, How life has changed in Vale of White Horse: Census 2021.

depot buildings. A retrofit programme for privately owned residential properties has been identified and the Solar Together programme for group buying solar PV and battery storage has already taken place.

3.1.8. Oxfordshire County Council

Oxfordshire County Council declared a climate emergency in 2019 and has the ambition target of becoming carbon neutral by 2030. To help achieve this target the council annually publishes a review of its 'Carbon Management Plan' to ensure progress is up to date and new actions are identified. The council has also received Zero Emissions Bus Regional Area funding, funding 159 electric buses in Oxfordshire and was also awarded LEVI funding of £3.6 million to triple public electric vehicle charging provision by 2025.
In addition to this the council was also one of three that SSEN partnered with through the RESOP Project to trial LAEP+ (now LENZA), an innovative local area energy planning tool created by Advanced Infrastructure and is currently in the process of working with district councils to develop the new Oxfordshire LAEP programme.

The Oxfordshire LAEP programme comprises the creation of the LAEPs and also builds the additional capacity and capability to conduct LAEP activities in-house in future years. The Oxfordshire LAEP project comprises of 5 District LAEPs and a county overview. To support this, SSEN is part of the Future Oxfordshire Partnership's governance structure for the Oxfordshire LAEP programme, furthermore it also sits on the County Council's energy planning working group and executive steering board to provide network insights.

3.2. Whole System Considerations

3.2.1. Transmission interactions

In the Fleet-Bramley area, National Grid Electricity Transmission (NGET) have referenced in their T3 business plan (2026-2031) that they plan to replace overhead line conductors on the Bramley – Fleet 1 & 2 circuit to increase capacity on the route[3]. We are working with NGET on managing load in the area and will continue to work closely together on long-term strategic planning to ensure we are coordinated on the 2050 vision for Bramley (Amesbury-Thatcham) GSP.

3.3. Flexibility Considerations

SSEN procures Flexibility Services from owners, operators, or aggregators of Distributed Energy Resources (DERs) or Consumer Energy Resources (CERs), which can be generators, storage, or demand assets. These services are needed in areas of the network which have capacity constraints at particular times or under certain circumstances. SSEN purchases Flexibility Services from all types of providers (e.g. domestic or commercial). Information on the process for procurement and how to participate are published on the Flexibility Services website and information on real time decision making on which providers are dispatched can be found in the Operational Decision-Making document.[4,5]

SSEN regularly recruits new Flexibility Services providers and increases the procured Flexibility Services with the latest bidding round for long term requirements held in May 2025 and recruitment through the Mini-Competition process most recently opening in mid-July 2025.[2]

3 National Grid – South East: Future Network Blueprint (https://riiot3.nationalgrid.com/document/30126/download)

4 SSEN, Flexibility Services Procurement (Flexibility Services Procurement - SSEN)

5 SSEN, 02/2024, Operational Decision Making (ODM), SSEN Operational Decision Making ODM

There has not currently been flexibility procured across Bramley (Amesbury-Thatcham) GSP as shown below in Figure 4. This map is based on all Flexibility Services procured, which covers requirements beyond those identified for managing the deferral of reinforcement.

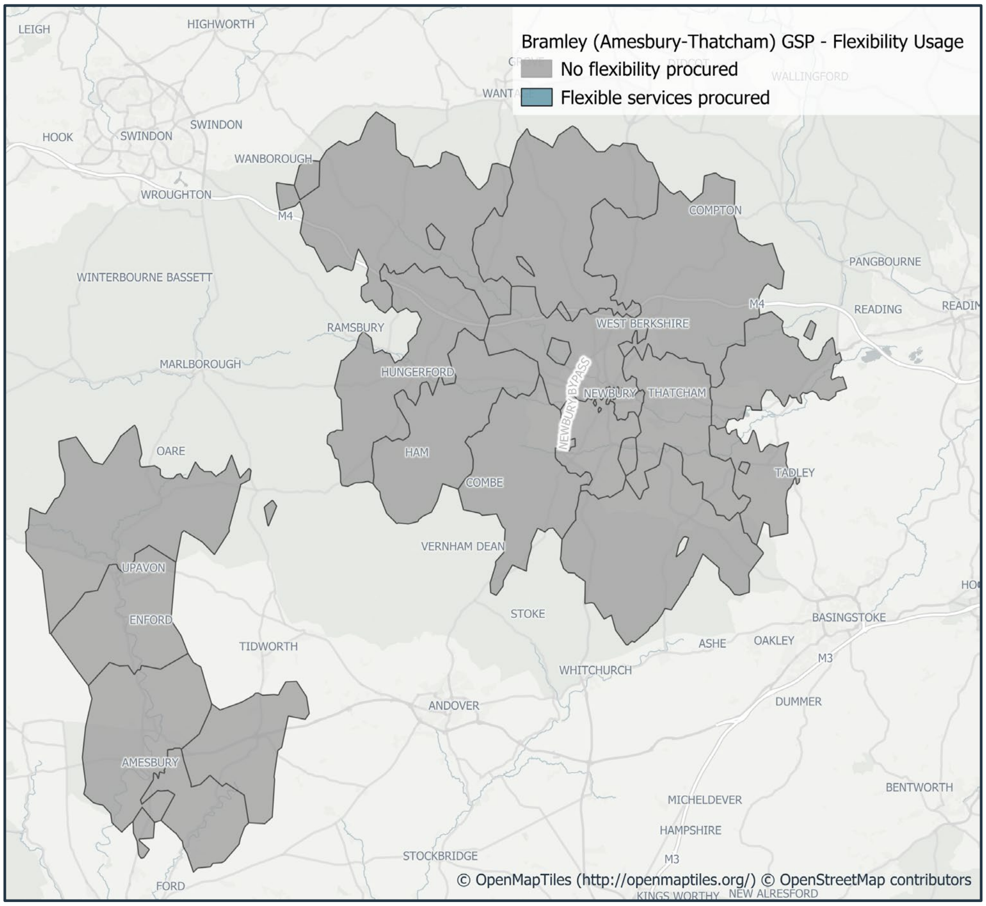

Figure 4 - Flexibility procurement across Bramley (Amesbury-Thatcham) GSP

4. EXISTING NETWORK INFRASTRUCTURE

4.1. Bramley (Amesbury-Thatcham) Grid Supply Point Context

The Bramley (Amesbury-Thatcham) GSP network is made up of 132kV, 33kV, 11kV, and LV circuits. It supplies several towns including Newbury, Thatcham and Amesbury as well as rural areas. In total, the GSP serves approximately 81,000 customers. Table 1 shows the values for the GSP, and the primary substations supplied by the GSP (noting that some sites for single customers are not shown here). The peak maximum demand refers to the peak at each individual substation which may not be at a coincident time as the others (meaning we would not expect the values for all primary substations to sum to that at the GSP).

Substation Name	Site Type	Number of Customers Served (approximate)	2024/25 Substation Maximum demand in MVA (Season)
Bramley (Amesbury-Thatcham)	Grid Supply Point	81,300	179.37 (Winter)
Amesbury	Bulk Supply Point	16,300	47.55 (Winter)
Thatcham	Bulk Supply Point	65,000	130.29 (Winter)
Ball Hill	Primary Substation	2,500	6.09 (Winter)
Beenham	Primary Substation	2,200	6.54 (Winter)
Boscombe Down	Primary Substation	3,300	16.78 (Winter)
Enford	Primary Substation	1,500	3.40 (Winter)
Hungerford	Primary Substation	3,800	7.95 (Winter)
Kingsclere	Primary Substation	3,000	5.11 (Winter)
Kintbury	Primary Substation	2,100	5.47 (Winter)
Lambourn	Primary Substation	3,100	6.92 (Winter)
Leckhampstead	Primary Substation	1,900	4.30 (Winter)
Love Lane	Primary Substation	8,900	18.26 (Winter)
Park House	Primary Substation	1,000	1.63 (Winter)
Pewsey	Primary Substation	4,100	7.54 (Winter)
Ratfyn	Primary Substation	6,400	10.66 (Winter)
Riverside	Primary Substation	4,000	12.21 (Winter)
St Johns	Primary Substation	11,100	17.36 (Winter)
Tadley	Primary Substation	5,800	7.00 (Winter)

Thatcham	Primary Substation	12,800	21.07 (Winter)
Yattendon	Primary Substation	3,800	8.93 (Winter)

Table 1 - Customer number breakdown and substation peak demand readings (2024-2025) for Bramley (Amesbury-Thatcham) GSP.

4.2. Current Network Topology

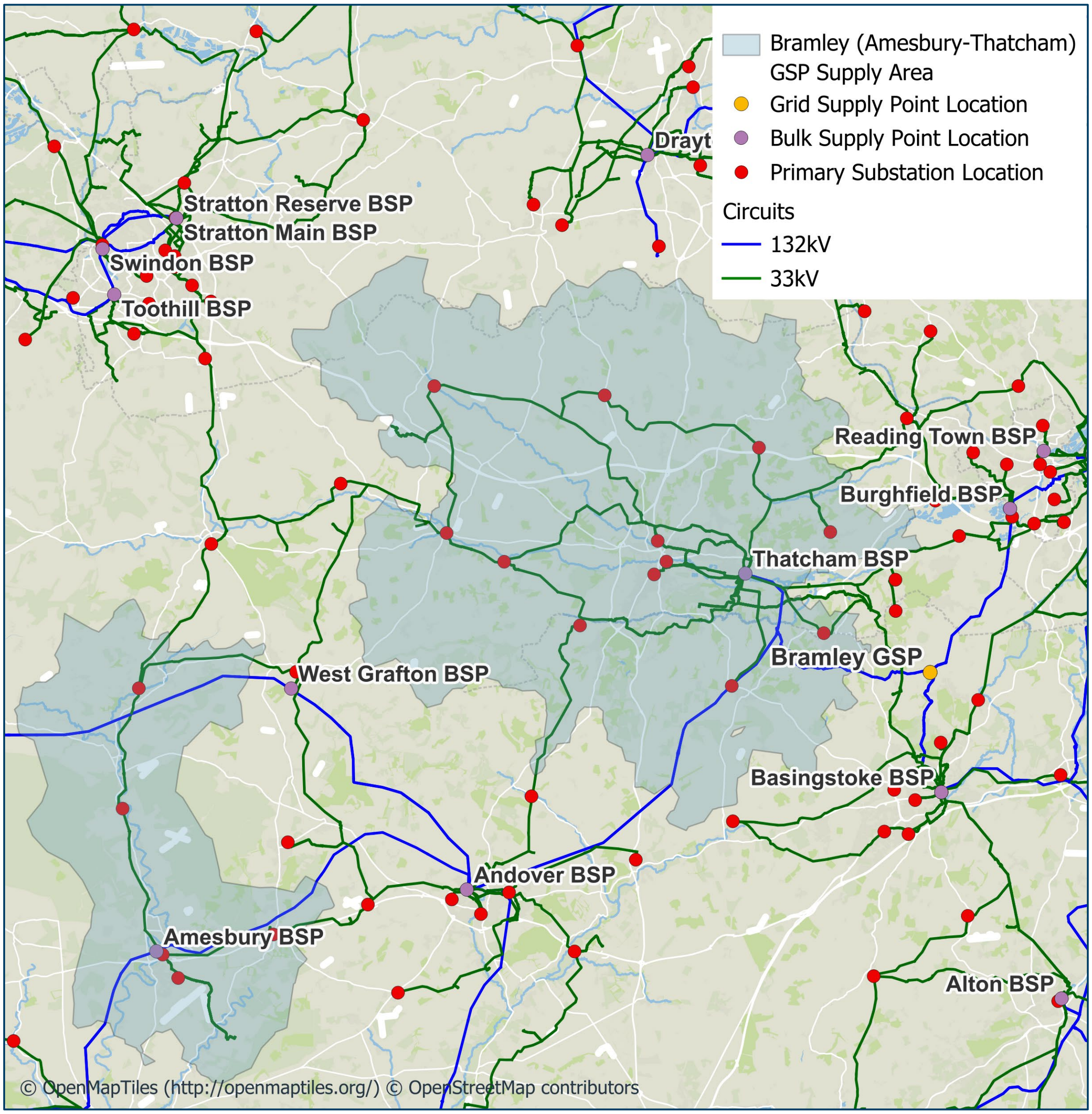

Figure 5 - Current network topology of Bramley (Amesbury-Thatcham) GSP.

4.3. Current Network Schematic

The existing 132kV network at Bramley (Amesbury-Thatcham) GSP is shown below in Figure 6. Additional schematics for the network fed by Amesbury BSP and Thatcham BSP can be found in Appendix A.

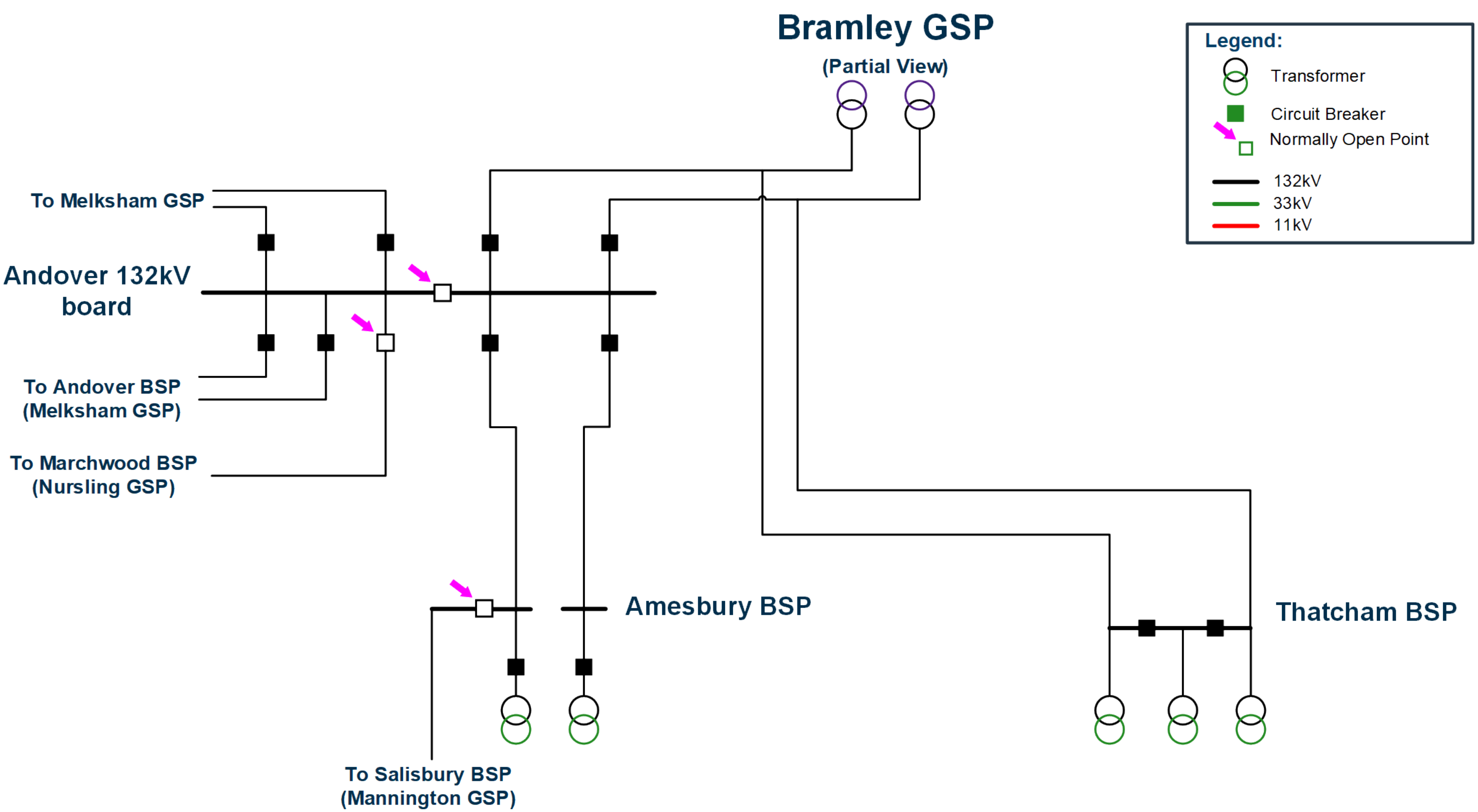

Figure 6 - Existing network supplied by Bramley (Amesbury-Thatcham) GSP

5. FUTURE ELECTRICITY LOAD AT BRAMLEY (AMESBURY-THATCHAM) GSP

The following section details load growth across the technologies projected in the Distribution Future Energy Scenarios. There are important notes on the values presented here:

- This SDP and the analysis conducted has been completed ahead of any changes arising from Clean Power 2030.
- These projections relate to the GSP supply area highlighted in Figure 1 and are not directly aligned to a particular local authority.
- Where MW values are presented in this section, they represent total installed capacity. When conducting network studies these values are appropriately diversified to represent the coincident maximum demand of the entire system rather than the total sum of all demands.
- For projections specific to individual primary substations or local authorities, please refer to our online dashboard.[6]

6 SSEN DFES Technology Projections - Microsoft Power BI

5.1. Generation and Storage

DFES Scenario	Generation capacity (MW)				Electricity storage capacity (MW)			
	Baseline	2030	2040	2050	Baseline	2030	2040	2050
Holistic Transition	16.2	216.7	265.8	337.8	0.6	21.2	49.7	69.7
Electric Engagement		235.9	286.9	323.4		19.2	37.5	53.5
Hydrogen Evolution		163.9	204.2	251.3		11.1	31.4	39.1
Counterfactual		92.8	156.4	183.8		5.0	16.6	21.0

Table 2 - Projected cumulative distribution connected generation capacity and electricity storage capacity across Bramley (Amesbury-Thatcham) GSP (MW). *Source: SSEN DFES 2024*

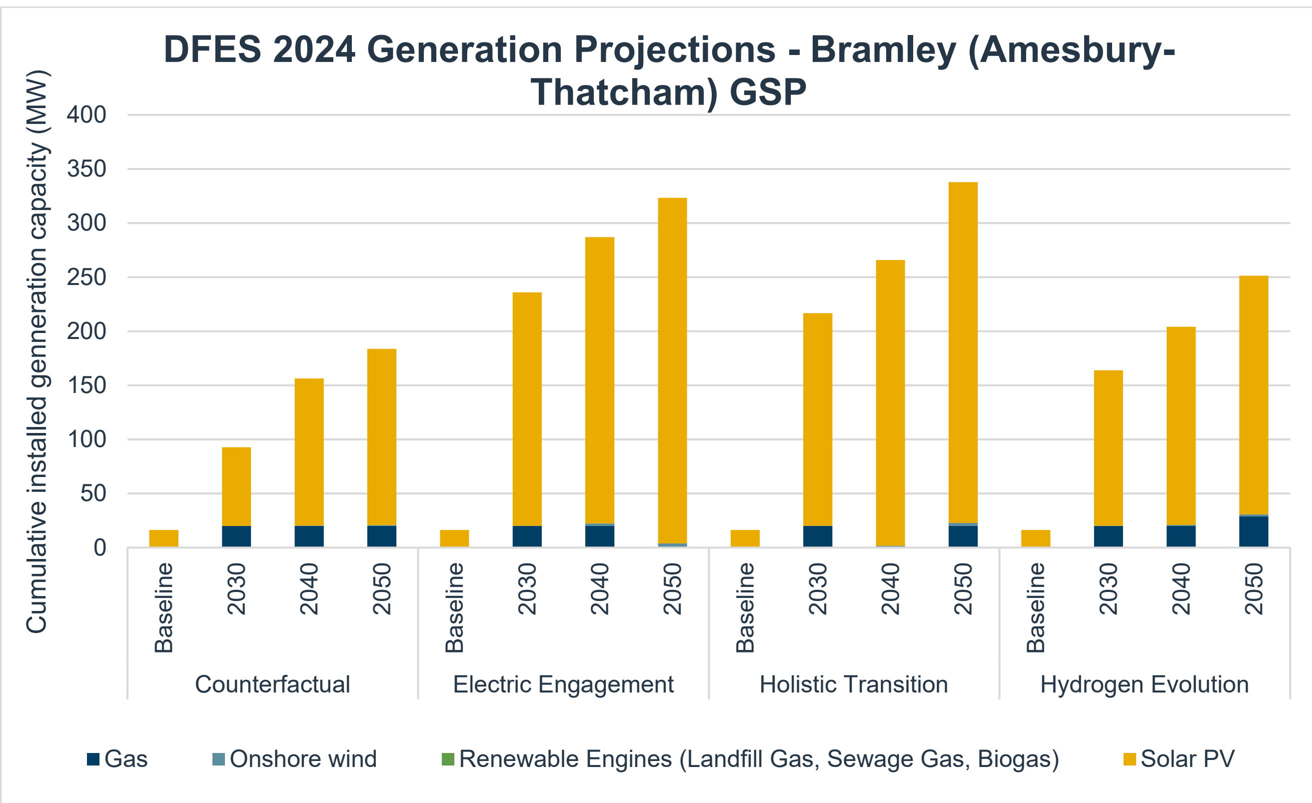

Figure 7 - Projected cumulative distributed generation capacity Bramley (Amesbury-Thatcham) GSP (MW). *Source: SSEN DFES 2024*

5.2. Transport Electrification

DFES Scenario	Domestic EV chargers – off-street (number of units)				Non-domestic EV chargers & domestic on-street EV chargers (MW)			
	Baseline	2030	2040	2050	Baseline	2030	2040	2050
Holistic Transition	2,975	18,390	58,640	61,556	14.3	30.2	107.2	125.4
Electric Engagement		30,720	58,099	60,619		39.3	115.5	127.0
Hydrogen Evolution		18,351	58,371	60,912		31.2	123.4	136.7
Counterfactual		14,675	55,788	60,495		22.4	79.1	127.6

Table 3 - Projected cumulative number of domestic EV chargers (off-street) and non-domestic and domestic (on-street) EV charge point capacity across Bramley (Amesbury-Thatcham) GSP. *Source: SSEN DFES 2024*

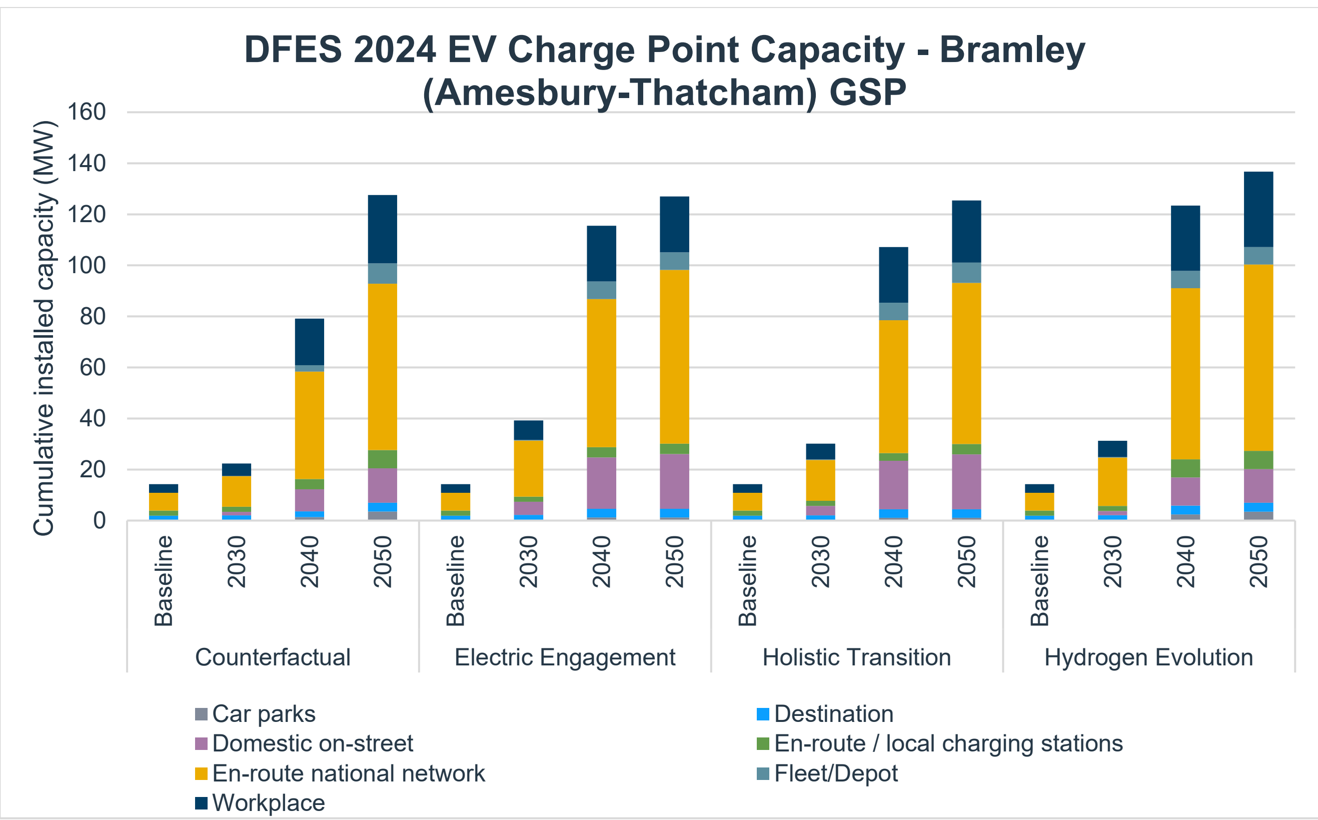

Figure 8 - Projected EV charge point capacity across Bramley (Amesbury-Thatcham) GSP. *Source: SSEN DFES 2024*

5.3. Electrification of Heat

DFES Scenario	Non-domestic heat pumps and resistive electric heating (m² of floorspace)				Domestic heat pumps (number of units)			
	Baseline	2030	2040	2050	Baseline	2030	2040	2050
Holistic Transition	343,483m^2	669,295m^2	1,085,998m^2	1,245,198m^2	2,759	14,208	51,715	68,904
Electric Engagement		610,184m^2	1,118,576m^2	1,310,354m^2		13,650	51,527	68,021
Hydrogen Evolution		606,532m^2	909,913m^2	1,030,42m^2		13,635	48,289	62,701
Counterfactual		505,909m^2	704,545m^2	861,085m^2		8,740	24,260	50,750

Table 4 - Projected non-domestic heat pumps and resistive electric heating floorspace and number of domestic heat pumps across Bramley (Amesbury-Thatcham) GSP. *Source: SSEN DFES 2024*

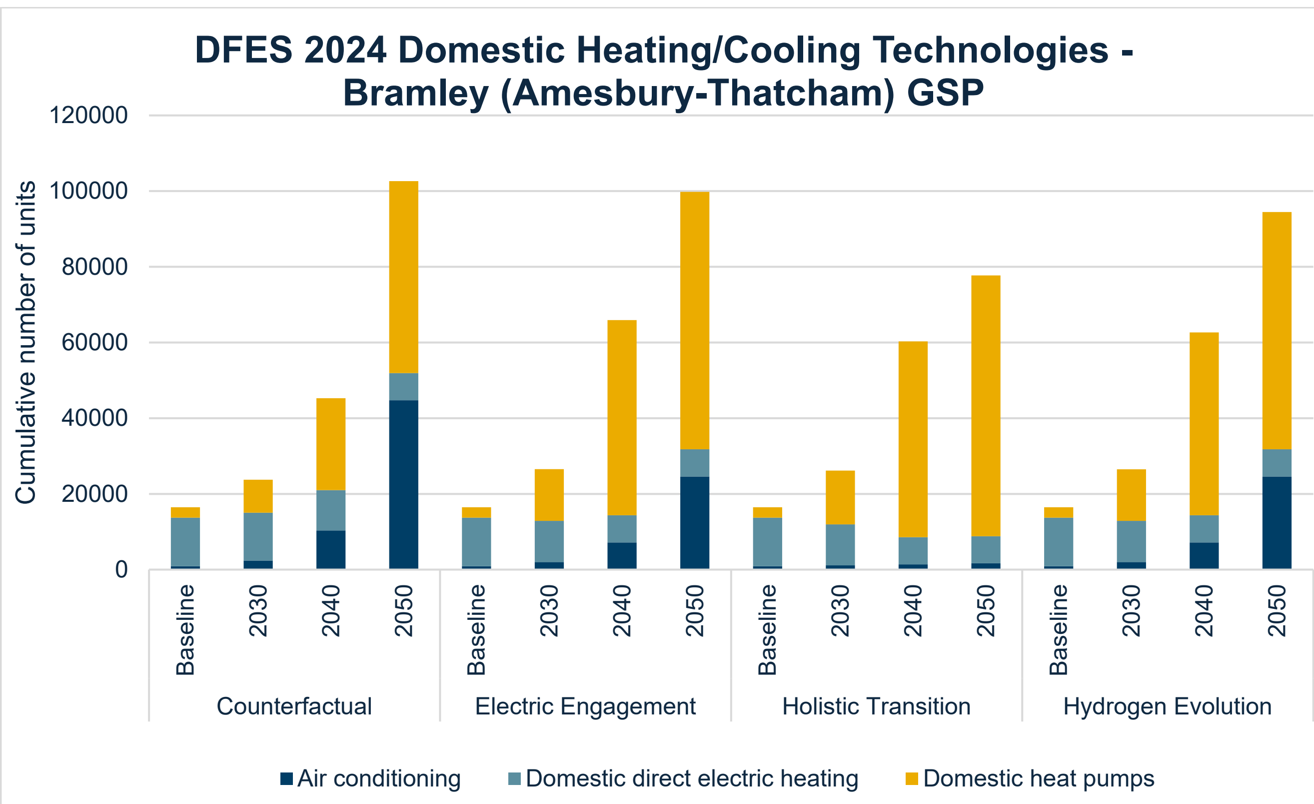

Figure 9 - Projected number of heating/cooling technologies across Bramley (Amesbury-Thatcham) GSP. *Source: SSEN DFES 2024*

5.4. New Building Developments

Through engagement with local authorities, we have developed an understanding of new development across our licence areas. This has allowed us to gauge an insight into future electricity demand for new developments ahead of a formal connection application. Below we investigate the non-domestic new developments across the study area for this SDP.

DFES Scenario	New domestic development (number of homes)			New non-domestic development (m^2)		
	2030	2040	2050	2030	2040	2050
Holistic Transition	2,844	6,158	8,604	117,725m^2	117,725m^2	117,725m^2
Electric Engagement	2,801	5,966	8,047	117,725m^2	117,725m^2	117,725m^2
Hydrogen Evolution	2,804	5,956	7,989	117,725m^2	117,725m^2	117,725m^2
Counterfactual	2,700	5,481	7,449	117,725m^2	117,725m^2	117,725m^2

Table 5 - Projected new domestic and non-domestic development across Bramley (Amesbury-Thatcham) GSP. *Source: SSEN DFES 2024*

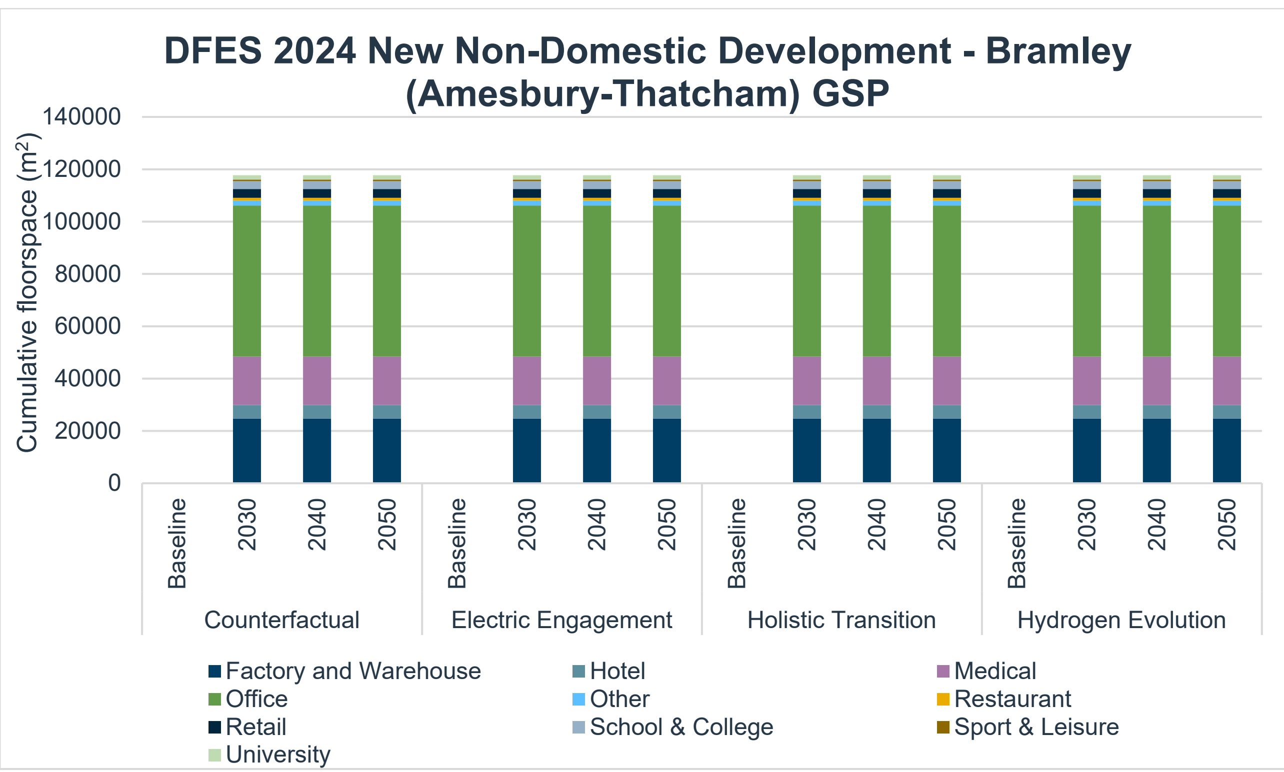

Figure 10 - Non-domestic new development under Bramley (Amesbury-Thatcham) GSP. *Source: SSEN DFES 2024*

5.5. Commercial and Industrial Electrification

There are a number of industrial customers connected at the High Voltage level (11kV and 6.6kV) as well as larger EHV connected customers across Bramley (Amesbury-Thatcham) GSP.

The M4 runs through Thatcham BSP and across the GSP there are several large A-roads. As such, there is significant growth seen in the DFES forecast in the GSP attributed to EV chargers along national road networks. System needs arising from this demand growth are accounted for in Section 8.2.

5.5.1. Agricultural Decarbonisation

Decarbonisation of the agricultural sector is an important consideration in this geographic area. SSEN leads the innovation project 'Future Agricultural Resilience Mapping' (FARM) which aims to understand the future energy requirements and means of decarbonising the domestic farming industry. This sector is currently still largely dependent on fossil fuels, and the project will support its investigations into the impact of food production on the electricity distribution system, to work out where reinforcement is needed. A data-driven tool to inform network planning will be devised and through this work, FARM will address the gap between the energy demands for food production and future network planning.

6. WORK IN PROGRESS

Network interventions can be caused by a variety of different drivers. Examples of common drivers are load-related growth, specific customer connections, and asset health. Across Bramley (Amesbury-Thatcham) GSP these drivers have already triggered network interventions that have now progressed to detailed design and delivery. For this report, these works are assumed to be complete, with any resulting increase in capacity considered to be released.

The drivers listed in the below table are predominantly where a customer connection application has driven the work or where investment proposals developed through our DNOA process are driving the reinforcement work. The published DNOA outcomes relevant to Bramley (Amesbury-Thatcham) GSP are included in Appendix D. The work included here is all work that has passed through the ID2 gate of our Distribution Governance and Investment Framework (DGIF), further information on this process is available in the DSO service statement 2025.[7] The network considered for long-term modelling is shown in Figure 11. Summary of existing works shown below in Table 6.

ID	Substation	Description	Driver	Forecast completion	Resolves future strategic needs to 2050?
Thatcham BSP					
1	Thatcham BSP	Install new 132kV Gas Insulated Switchgear at Thatcham BSP.	DNOA process	2027	
2	Thatcham BSP	Add a fourth 132/33kV transformer at Thatcham BSP.	DNOA process	2027	
3	Thatcham BSP	Add two new circuits from Bramley GSP to Thatcham BSP.	DNOA process	2031	
4	Hungerford PSS	Replace and uprate the existing transformers and replace the 33kV switchgear.	Asset replacement	2026	
5	Lambourn PSS	Replace and uprate the existing transformers and replace two circuit breakers.	Asset replacement	2027	
6	Love Lane PSS & Riverside PSS	Transfer load from Love Lane PSS to Riverside PSS and uprate part of the 33kV circuits between	Customer connection	2027	

7 DSO Service Statement 2025

		Thatcham BSP and Love Lane PSS.			

Table 6 - Works already triggered through the DNOA process, customer connections and asset replacement.

Where the above works are marked as not providing sufficient capacity for 2050 peak demands, it is important to note that this relates to the individual primary substation's firm capacity. When considering the further works identified in this report, the holistic plans aim to provide capacity across the GSP for 2050 based on current projections.

Alongside these asset solutions being deployed, flexibility solutions are also being used to release additional capacity.

6.1. Network Schematic (following completion of above works)

The network schematic below in Figure 11 shows the 132kV network with changes highlighted and referenced to the in Table 6. Additional schematics for changes to the 33kV networks under Thatcham BSP can be found in Appendix A.

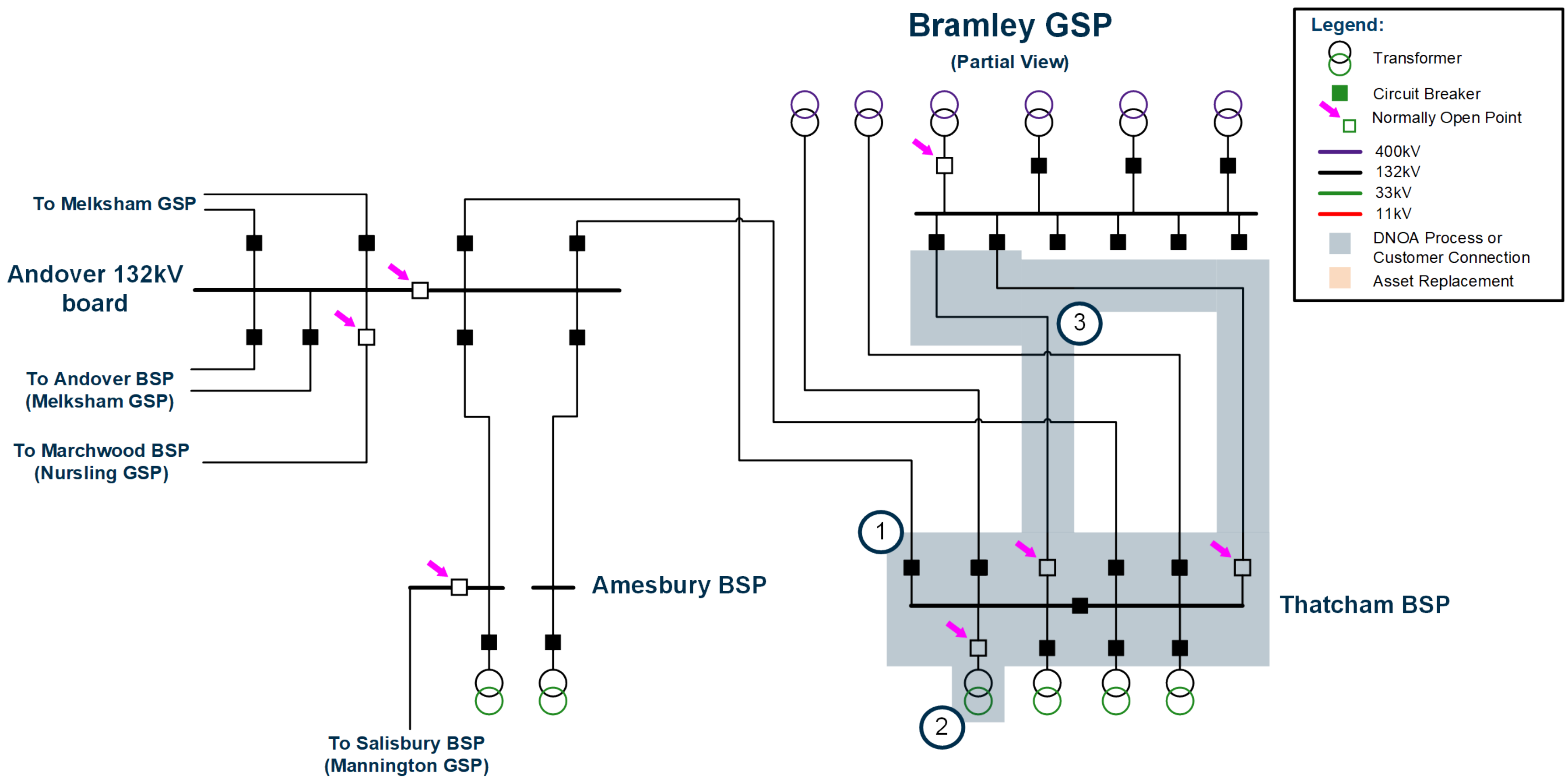

Figure 11 - Bramley (Amesbury-Thatcham) Network schematic following completion of triggered works.

7. SPATIAL PLANS OF FUTURE NEEDS

7.1. Extra High Voltage / High Voltage Spatial Plans

The EHV/HV spatial plans shown below in Figure 12 shows the projected headroom or capacity shortfall due to demand increases at primary substations across the Bramley (Amesbury-Thatcham) SDP study area. Darker shades indicate that there is a projected capacity shortfall whereas lighter blue shades indicate that there is headroom capacity based on current projections. EHV/HV spatial plans for the other DFES scenarios are presented in Appendix B.

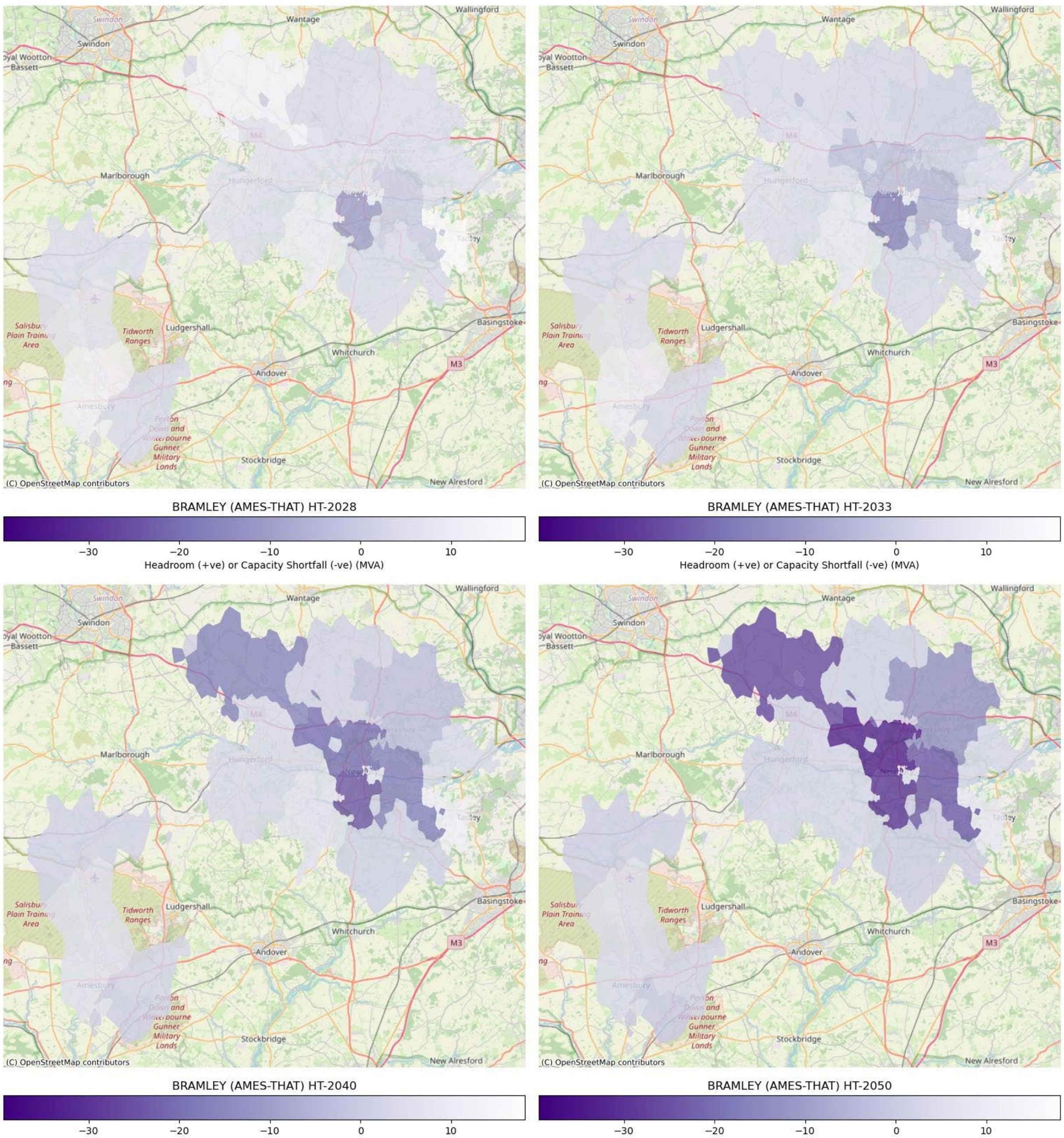

Figure 12 - Bramley (Amesbury-Thatcham) GSP - EHV/HV Spatial Plans – Holistic Transition

7.2. HV/LV Spatial Plans

The HV/LV spatial plans shown below in Figure 13 show the point locations of secondary transformers supplied by Bramley (Amesbury-Thatcham) GSP. The points are colourised based on the projected percentage loading with red meaning higher percentage loading and green being lower percentage loading. The HV/LV spatial plans for the other DFES scenarios are available in Appendix C.

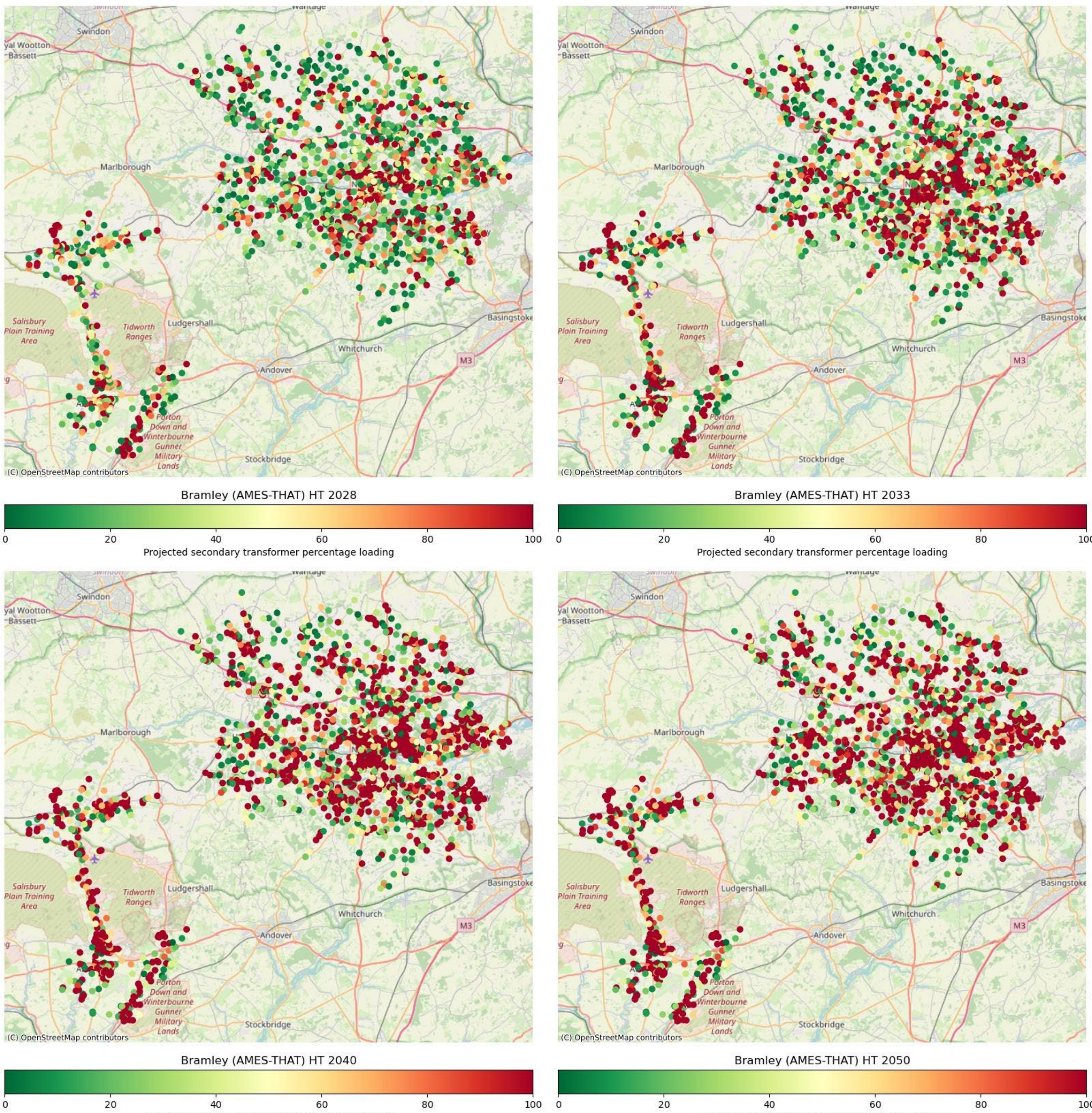

Figure 13 - Bramley (Amesbury-Thatcham) GSP - HV/LV Spatial Plans – Holistic Transition

8. SPECIFIC SYSTEM NEEDS AND OPTIONS TO RESOLVE

In this section we summarise the specific needs arising from our future spatial plans. The outputs of the power system analysis in this section show where we may observe the need for further intervention on the distribution network. This could be through asset solutions or flexibility services including access products which may be used to enable connection of projects ahead of reinforcement delivery. We also propose some initial options to resolve the needs forecasted. If required during the next ten years, these will be further developed through the DNOA process.

The section consists of three sets of results:

- Future EHV system needs to 2035 – these needs are more certain and therefore we have more clearly defined options to meet the requirements, and we recommend that these are progressed through the DNOA process. In all cases, we are proposing solutions that meet the projected requirements for 2050 and, where appropriate, system needs arising beyond this period are taken into account to ensure a holistic solution.
- Future EHV system needs to 2050 – there is a greater degree of uncertainty of outcomes in this time frame. This also provides more opportunities to work with stakeholders to develop strategic plans, and our outlined solutions reflect this initial phase of the work as we look to engage with interested parties.
- Future HV/LV system needs to 2050 – the future needs of the HV and LV networks are locationally specific but can be considered as an aggregated volume. In this section we provide information on our future forecasts for local HV and LV network needs.

8.1. Overall Dependencies, Risks, and Mitigations

There are several overarching risks to the delivery of our strategic plan. Below we list these alongside proposed mitigating actions. We will work with stakeholders to develop these mitigating actions further.

Dependency: There are interconnection points at 132kV to multiple GSPs and as such, network options impact future network development at other GSPs, notably Bramley (Basingstoke) GSP, Minety GSP and Melksham GSP, as well as Bramley (Amesbury-Thatcham) GSP.
Risks: Ineffective network solutions are implemented which limit future network optionality or are not optimal when the wider network is taken into view.
Mitigations: Optioneering on the 132kV network should continue to consider opportunities at other GSPs to ensure efficient delivery of work across the Berkshire, Hampshire and Wiltshire regions.

Dependency: The procurement of flexibility services is required to optimise load-related needs.
Risks: Complexity in the network configuration limits deployment of flexibility services.
Mitigations: Consider options which remove barriers for flexibility provisions.

Dependency: Significant reinforcement and reconfiguration are likely required on long circuits in Thatcham BSP.
Risks: Balancing the costs of long cable routes alongside risks of enabling long overhead line routes delay releasing capacity on the network and do not deliver the most suitable and efficient solution.
Mitigations: Early stakeholder engagement with the local community during feasibility and detailed optioneering to explore possible ways to efficiently provide a secure and operationally flexible network for the future.

Dependency: Delivery of the reinforcement work highlighted in the works in progress section (Section 6) will be required to enable both capacity in the near-term but also to enable the proposed future options in this system needs section.
Risks: Delays or changes to triggered works fail to release capacity in the near-term and/or do not provide flexibility of future investment.
Mitigation: Current reinforcement projects are included in this strategic development plan, and dependencies are identified as part of the DNOA process and form part of the handover of work to delivery teams for consideration. Proposed work should also ensure that it is enabling future network development such as considering space constraints at the site.

Dependency: Triggered works and future proposed options are particularly dependent on works to install a new 132kV switchboard at Bramley GSP which is a shared site with National Grid Electricity Transmission.
Risks: Delays to works have the potential to delay customers connecting and to delay dependent reinforcement schemes.
Mitigation: Continue to progress design and execution of these works and as part of this, continue productive engagement with National Grid Electricity Transmission.

8.2. Future EHV System Needs

The following table details the near-term to medium-term distribution network system needs that have been identified through power system analysis. While asset solutions are described in the table below it is important to note that the use of flexibility will be evaluated for all schemes to ensure the best possible solution is progressed. For the projects shown in Table 7 we recommend that these are progressed through the DNOA process so that there is sufficient time for solutions to be designed and delivered. The interactions between possible options have been considered to identify potential synergies and efficiencies. As such, constraints have been grouped strategically to be considered alongside each other and any additional interactions between constraints referenced.

8.2.1. System needs to 2035

ID	Location of proposed intervention	HT Year	EE Year	HE Year	CF Year	Network State	Comments and potential options to resolve the system need
132kV Network							
1	Amesbury BSP transformers	2030-2034	2030-2034	2030-2034	2030-2034	N-1: Loss of one of the transformers.	Option a: • Utilise the interconnection to Melksham GSP at Pewsey PSS under loss of a transformer at Amesbury BSP. Option b: • Uprate existing 33kV interconnection to Andover BSP for use under loss of a BSP transformer at Amesbury BSP. Option c: • Add a third transformer at Amesbury BSP. • Add a 132kV busbar at Amesbury BSP or add a third circuit from Andover 132kV board. Option d:

ID	Location of proposed intervention	HT Year	EE Year	HE Year	CF Year	Network State	Comments and potential options to resolve the system need
							• Transfer Pewsey PSS or Park House PSS and Ratfyn PSS to Melksham GSP.
2	Circuits from Thatcham tee to Andover 132kV board.	2030-2034	2030-2034	2035-2039	2035-2039	N-1: Loss of one of the circuits between Thatcham and Andover 132kV board.	Option a: • Replace and uprate the existing circuits. Option b: • Transfer Pewsey PSS or Park House PSS and Ratfyn PSS to Melksham GSP. Option c: • Add a third circuit between Thatcham BSP and Andover BSP.
33kV Network							
3	Under Thatcham BSP, the following primaries are connected on two looped circuits: (a) Beenham PSS, Yattendon PSS, and Leckhampstead; (b) Ball Hill PSS, Kintbury PSS, Hungerford PSS, and Lambourn PSS. The two looped circuits are connected through a shared circuit to Thatcham BSP between Leckhampstead PSS and Lambourn PSS. Constraints arise on these circuits within a similar timeframe therefore the constraints on both loops should be considered to find the most efficient option with consideration of where operational benefits can be achieved. Included below are three options to resolve constraints on this area of the network, however due to the complexity of the network arrangements and number of primary substations involved, there are multiple options which will need to be explored in detail during the DNOA process.							
	Yattendon PSS transformers	2030 - 2034	2035 - 2039	2030 - 2034	2035 - 2039	N-1: Loss of one transformer.	Option a: • Build a new primary substation and connect it through two direct circuits to Thatcham BSP. • Transfer load from Yattendon PSS, Leckhampstead PSS and Lambourn PSS. • Add two direct circuits to Ball Hill PSS from Thatcham BSP to remove it from the ringed circuits. Option b: • Replace the existing transformers at Leckhampstead PSS with three transformers. • Build three direct circuits from Thatcham BSP to Leckhampstead PSS to remove it from the ringed circuits. • Transfer load from Lambourn PSS and Yattendon PSS to Leckhampstead PSS. • Add two direct circuits to Ball Hill PSS from Thatcham BSP to remove it from the ringed circuits.
	Leckhampstead PSS transformers	2035 - 2039	2035 - 2039	2035 - 2039	2040 - 2044	N-1: Loss of one transformer.	
	Lambourn PSS transformers	2030 - 2034	2030 - 2034	2030 - 2034	2035 - 2039	N-1: Loss of one transformer.	
	Circuits from Thatcham BSP to Lambourn PSS and Leckhampstead PSS via a teed point	From 2030 - 2034	From 2030 - 2034	From 2030 - 2034	From 2030 - 2034	N-1: Loss of part of the ringed circuit.	
	Circuit from Thatcham BSP to Beenham PSS teed point	Ahead of 2030	Ahead of 2030	Ahead of 2030	Ahead of 2030	N-1: Loss of part of the ringed circuit.	
	Circuits from Beenham PSS tee point to Yattendon PSS and Leckhampstead PSS	From 2030 - 2034	From 2030 - 2034	From 2030 - 2034	2035 - 2039	N-1: Loss of part of the ringed circuit.	
	Circuits between Thatcham BSP and Ball Hill PSS, Kintbury	From 2030 - 2034	From 2030 - 2034	From 2030 - 2034	From 2030 - 2034	N-1: Loss of part of the ringed circuit.	

ID	Location of proposed intervention	HT Year	EE Year	HE Year	CF Year	Network State	Comments and potential options to resolve the system need
	PSS, Hungerford PSS and Lambourn PSS						Option c: • Replace and uprate the existing transformers at Yattendon PSS. • Replace the existing transformers at Lambourn PSS with three transformers. • Build three direct circuits to Lambourn PSS to remove it from the ringed circuits. Consider whether to move Lambourn to a closer BSP in Minety GSP or Melksham GSP. • Transfer load from Leckhampstead PSS to Yattendon PSS or Lambourn PSS. • Build a direct circuit from Thatcham BSP to Hungerford PSS.
4	Thatcham PSS transformers	Ahead of 2030	2030 - 2034	Ahead of 2030	2030 - 2034	N-1: Loss of one transformer.	There is significant load growth seen under Thatcham PSS, Love Lane PSS, Riverside PSS and St Johns PSS. In particular, there is a large amount of demand assigned to Love Lane PSS in the DFES attributed to en-route national network EV charging which would likely require a dedicated primary substation. Option a: • Replace the two existing transformers at Riverside PSS with four transformers and split into two. • Replace the existing circuits connecting Riverside PSS to Thatcham PSS with four new circuits. • Transfer load from Love Lane PSS, St Johns PSS and Thatcham PSS to Riverside PSS. • Build a new primary substation to accommodate EV charging load under Love Lane PSS. Option b: • Build a new primary substation and transfer load from Love Lane PSS and Riverside PSS. • At Thatcham PSS, replace the existing transformers with four transformers and split the primary into two. • Transfer load from St Johns PSS to Thatcham PSS.
	Riverside PSS transformers	Ahead of 2030	Ahead of 2030	Ahead of 2030	Ahead of 2030	N-1: Loss of one transformer.	
	Love Lane PSS transformers	Ahead of 2030	Ahead of 2030	Ahead of 2030	2030 - 2034	N-1: Loss of one transformer.	
	Circuits from Thatcham BSP to Love Lane PSS	2030 - 2034	2030 - 2034	2030 - 2034	2035 - 2039	N-1: Loss of one of the circuits.	
	St Johns PSS transformers	2030 - 2034	2030 - 2034	2030 - 2034	2030 - 2034	N-1: Loss of one transformer.	
	Circuits from Thatcham BSP to St Johns PSS	2030 - 2034	2030 - 2034	2030 - 2034	2030 - 2034	N-1: Loss of one of the circuits.	

ID	Location of proposed intervention	HT Year	EE Year	HE Year	CF Year	Network State	Comments and potential options to resolve the system need
							Option c: • At Love Lane PSS, replace the existing transformers with four transformers and split the primary into two. • At St Johns PSS, replace and uprate the existing transformers. • At Thatcham PSS, replace the existing transformers with three transformers. • At Riverside PSS, transfer load to neighbouring primaries, add a third transformer or replace and uprate the existing transformers.
5	Ratfyn PSS transformers	Ahead of 2030	Ahead of 2030	Ahead of 2030	Ahead of 2030	N-1: Loss of one transformer.	Ahead of 2030, constraints on the transformers at Ratfyn PSS are expected to arise. In the late 2030s and 2040s, constraints at Boscombe Down PSS and Park House PSS are forecast – the impact on future optioneering at these primaries should be considered while sizing asset options for Ratfyn PSS. Option a: • Replace and uprate both existing transformers. Size assets to accommodate future demand at Park House PSS and Boscombe Down PSS if option a for constraint 8 is preferred. Option b: • Add a third transformer.

Table 7 - Summary of system needs identified in this strategy through to 2035 along with indicative solutions.

8.2.2. System needs to 2050

ID	Location of proposed intervention	HT Year	EE Year	HE Year	CF Year	Network State	Comments and potential options to resolve the system need
132kV Network							
6	Thatcham BSP transformers	2040-2044	2040-2044	2035-2039	2045+	N-1: Loss of one of the Thatcham BSP transformers	Option a: • Transfer Lambourn PSS to a different BSP in Minety GSP or Melksham GSP (as considered in option c for constraint 3). Option b: • Replace and uprate A3MT transformer. • Reinforce 33kV interconnections between primaries in Melksham GSP and primaries in Thatcham BSP for use under loss of one of the BSP transformers. Option c: • Replace and uprate A3MT transformer. • Transfer Ball Hill PSS and Hungerford PSS to Melksham GSP.
	33kV interconnection circuits to Melksham GSP under Thatcham BSP	2035-2039	2035-2039	2035-2039	2040-2044		

ID	Location of proposed intervention	HT Year	EE Year	HE Year	CF Year	Network State	Comments and potential options to resolve the system need
7	Circuits between Andover 132kV board and Amesbury BSP	2040-2044	2045+	2045+	2045+	N-1: Loss of one of the circuits feeding Amesbury BSP	Options a, b and d for constraint 2 should resolve the constraint on the circuits to Amesbury BSP. If option c is chosen and a third circuit is added, this constraint is resolved also. If option c is chosen and a 132kV busbar is utilised, then below are possible options to resolve the constraints on the circuits: Option a: • Add a third circuit from Andover 132kV board to Amesbury BSP. Option b: • Replace and uprate both circuits.
33kV Network							
8	Park House PSS transformers	2035 - 2039	2040 - 2044	No issue	2045+	N-1: Loss of one transformer.	Option a: • If option a is chosen for constraint 5, transfer load from Park House PSS and Boscombe Down PSS to Ratfyn PSS. Option b: • Transfer load from Park House PSS to Thruxton PSS in Melksham GSP which sees constraints in a similar time period. • Transfer load from Boscombe Down PSS to Ratfyn PSS or Park House PSS and replace and uprate the circuits from Amesbury BSP. Option c: • Replace and uprate the existing transformers at Park House PSS. • Transfer load from Boscombe Down PSS to Park House PSS.
	Boscombe Down PSS transformers	2045+	2045+	No issue	2045+	N-1: Loss of one transformer.	
	Circuits from Amesbury BSP to Boscombe Down PSS	2035 - 2039	2030 - 2034	2030 - 2034	2035 - 2039	N-1: Loss of one of the circuits.	
9	Tadley PSS transformers	2035 - 2039	2035 - 2039	2035 - 2039	2040 - 2044	N-1: Loss of one transformer.	Option a: • Replace and uprate the existing transformers at Tadley PSS or Kingsclere PSS. • Transfer load between Kingsclere PSS and Tadley PSS. Option b: • Add a third transformer at Kingsclere PSS or Tadley PSS. • Transfer load between Kingsclere PSS and Tadley PSS. Option c: • Replace both transformers at Tadley PSS or add a third transformer. • Transfer load from Kingsclere PSS to Ball Hill PSS.
	Kingsclere PSS transformers	2035 - 2039	2035 - 2039	2035 - 2039	2040 - 2044	N-1: Loss of one transformer.	
10	Hungerford PSS transformers	2045+	No issue	No issue	2045+	N-1: Loss of one transformer.	There are constraints seen on Hungerford PSS, Kintbury PSS and Ball Hill PSS, though this varies under different DFES scenarios. The

ID	Location of proposed intervention	HT Year	EE Year	HE Year	CF Year	Network State	Comments and potential options to resolve the system need
	Kintbury PSS transformers	No issue	No issue	No issue	2035 - 2039	N-1: Loss of one transformer.	demand load not able to be met in each case is small and so the recommendation is to explore options to transfer load on this part of the network once there is more accurate view of how demand will grow in this area in the 2040s.
	Ball Hill PSS transformers	No issue	No issue	2045+	No issue	N-1: Loss of one transformer.	

Table 8 - Summary of system needs identified in this strategy through to 2050 along with indicative solutions.

8.3. Future Requirements of the High Voltage and Low Voltage Networks

Our HV/LV spatial plans have shown that there is no clear pattern to future demands on these lower voltage networks. We are therefore planning on a forecast volume basis, and this section provides further context on this work for both the Bramley (Amesbury-Thatcham) GSP high voltage and low voltage network needs to 2050.

8.3.1. High Voltage Networks

As well as the EHV system needs identified in the previous section, increased penetration of low carbon technologies (LCTs) connecting to the distribution network will result in system needs on the High Voltage (HV) and Low Voltage (LV) networks. To provide a view on the impact of these technologies on the distribution network here we have used the load model that is produced by SSEN's Data and Analytics team.[8]

The load model is a machine learning product which estimates a half-hourly annual demand profile for each household based on a series of demographic, geographic and heating type factors. This enables us to estimate capacity on the electricity network while protecting individual customers data privacy by using modelled data. These views are then aggregated up the network hierarchy based on the combinations of customers associated with each asset. This view is supplemented with the DFES to highlight the projected impact of LCTs on the network.

For the 18 primary substations supplied by Bramley (Amesbury-Thatcham) GSP, the percentage of secondary substations where projected peak loading exceeds the nameplate rating of the secondary transformer was taken from the load model data. Figure 14 demonstrates how this percentage changes under each DFES scenario from now to 2050 where it is projected that without intervention, 42% of secondary transformers will be overloaded under the HT scenario.

To satisfy these requirements a variety of solutions will need to be investigated. It is likely that a combination of flexibility and asset replacement will be employed to resolve the projected HV system needs. It is important to note that for HV needs, flexibility is likely to be provided through Distributed Energy Resources (DER), Consumer Energy Resources (CER), and domestic/commercial Demand Side Response (DSR). One of the challenges associated with procuring flexibility to High Voltage and Low Voltage system needs is that only a small number of customers can provide a flexible service due to the requirement to be supplied by a specific secondary transformer. As the role of aggregators develops, we may see a shift in the potential for flexibility in an area. Where the magnitude of an overload is too large for flexibility to be feasible, addition of new assets or asset replacement will be necessary.

8 SSEN Open Data Portal, 2023, SSEN Secondary Transformer – Asset Capacity and Low Carbon Technology Growth.

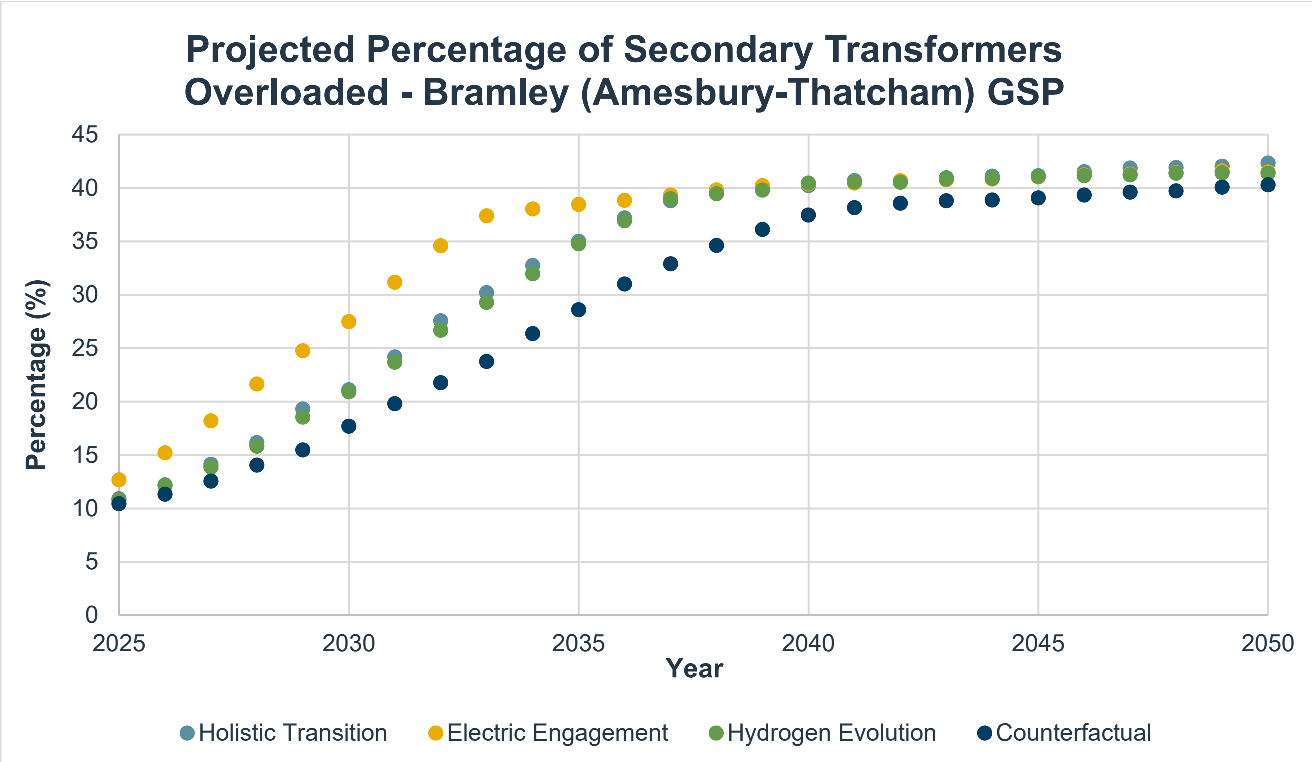

Figure 14 - Bramley (Amesbury-Thatcham) GSP Projected secondary transformer loading. *Source: SSEN Load Model*

Considering the Just Transition in HV development

SSEN are building on the findings from the Vulnerability Future Energy Scenarios (VFES). This innovation project investigated how the use of new foresighting techniques, along with data analytics and expert validation could be used to identify and forecast consumers in vulnerable situations as we move toward net zero. Use of the outputs from the VFES enable SSEN to develop the network in a way that truly accounts for the levels of vulnerability their customers in different locations face. Inclusion of the use of the VFES also acts as an example of how this data can be used more broadly by SSEN as well as other organisations for spatial planning. For example, it can help us identify areas where energy efficiency mechanisms could help reduce the need for network investment.

One of the outputs from this innovation project was the report produced by the Smith Institute.[9] This work groups LSOAs[10] that share similar drivers of vulnerability. The groupings were informed by mathematical analysis of demographic data and of SSEN's priority service register, using machine learning to model the complex relationships that exist between the two. The resulting group numbers and descriptions are shown in Table 9.

9 VFES Machine Learning Discovery of Vulnerability Signatures Report, Smith Institute, 08/11/2022, (NIA SSEN 0063: VFES – Vulnerability Future Energy Scenarios | SSEN Innovation)

10 Lower layer Super Output Areas (LSOAs) (Statistical geographies - Office for National Statistics)

Group Number & Level of Vulnerability	Description of Group
1 – Very high	Driven up by higher levels of poor health and disability/mental health benefit claimants, reduced by smaller household sizes.
2 – High	Driven up by larger household sizes, reduced by lower elderly population levels.
3 – High	Driven up by larger elderly population levels, reduced by lower levels of disability and mental health benefit claimants.
4 – Slightly higher than average	Driven up by larger elder population levels and moderately higher provision of care, reduced by smaller household sizes.
5 – Slightly lower than average	Driven down by lower elderly population levels and larger levels of ethnic diversity, increased by higher household sizes and greater provision of care.
6 – Low	Driven down by lower level of bad health and disability/mental health benefit claimants, increased by moderate elderly population levels and household sizes.
7 – Very low	Driven down by substantially lower elderly population levels, less provision of care and a higher level of households in private rented dwellings.

Table 9 - VFES Groupings

To understand the vulnerability groupings across Bramley (Amesbury-Thatcham) GSP supply area we have visualised the LSOA categorisation for the study area. By overlaying secondary transformers that are projected to be overloaded by 2028 (under the Holistic Transition scenario), we begin to understand the crossover between network capacity needs and areas categorised as high vulnerability through the VFES work. This is shown below in Figure 15.

The majority of the Bramley (Amesbury-Thatcham) GSP area falls into category 6 with low vulnerability. There are notable areas around Newbury and Thatcham which have high or very high vulnerability (categories 1 and 2) with secondary transformers which are forecast to be overloaded by 2028 under HT.

By overlaying the point locations of secondary transformers projected to be overloaded (in 2028 under the Holistic Transition scenario) we identify areas that are categorised as more vulnerable and also may have capacity shortfalls at the secondary network level. More vulnerable groups may have a lower level of adoption of LCTs and therefore provide less ability to manage overloads through flexibility services. Further they may point towards areas of social housing where there could be a more sudden rollout of LCTs such as heat pumps in the future. They may also highlight areas where there is an evidential need for energy efficiency measures.

We recommend the use of these insights to prioritise work in heavily loaded areas of our network ensuring the network remains secure, stable, and resilient in the areas where vulnerable customers would be most disadvantaged by power outages.

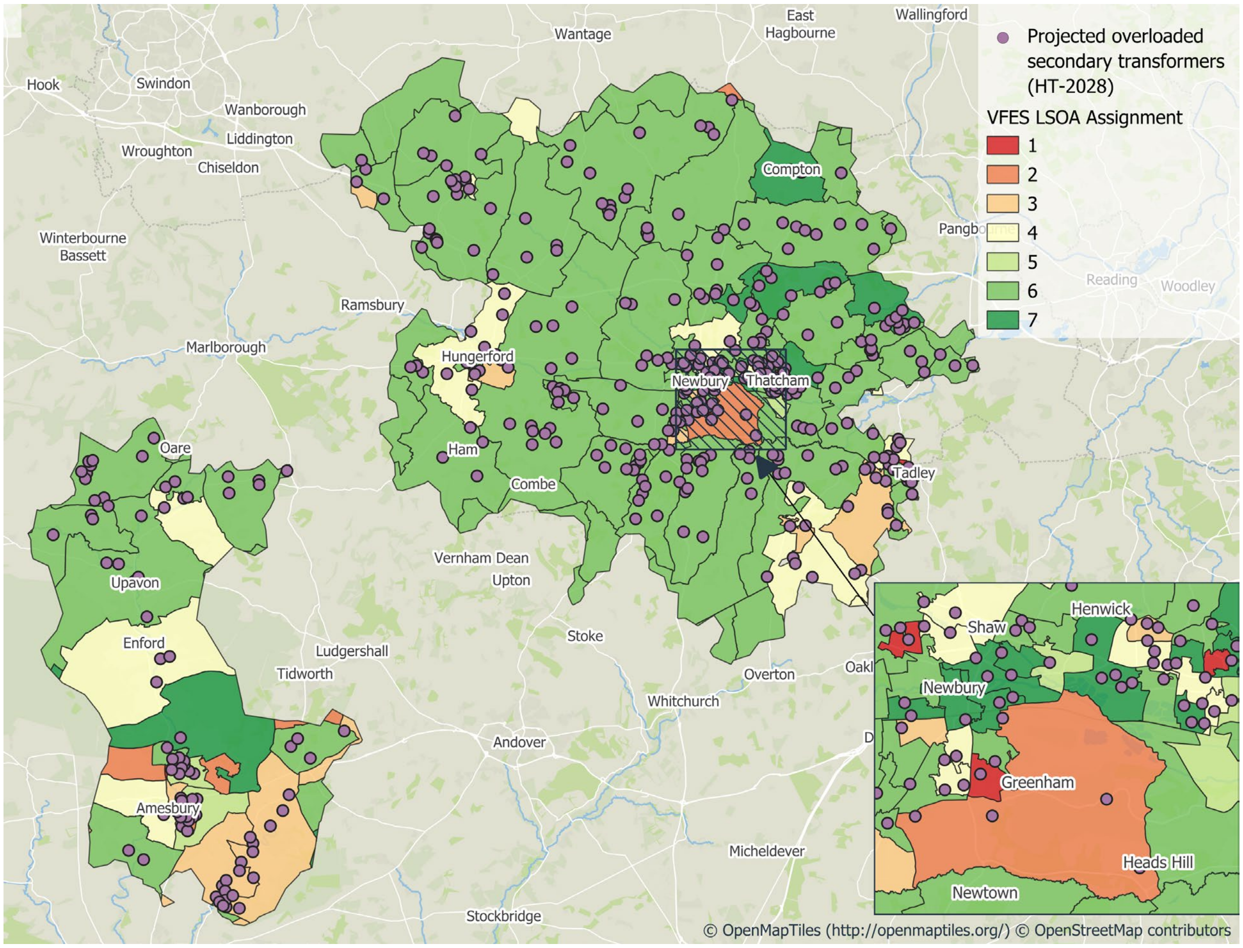

Figure 15 - Bramley (Amesbury-Thatcham) GSP VFES heat map with overloaded secondary transformers.

8.3.2. Low Voltage Networks

Drivers for interventions in low voltage networks may be either capacity related or be driven by voltage requirements. We are progressing options to resolve both drivers. From a network perspective the solution typically involves upgrading the number of LV feeders to split/ balance the load and improve voltage or to install another substation at the remote end of the LV network to balance load and improve voltage. In both instances, flexibility at a local level, especially voltage management products linked to battery export and embedded generation such as solar is likely to be required alongside traditional reinforcement.
We are leveraging recent innovation work through Project LEO (Local Energy Oxfordshire) and My Electric Avenue to inform this strategy. Enhanced network visibility through smart meter data analytics and low-cost substation feeder monitoring is also necessary to enable appropriate dispatch of services and network reconfiguration.

Capacity driven needs – Thermal constraints tend to materialise in the sections of cable leading to the substation (transformer) where multiple customer loads join together. We are modelling requirements out to 2050 leveraging low voltage monitoring and metering equipment combined with analytical techniques. This will demonstrate how the magnitude of the system need of the LV network across Bramley (Amesbury-Thatcham) GSP changes across scenarios and years out to 2050.

Voltage driven needs – Generally, connection of Low Carbon Technology and large loads such as heat pumps is limited by voltage constraints before thermal constraints when located more than around 150m from the local secondary transformer. Increased loading on our low voltage networks can reduce the voltages to consumer premises. This is a non-linear relationship and as such requires more complex analysis. We are currently undertaking analysis to better understand the extent of this future need.

Initial analysis indicates that across Bramley (Amesbury-Thatcham) GSP 26% of low voltage feeders may need intervention by 2035 and 37% by 2050 under the HT scenario as shown in Figure 16. The need is unlikely to be triggered until 2028 onwards. However, due to the timeline to grow workforce, with jointing skills taking typically 4 years to be fully competent, it is necessary to start recruitment and initiate programmes ahead of need to be able to deliver the required volumes from 2028 onwards

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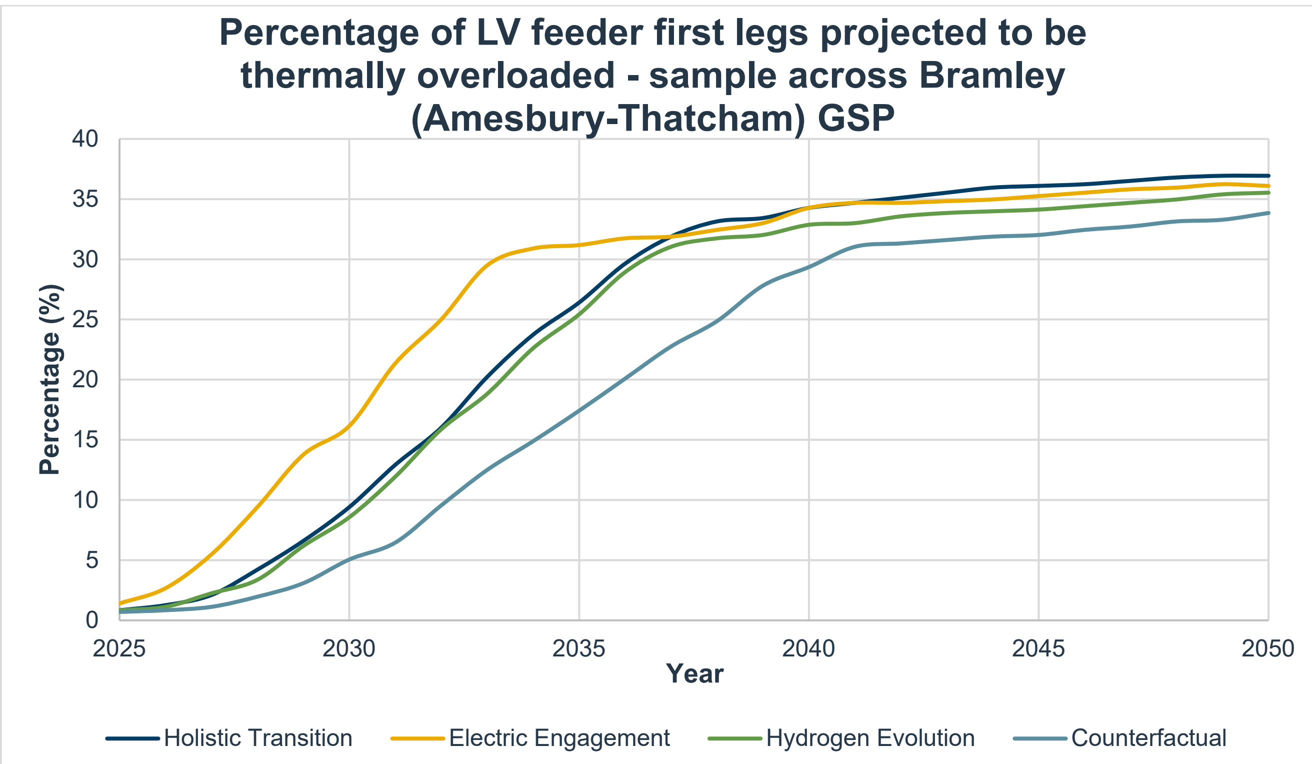


Figure 16 - Percentage of LV feeders projected to be overloaded under Bramley (Amesbury-Thatcham) GSP

9. RECOMMENDATIONS

The review of stakeholder engagement and the SSEN 2024 DFES analysis provides a robust evidence base for load growth across Bramley (Amesbury-Thatcham) GSP group in both the near and longer term. Drivers for load growth across Bramley (Amesbury-Thatcham) GSP arise from multiple sectors and technologies. These drivers impact not only the EHV network but will drive system needs across all voltage levels.

The findings from this report have provided evidence for 4 key recommendations:

1. System needs that have been identified to arise in the near-term should be progressed through the DNOA process to develop a more in-depth solution. For this SDP, this includes:
    a. Circuits between Thatcham BSP and Beenham PSS teed point (Constraint 3)
    b. Love Lane PSS transformers (Constraint 4)
    c. Riverside PSS transformers (Constraint 4)
    d. Thatcham PSS transformers (Constraint 4)
    e. Ratfyn PSS transformers (Constraint 5)

    It is possible that some of the above constraints may not have a near term system need based on actual load growth and therefore will not initially result in a DNOA outcome. Annual reassessment will enable us to confirm whether these system needs are likely to arise. When carrying out this annual reassessment the delivery timelines of the work should be considered alongside the potential for flexibility services to manage network capacity.

2. Thatcham BSP has a large 33kV ringed circuit with several primary substations connected to it which are forecast to have significant demand growth by 2050. Effective reconfiguration of this ring will unlock operational benefits as well as capacity and as such should be investigated in detail to reach the most suitable solution. Generation requirements following CP2030 and connections reform should also be considered when options are considered in detail for the 33kV network under Thatcham BSP.

3. There are notable interconnections under Bramley (Amesbury-Thatcham) GSP on the 132kV network and the 33kV network, this presents opportunities to optimise investment across neighbouring GSPs to unlock capacity across the region in an effective and coordinated manner.

4. Considering the significant growth in DERs expected across Bramley (Amesbury-Thatcham) GSP supply area, engagement with NGET and NESO should be proactive creating a long-term plan for the area which incorporates the outputs of CP2030 and connections reform.

Actioning these recommendations will allow SSEN to develop a network that supports local net zero ambitions and enables growth in the local economy. By doing so, this will ultimately contribute to net zero targets at a national level.

Appendix A: Additional Network Schematics

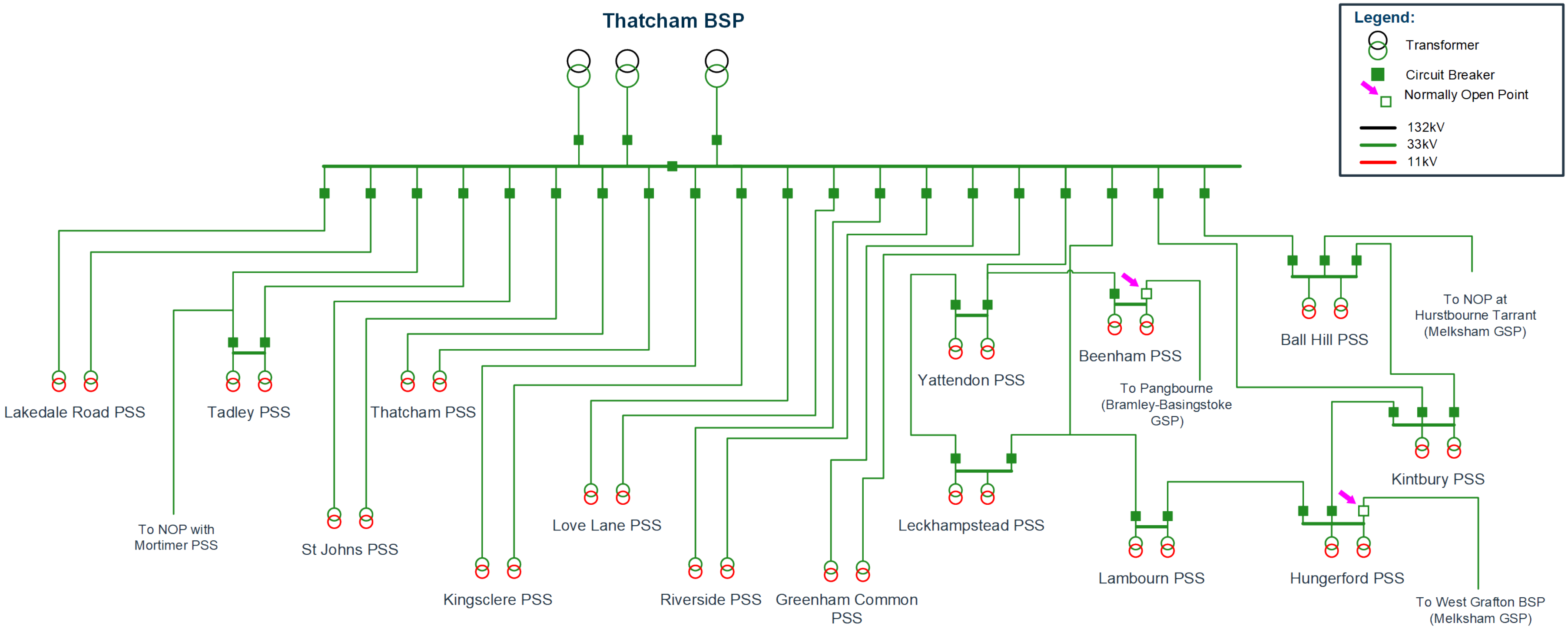


Figure 17 - Schematic diagram of the existing network supplied by Thatcham BSP

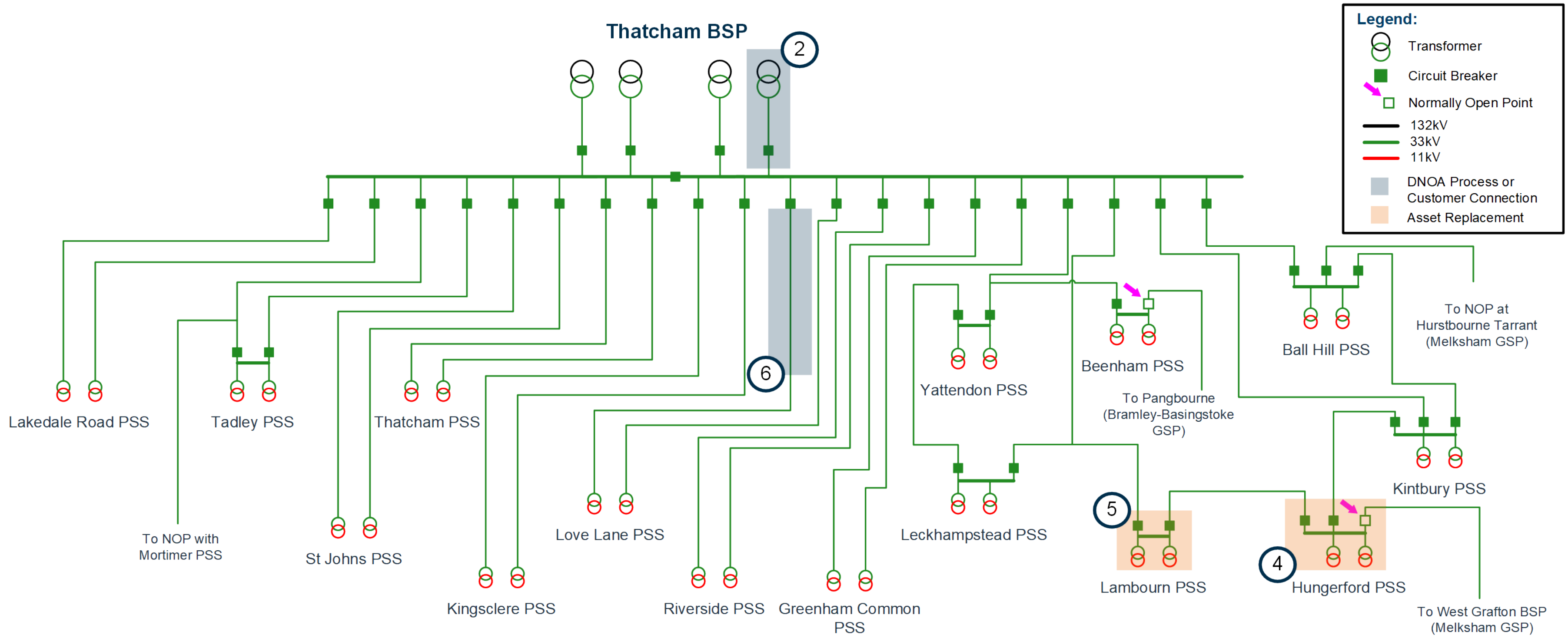


Figure 18 - Schematic diagram of the network supplied by Thatcham BSP following the completion of triggered work

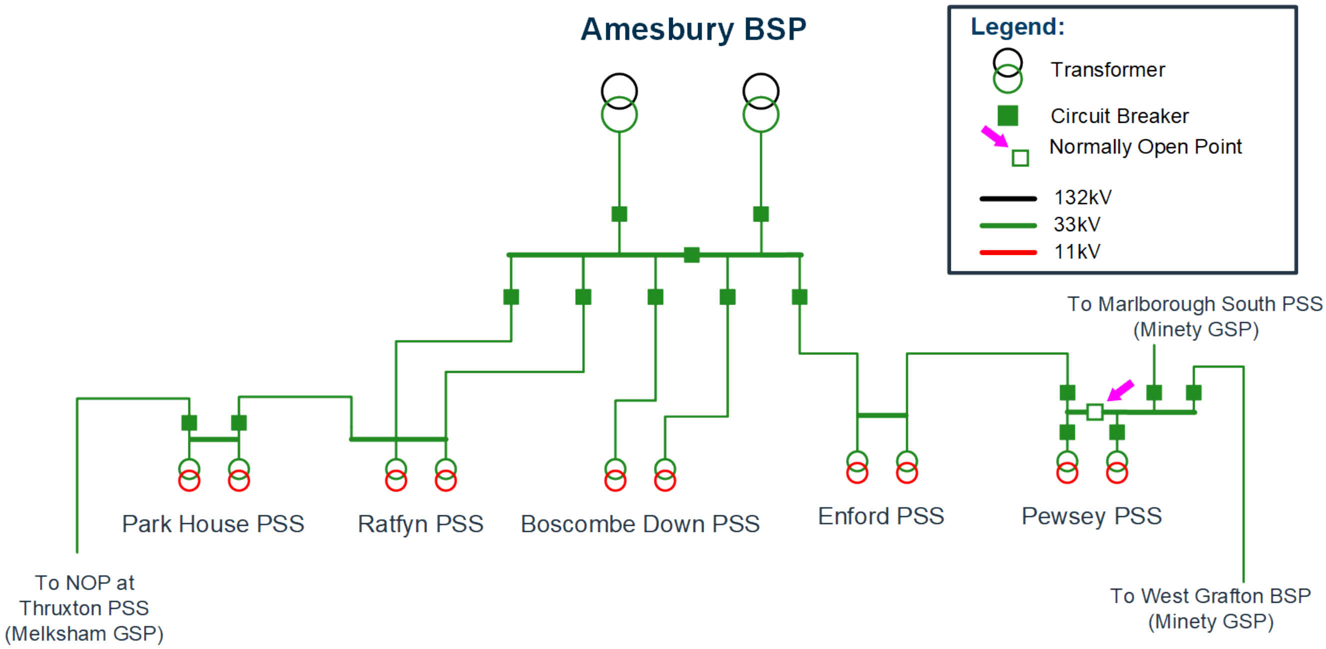


Figure 19 - Schematic diagram of the network supplied by Amesbury BSP

Appendix B: EHV/HV spatial plans for other DFES scenarios

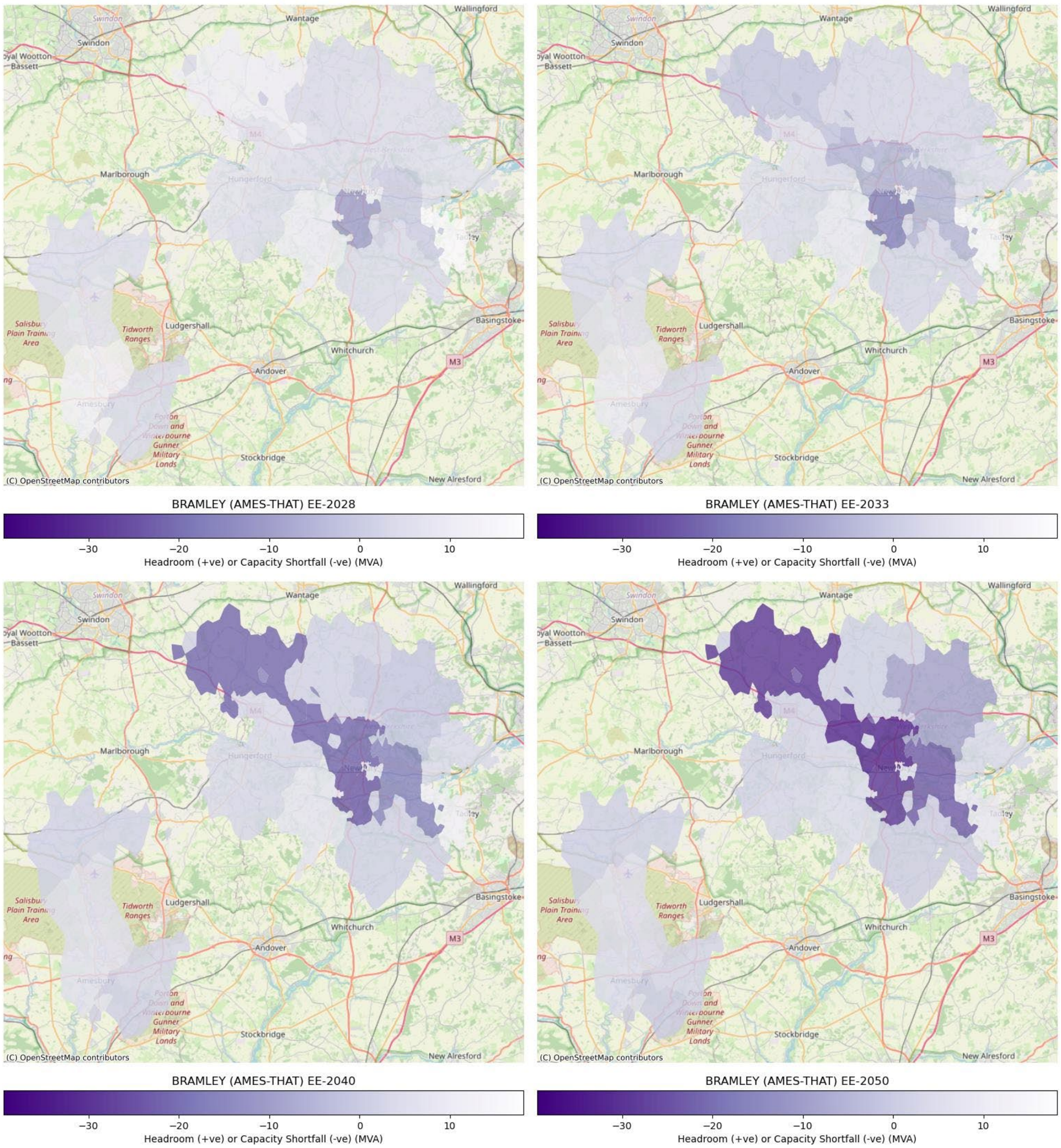


Figure 20 - Bramley (Amesbury-Thatcham) GSP - EHV/HV Spatial Plan - Electric Engagement

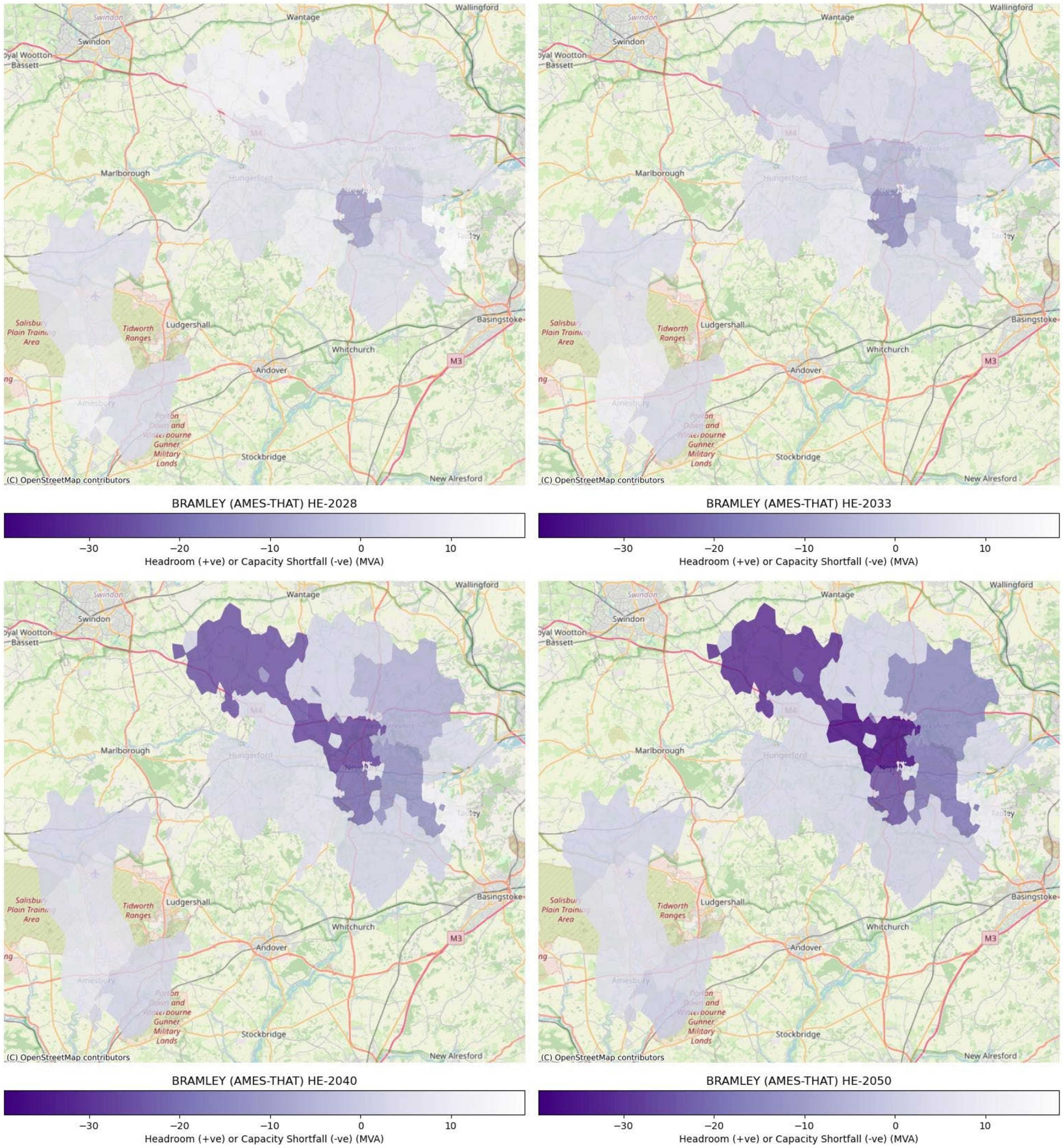


Figure 21 - Bramley (Amesbury-Thatcham) GSP - EHV/HV Spatial Plan – Hydrogen Evolution

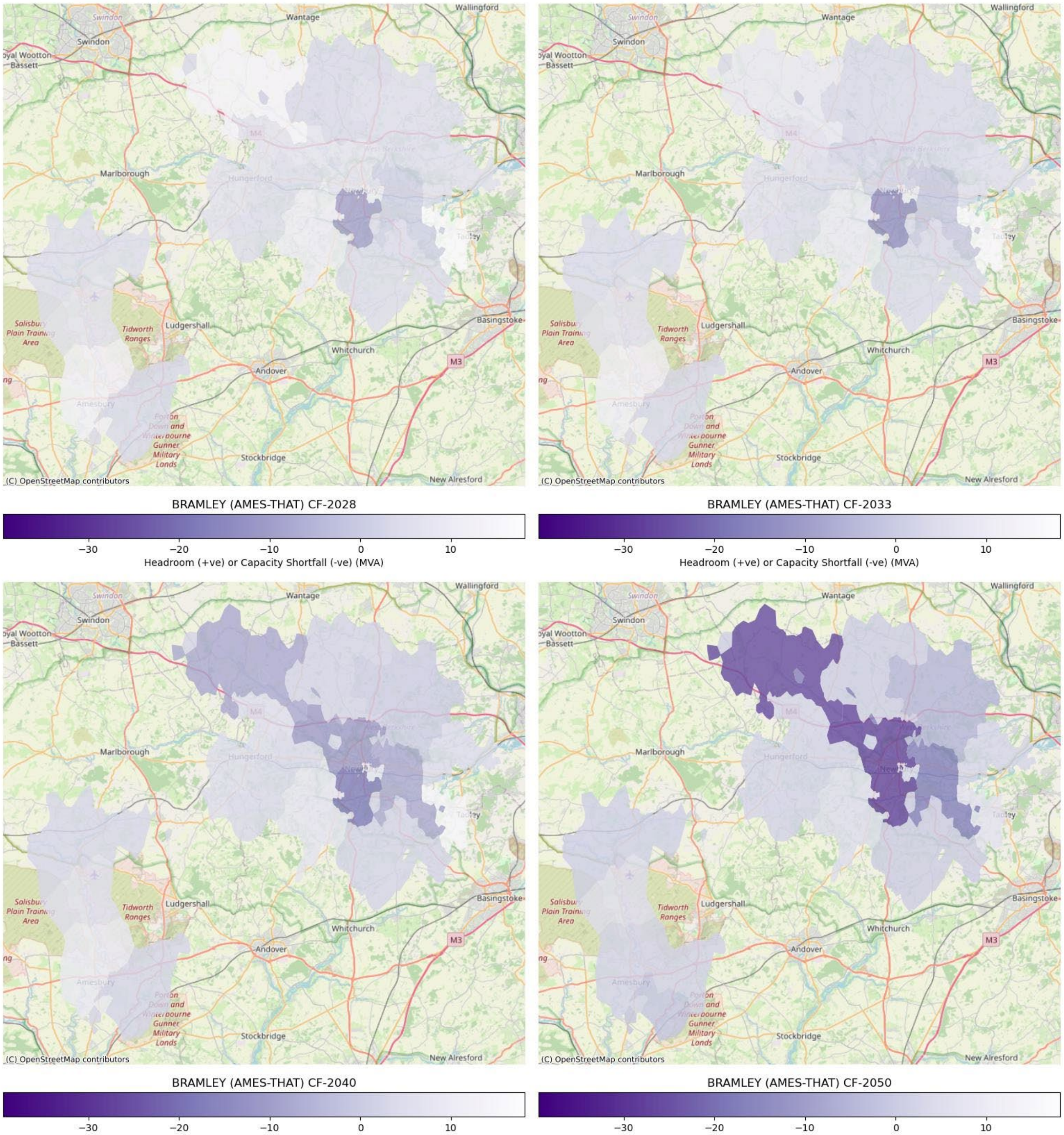


Figure 22 - Bramley (Amesbury-Thatcham) GSP - EHV/HV Spatial Plan – Counterfactual

Appendix C: HV/LV spatial plans for other DFES scenarios

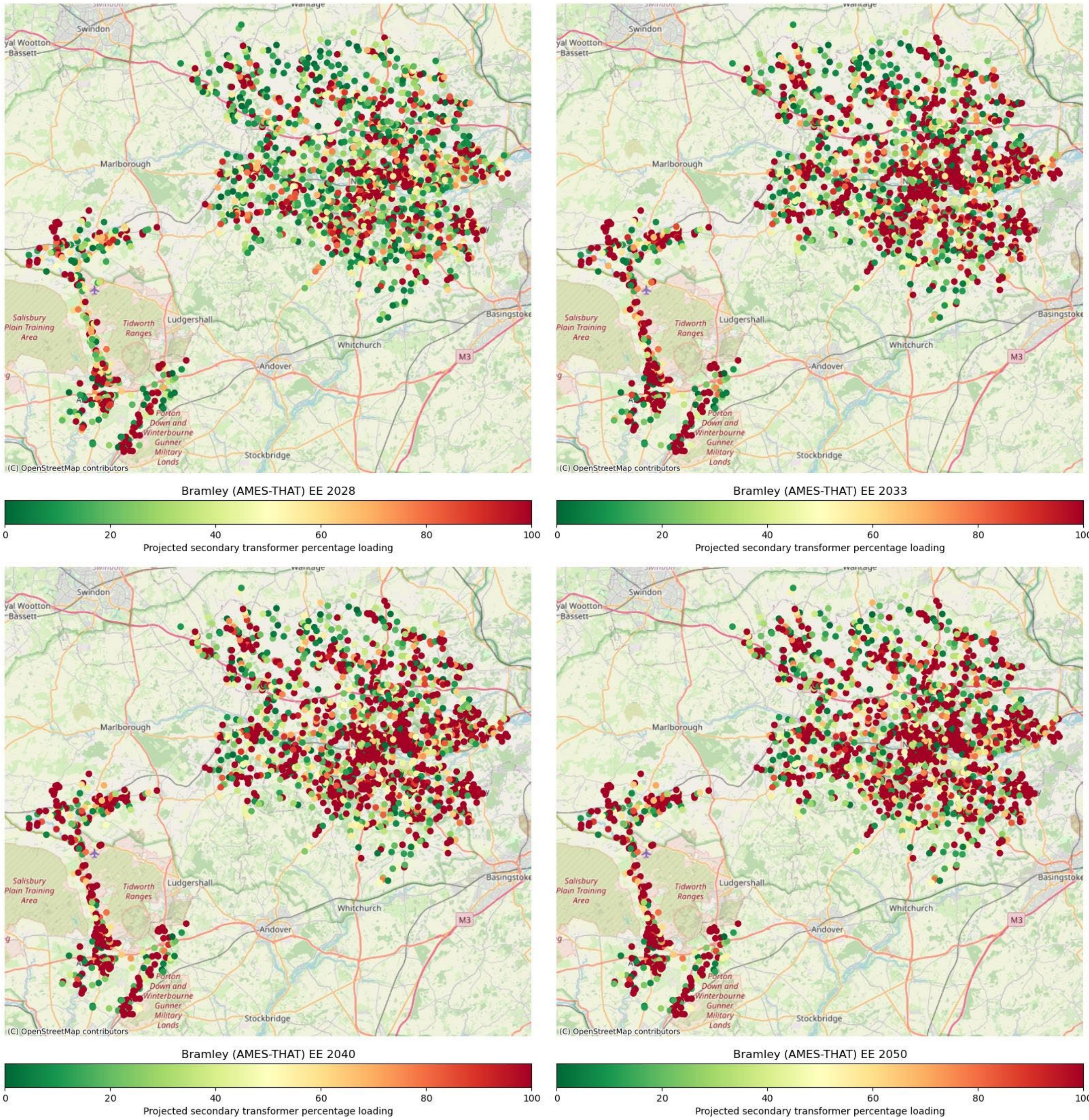


Figure 23 - Bramley (Amesbury-Thatcham) GSP - HV/LV Spatial Plan – Electric Engagement

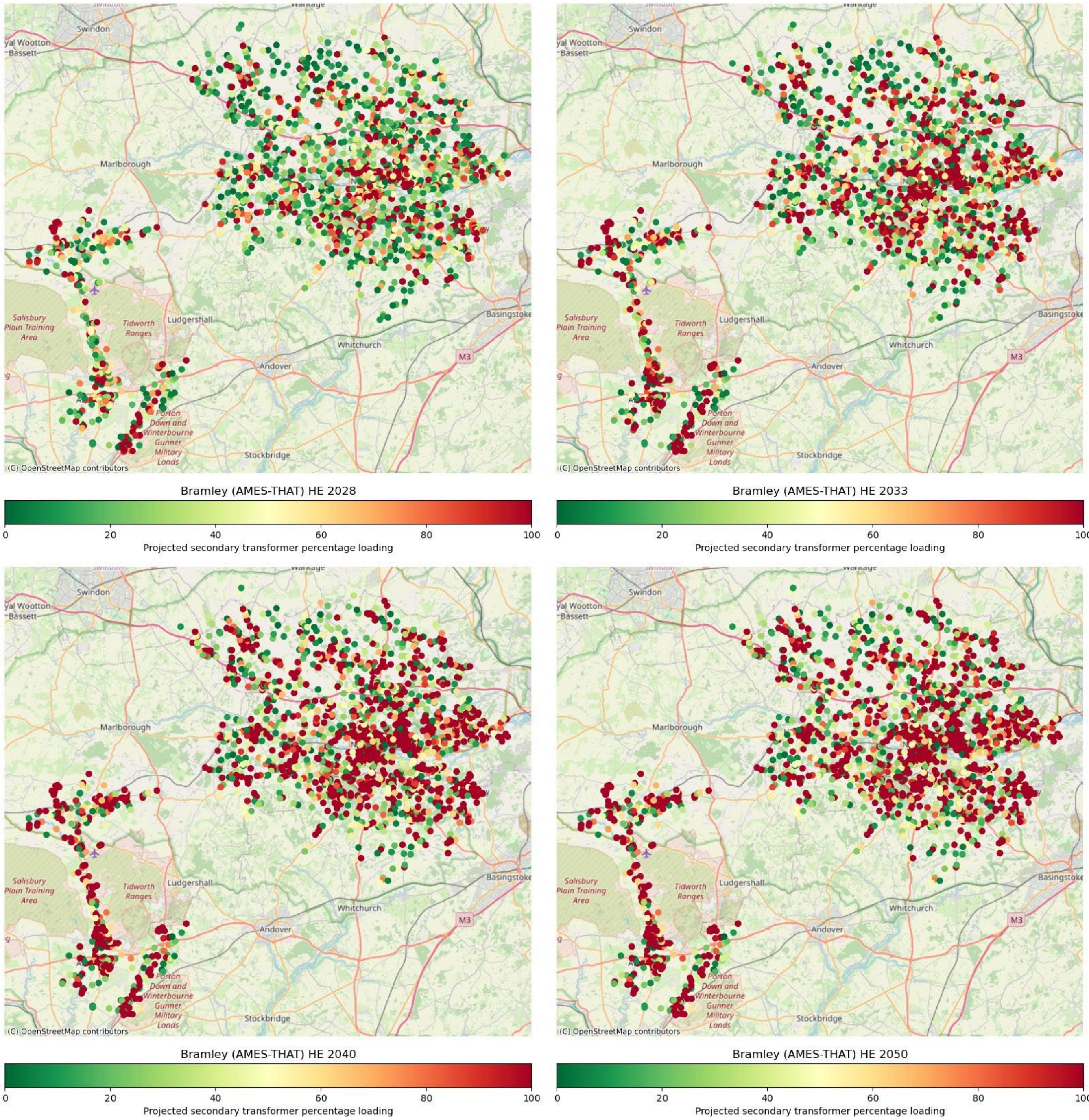


Figure 24 - Bramley (Amesbury-Thatcham) GSP - HV/LV Spatial Plan – Hydrogen Evolution

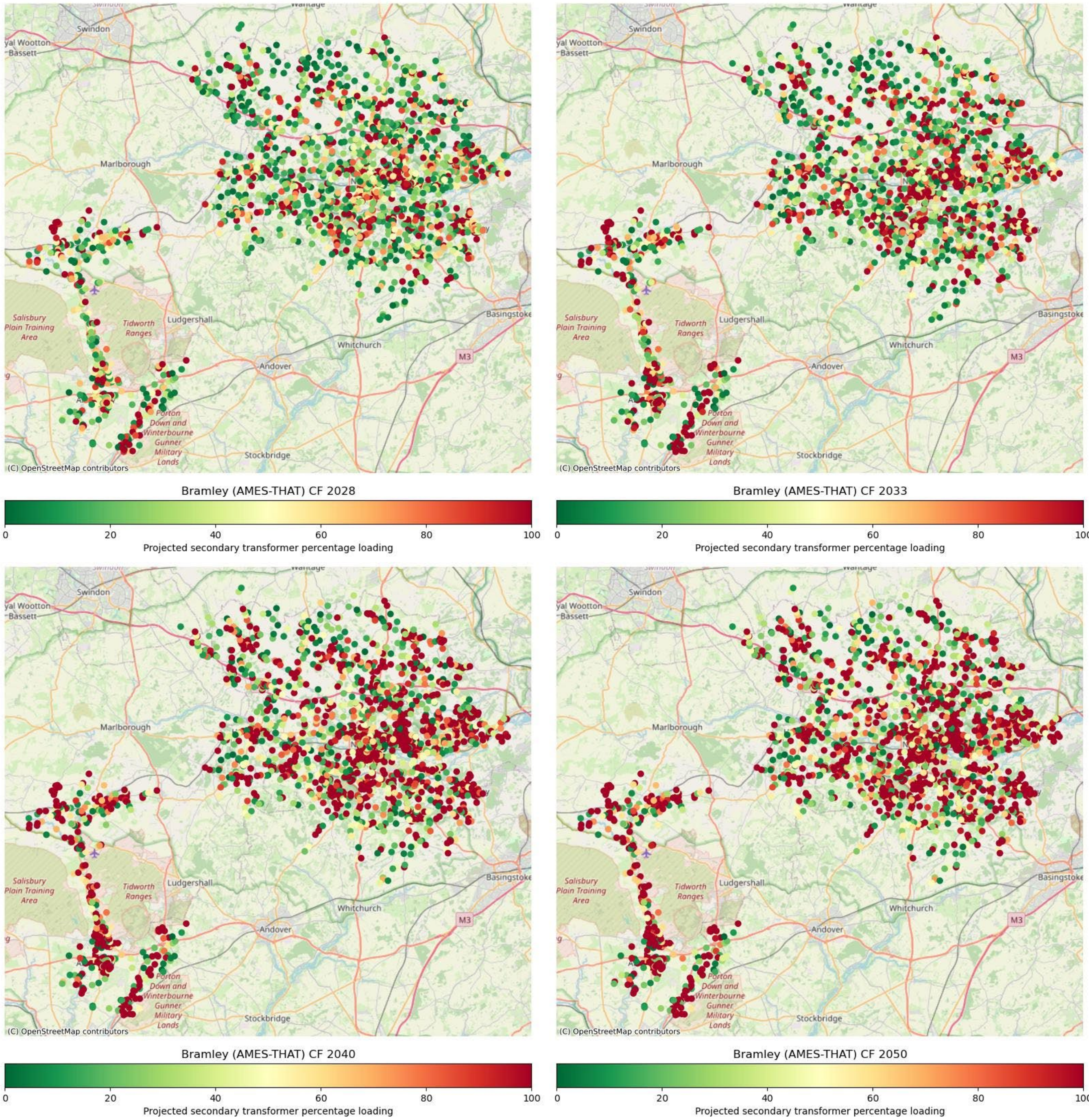


Figure 25 - Bramley (Amesbury-Thatcham) GSP - HV/LV Spatial Plan - Counterfactual

Appendix D: Relevant DNOA Outcome Reports

November 2024 Report

DNOA Outcome Report

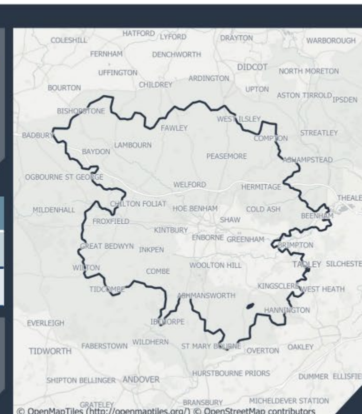
Thatcham and Newbury (Thatcham BSP)

Scheme description

- The reinforcement of Thatcham BSP will increase capacity in the Thatcham and Newbury area. Postcode(s): OX12, RG14, RG17, RG18, RG19, RG2, RG20, RG25, RG26, RG28, RG7, RG8, SN8 , SP11.
- Local authority: Basingstoke and Deane, West Berkshire
- Load related – substation overload during FCO conditions due to forecasted demand growth.

Proposed option

- Flexibility/Asset Solution: Utilise flexibility for 1 year to manage the constraint and deliver an asset solution of an additional 132/33kV transformer at Thatcham BSP.
- This option addresses the forecasted thermal overload at Thatcham BSP out to 2038.
- Capacity released: 90MVA



System need requirement

J	F	M	A	M	J	J	A	S	O	N	D

DNOA History

2024/25	2025/26	2026/27	2027/28	2028/29
Initial assessment				

Indicative flexibility price (if available):

- Availability price: £115/MW/h
- Utilisation price: £146/MWh

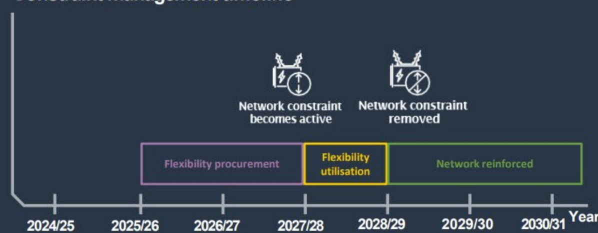
Reinforcement timeline

- Flexibility solution utilised in 2027/28.
- Reinforcement delivery by the end of 2027/28.

Estimated peak MW outside firm network capacity under each scenario
Grey text relates to estimated peak MW without reinforcement delivery

	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
CT	-	-	-	1.91	- (8.57)	- (34.79)	- (41.80)
ST	-	-	-	-	- (2.26)	- (26.61)	- (31.90)
LTW	-	-	2.30	6.16	- (13.67)	- (39.97)	- (48.40)
FS	-	-	-	-	- (0.41)	- (24.11)	- (29.07)

Constraint management timeline



30 | Scottish and Southern Electricity Networks Distribution | **DNOA Outcomes Report November 2024 – Ref. 1124-22**

Appendix E: Glossary

Acronym	Definition
AIS	Air Insulated Switchgear
ANM	Active Network Management
BAU	Business as Usual
BSP	Bulk Supply Point
CB	Circuit Breaker
CBA	Cost Benefit Analysis
CER	Consumer Energy Resources
CF	Counterfactual
CMZ	Constraint Managed Zone
CT	Consumer Transformation
DER	Distributed Energy Resources
DESNZ	Department for Energy Security and Net Zero
DFES	Distribution Future Energy Scenarios
DNO	Distribution Network Operator
DNOA	Distribution Network Options Assessment
DSO	Distribution System Operation
DSR	Demand Side Response
EE	Electric Engagement
EHV	Extra High Voltage
EJP	Engineering Justification Paper
ER P2	Engineering Recommendation P2
NESO	National Energy System Operator
NGET	National Grid Electricity Transmission
ENA	Electricity Networks Association
EV	Electric Vehicle
FES	Future Energy Scenarios
FS	Falling Short

GIS	Gas Insulated Switchgear
GSPs	Grid Supply Point
HE	Hydrogen Evolution
HT	Holistic Transition
HV	High Voltage
kV	Kilovolt
LAEP	Local Area Energy Planning
LCT	Low Carbon Technology
LENZA	Local Energy Net Zero Accelerator
LV	Low Voltage
LW	Leading the Way
OHL	Overhead Line
PSS	Primary Substation
PV	Photovoltaic
NSHR	Network Scenario Headroom Report (part of the Network Development Plan)
MW	Megawatt
MVA	Mega Volt Ampere
ODM	Operational Decision Making
RESOP	Regional Energy System Operation Planning
RIIO-ED1/2	Revenue = Incentives + Innovation + Outputs, Electricity Distribution 1 / 2 (regulatory price control periods)
SDP	Strategic Development Plan
SEPD	Southern Electric Power Distribution
SLC	Standard Licence Condition
SSEN	Scottish and Southern Electricity Networks
ST	System Transformation
UM	Uncertainty mechanism
VFES	Vulnerability Future Energy Scenarios
WSC	Worst Served Customers

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