

MAYOR OF LONDON

Draft New London Plan: Utilities Impact Assessment



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Greater London Authority
City Hall
Kamal Chunchie Way
London E16 1ZE

www.london.gov.uk
enquiries 020 7983 4000
Email Londonplan@london.gov.uk

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1 Executive Summary

- 1.1 This report provides a high-level assessment of how the residential growth targets proposed for the new London Plan may affect water and electricity networks operated by Thames Water, Affinity Water, Scottish and Southern Electricity Networks (SSEN) and UK Power Networks. Three growth scenarios - Baseline, High and Mid (which was ultimately preferred)- were tested.
- 1.2 Delivering the new London Plan's housing targets will require sufficient utilities infrastructure capacity to ensure developments can connect to networks in a timely and cost-efficient manner. This is particularly important given wider pressures on utilities networks, including maintenance of ageing assets, increased demand from decarbonisation and electrification, as well as climate adaptation and resilience related upgrades.
- 1.3 Although utilities and spatial planning operate through separate regulatory frameworks, improved visibility and alignment between these activities is essential. Coordinated planning helps ensure that the right infrastructure is delivered at the right time and at an efficient cost.
- 1.4 The assessment results are that all utilities confirmed that their networks can accommodate the growth levels in the GLA's mid (i.e. preferred) scenario, and by extension, the slightly lower final growth quantum incorporated in the draft new London Plan. However, the results also show that the growth scenarios introduce substantial demand onto specific assets and trigger reinforcement requirements that would not otherwise arise within current investment timelines.
- 1.5 Utilities identified several mitigating actions to support delivery of the GLA's mid growth scenario. These include safeguarding of land for infrastructure, allowing sufficient lead in times, and strengthening strategic engagement and coordination to inform network investment planning, particularly in locations where high growth will be concentrated or other stress is evident. Further collaborative work between the GLA, local authorities and utilities (including on strategies such as Integrated Water Management Strategies and energy masterplans) should be considered to support delivery of growth ambitions.

2 Introduction and context

Overview

- 2.1 The Greater London Authority (GLA) is preparing a new London Plan, the Spatial Development Strategy for London, under the Greater London Authority Act 1999. The Plan will set a framework for future growth and identify areas for future development, to support the delivery of new homes and jobs needed in London up to 2050.
- 2.2 The National Planning Policy Framework (NPPF) (paragraph 27) notes that plan-making authorities should align their plan policies as fully as possible with those of other bodies, including the relevant investment plans of bodies such as infrastructure providers. Further to this, the National Planning Practice Guidance (NPPG) (Paragraph: 059 Reference ID: 61-059-20190315) indicates that policy-making authorities should work with infrastructure providers and others to identify infrastructure deficits and requirements, and opportunities to address them.
- 2.3 In line with this and to ensure that future development can be accommodated, the GLA has assessed potential growth patterns in the new London Plan through a suite of technical studies, including this Utilities Impact Assessment. These assessments help identify the infrastructure and activities required to support growth and ensure the Plan is positively prepared, justified, effective and consistent with national policy.
- 2.4 Utilities infrastructure is critical to support new development, which typically requires connection to the electricity, water and sewerage networks, and exceptionally the gas network. Although electricity distribution network operators (DNOs) and water and wastewater companies are required by regulation to connect domestic properties to their networks, issues can occur to frustrate the delivery of development where infrastructure is not in place to support need. This is typically when new infrastructure or infrastructure reinforcement is required which can result in connection delays and additional costs.
- 2.5 Utilities undertake their own network investment planning, regulated separately from the spatial planning regime. However, alignment between the two has become increasingly important due to several pressures on both systems, including housing need, economic growth, decarbonisation and electrification, and the emergence of system disruptors such as data centres, as well as the need for climate resilient infrastructure.
- 2.6 To help ensure this alignment and prevent utilities infrastructure becoming a brake on delivery, network capacity should be assessed against growth scenarios, and where appropriate, mitigated (e.g. through phasing assumptions, identification of new strategic infrastructure requirements that will need to be secured) upfront in the plan-making process to support delivery of this growth. This assessment approach is novel, and GLA has worked proactively with utilities to develop a robust methodology.



Figure 1: diagram showing how strategic national direction influences spatial planning and utilities planning regimes

- 2.7 The GLA London Plan team prepared scenarios for growth which have been assessed to understand how they could be delivered with appropriate utilities. Using this feedback, a mid (or preferred) scenario was prepared, and this was also shared with utilities providers to understand its potential network impacts, and to ensure that any mitigations and potential impacts on development phasing is understood. It is anticipated that this picture will evolve following the identification of the final draft spatial strategy and public consultation on the draft London Plan. This assessment will therefore need to be refreshed prior to, and potentially once again after Examination in Public of the new London Plan to reflect changes to the spatial strategy as the new London Plan moves through the plan making process.

Assessment scope

- 2.8 This assessment covers electricity and water utilities networks operated by UK Power Networks, Scottish and Southern Electricity Networks (SSEN), Thames Water, and Affinity Water. Gas and Communications infrastructure are not within scope of this assessment, as they are not considered to be such a determining factor on the growth and phasing of housing delivery, particularly given the emerging Future Homes Standard which comes into force in 2028 which will further reduce the number of new gas connections.
- 2.9 This assessment reviews the capacity of existing water, foul and surface water networks, as well as the electricity distribution networks, to accommodate scenarios for future development across London. It is a bespoke, strategic assessment for the purposes of informing the preparation of the new London Plan. It is not a comprehensive or conclusive impact assessment of all implications of growth for utilities' networks.
- 2.10 It is recognised that considering infrastructure solely from a capacity perspective has limitations, and there will be other considerations which drive feasibility of delivering the infrastructure needed to support growth, including skills, the supply chain, land availability and costs, all of which are outside the scope of this study.
- 2.11 A particular consideration for the electricity networks but out of scope of this assessment are constraints that exist upstream of the distribution network. Engagement with National Grid Electricity Transmission (NGET) was sought as part of this study, given the importance of transmission-level constraints (particularly in west London) to the deliverability of growth; however, it was not possible to secure this within the timescales of this assessment. As such, transmission-level constraints and their implications for

development are not directly assessed in this report, beyond the evidence on known constraints referenced in the baseline (section 3) and analysis (section 5).

- 2.12 UK Power Networks have separately tested growth forecasts with National Grid Electricity Transmission to confirm there is sufficient capacity for the mid- growth scenario.
- 2.13 Furthermore, although the assessment has highlighted the implications of growth for utilities networks under current investment plans, utilities investment plans are updated regularly and will evolve to reflect the final growth ambitions of the new London Plan, and actual housing delivery. As such, the results should not be taken as conclusive for any growth area and this work should be seen as a starting point for further detailed assessment work and engagement with the relevant utilities, which will be required prior to site allocation and planning application stages of the planning process.
- 2.14 The research was undertaken in early 2026, and this report reflects the position at that point in time. Views on the infrastructure requirements needed to support development may change as more information becomes available.

Utilities engagement

- 2.15 This assessment and report have been prepared with extensive engagement with utilities, including on development of the methodology, analysis of results, and the subsequent write up. The complements ongoing close working between utilities and Development Management functions. This engagement will be ongoing as the draft London Plan progresses and as homes continue to be delivered.

Report structure

- 2.16 The report includes an executive summary of the work and findings, an introduction and context (this section), followed by sections on the utilities' contexts and current baseline, new London Plan future housing growth scenarios, the assessments themselves, and the results and conclusion.

3 Utilities contexts, collaboration and current baseline

- 3.1 Utilities operate within regulatory frameworks that are separate from but linked to the spatial planning regime. These regulatory frameworks help to support infrastructure planning and investment in the right place at the right time to serve residential and commercial development. The following subsections set out the regulatory context for London's electricity and water utilities, collaborative planning activity undertaken, and the current baseline position for each utility provider.
- 3.2 This Utilities Impact Assessment builds upon extensive collaborative work between utility companies, the GLA and other stakeholders in London. Notable areas of collaboration include street works collaboration, developer connections and strategic infrastructure planning. The GLA Infrastructure Coordination Service (ICS) led strategies such as Local Area Energy Plans and Integrated Water Management Strategies (developed with support from utilities, boroughs and London Councils) are of particular relevance.
- 3.3 These infrastructure strategies are also described further below. They support delivery of existing planning assumptions for the growth of homes and jobs in London, as well as climate related targets. They act as a coordination tool to ensure that infrastructure investment decisions of regulated utilities are better aligned with local development priorities and resilience objectives, primarily through provision of data which is shared with relevant utilities.

Electricity networks

Electricity system and regulatory context

- 3.4 The electricity network is an infrastructure system designed to transport electricity from points of generation to points of storage and consumption, such as batteries, homes and businesses. It is formed by two main structural components, the national Transmission Network and the regional Distribution Networks. The Office for Gas and Electricity Markets (Ofgem) regulates the system, and the National Energy System Operator (NESO) balances supply and demand.

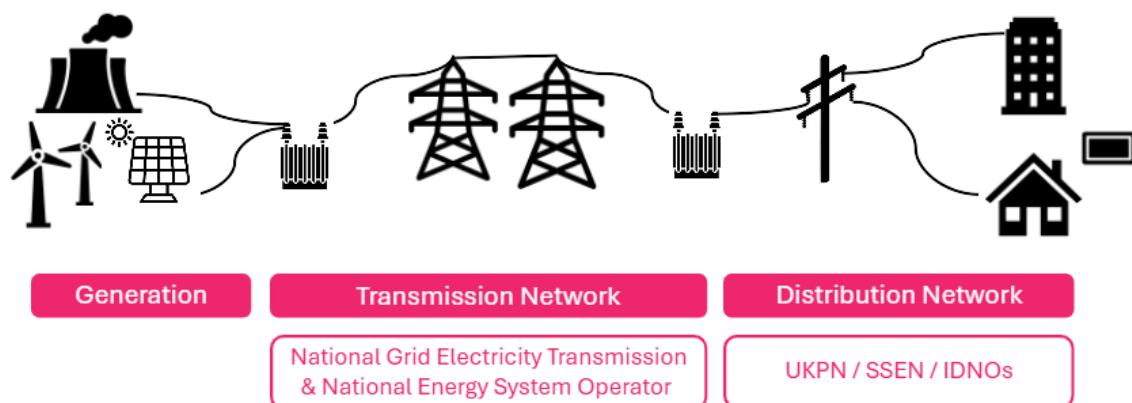


Figure 2 - traditional electricity network flow from generation and transmission to distribution and consumption. NB: some generation now occurs locally through solar PV and other sources, and storage solutions such as batteries also sit within the system

- 3.5 Distribution Networks are operated by Distribution Network Operators (DNOs) and Independent Distribution Network Operators (IDNOs). DNOs own and maintain physical electricity distribution infrastructure and connect new development to the grid. Some DNOs have Distribution System Operators (DSOs) who operate within the same parent utility company as the DNO and help facilitate cost efficient transition to a low carbon energy system. Ofgem regulates DNOs and DSOs through a performance-based model called the Revenue = Incentives + Innovation + Outputs (RIIO) framework, designed to ensure networks remain safe, reliable and capable of supporting growth and the transition to net zero.
- 3.6 Regulation is structured into multi-year periods known as price controls, which set the investment allowances and performance targets for each DNO and their DSO. The price control periods are:
- RIIO-ED1: The first distribution-specific period under this framework, which ran from April 2015 to March 2023.
 - RIIO-ED2: The current five-year period, running from 1 April 2023 to 31 March 2028. It focuses on a £22.2bn investment package to enable the electrification of heat and transport.¹
 - RIIO-ED3: The subsequent period is scheduled to run from 1 April 2028 to 31 March 2033, with consultations already underway to align investment with 2030 clean power targets and UK Government's Industrial Strategy. Alongside Ofgem Business Planning Guidance, NESO has produced the transitional Regional Energy Strategic Plan (tRESP) to inform network investments for ED3 period. SSEN and UK Power Networks must submit their final ED3 business plans to Ofgem in late 2026.
- 3.7 To manage the uncertainty of future demand, Ofgem recommends DNOs use specific planning tools to ensure investment is optimised. Key publications from DNOs and their DSOs informing long term network investment plans are:

¹ Ofgem: RIIO-ED2 Final Determinations Overview Document - <https://www.ofgem.gov.uk/sites/default/files/2022-11/RIIO-ED2%20Final%20Determinations%20Overview%20document.pdf>

- Distribution Future Energy Scenarios (DFES): DSOs produce annual DFES reports that outline various credible pathways for local decarbonisation, such as the growth of electric vehicles and heat pumps. These granular, regional projections are disaggregated from the national Future Energy Scenarios (FES) and inform DSOs' long term network planning process.
 - Distribution Network Options Assessment (DNOA): in the DNOA process DNOs evaluate the capacity needs identified in their DFES. The DNOA provides a framework for deciding between traditional physical reinforcement (like laying new cables) and flexible solutions (such as paying customers to shift the timing of their electricity demand). This is with an objective of maintaining efficient system costs for consumers. Under ED2, this process encourages a "flexibility first" approach, which Ofgem incentivises to lower overall system costs for consumers. In Ofgem's ED3 sector-specific methodology decision (SSMD) published in May 2026, Ofgem has introduced the "build and flex" strategy in the ED3 period, which sets out that flexibility and other smart alternative should be used to optimise the existing capacity of the network and in doing so help to manage the timing and location of future demand².
 - Long Term Development Statement (LTDS): The LTDS describes the DNOs networks, its design and operation within the past year, and looks forward with a load forecast and network developments for the next five years.
 - In addition, during ED2 DNOs have been able to use uncertainty mechanisms to adjust their load related growth allowances should demand materialise faster than anticipated. These may continue in ED3 but are not guaranteed.
- 3.8 The DNOs are required to use outputs from NESO's strategic energy planning as one of the inputs to inform their business plans. NESO has responsibility for strategic energy planning in Great Britain and is required by Ofgem to prepare a Regional Energy Strategic Plan (RESP) for the London Region, which seeks to align local energy needs with national growth and decarbonisation targets. The first RESP, called the "transitional" RESP (tRESP) was published in January 2026 to inform DNO's ED3 planning; a subsequent "enduring" RESP is expected in 2028, with regular refreshes after.
- 3.9 Ofgem³ has proposed that the DNO's responsibilities in network planning for ED3 includes "supporting the creation of long-term integrated network development plans by identifying future system needs, set out by the tRESP (and enduring RESPs) and their own DFES, to coordinate investment across multiple drivers to ensure timely and efficient delivery of capacity".
- 3.10 Heat networks are a relevant infrastructure which influence electricity network planning. High heat network uptake may reduce the impact of decarbonisation needs on the electricity network⁴, and as such assumptions DNOs make on this have a large impact on their planning. Ofgem has assumed the regulatory role for heat networks, which should help to ensure appropriate alignment between electricity networks and heat network planning. From January 2026 heat networks must register with Ofgem to operate, and Government is working with 28 local authorities to better understand how zone boundaries should be defined and data inputs, which will feed into forthcoming Heat Network Zoning regulations.

² P.8, [ED3 Sector Specific Methodology Decision](#)

³ Paragraph 5.71 [Sector specific methodology consultation: electricity distribution price control \(ED3\)](#) | [Ofgem](#)

⁴ [Electricity System Benefits of Heat Networks](#)

Collaborative energy planning

- 3.11 Energy planning activity in London operates across multiple scales, ranging from strategic regional planning to local and project-level initiatives. In recent years, DSOs operating in the Greater London region have been working proactively with the GLA and boroughs in recent years to account for local data in DFES and DNOA preparation, to ensure network investments support delivery of local targets and ambitions. This includes data from Local Plans (on growth of homes and jobs) and data on net zero infrastructure plans from local energy planning, created to assist in London's journey to net zero greenhouse gas emissions.

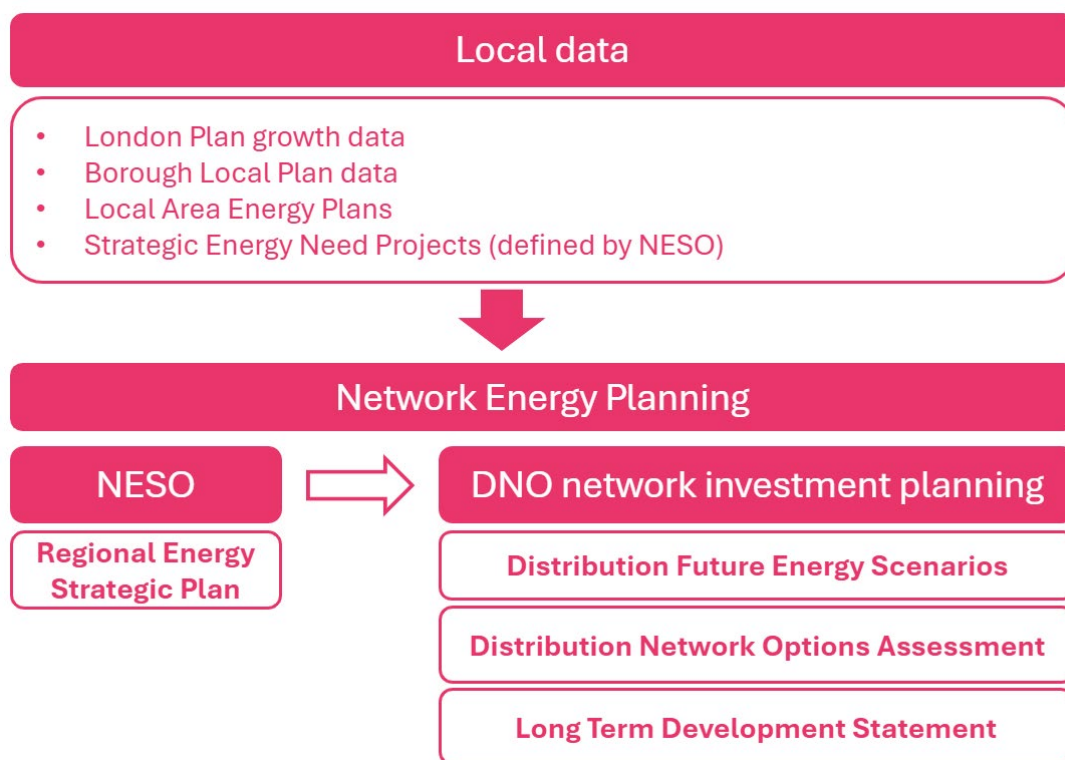


Figure 3- strategic diagram illustrating how local data feeds into network energy planning

- 3.12 It is expected that heat network zones and associated datasets will also be important local datasets to feed into network energy planning. For example, UK Power Networks are working on an innovation project Heatropolis, which aims to reduce electricity demand from low-carbon heat networks at peak times, helping to avoid unnecessary network upgrades⁵.
- 3.13 NESO's Future Energy Scenarios 2025 indicates that Great Britain's electricity demand is forecast to more than double by 2050⁶. Local Area Energy Planning work in London has confirmed this direction at the local level, highlighting that future electricity demand will increase substantially from new homes and jobs, and uptake of technologies including EV charge points, heat pumps and cooling. Increases are concentrated in areas of high growth and density, but large energy demand users such as data centres will also introduce substantial demands. This will require considerable network capacity

⁵ [Heatropolis - UKPN Innovation](#)

⁶ [Bold and sustained action on clean energy “imperative” now and beyond 2030 | National Energy System Operator](#)

reinforcement and other responses (including flexible demand management) by electricity networks to ensure needs can be met.

- 3.14 The Energy System’s Catapult methodology for Local Area Energy Planning has been undertaken across London, supported by GLA, London Councils and other stakeholders, and shared with DNOs. LAEPs create a picture of the current energy system, assembling information on current energy demand across the built environment. They then create scenarios of future energy needs, which account for planned growth of homes and jobs (from adopted local plans) as well as decarbonisation ambitions and the additional electricity demand required to support roll out of low carbon technologies.
- 3.15 Subregional LAEPs have been prepared covering the first four stages of the ESC methodology, covering all London Boroughs in the following subregional geographies:
- West London subregional LAEP
 - Central, Inner East & North London subregional LAEP
 - South London subregional LAEP
 - East London subregional LAEP

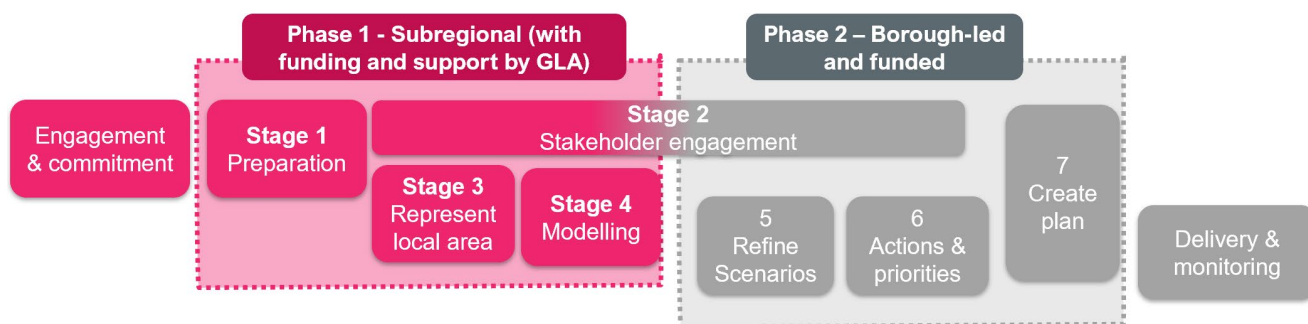


Figure 4: showing LAEP approach in London undertaken in partnership by GLA, London Councils and Boroughs

- 3.16 Data and evidence from these projects are stored on the [LAEP DataHub](#).
- 3.17 The GLA is supporting boroughs to complete the remaining steps for their local area through the GLA’s Zero Carbon Accelerator. These energy plans help to put net zero ambitions into action, by identifying future energy scenarios with associated new homes and jobs targets, as well as low carbon technology numbers, locations and deployment rates.
- 3.18 Further local energy planning work completing the LAEP process has been undertaken Westminster, City of London, Tower Hamlets (Isle of Dogs) and Enfield, as well as west London, in Hounslow, Old Oak and Park Royal Development Corporation (OPDC), Ealing, Barnet, Brent, Hammersmith & Fulham and is ongoing in multiple other boroughs.
- 3.19 The GLA has worked closely with UK Power Networks to assess whether the differences between the LAEP outputs and their DFES outputs were material⁷. Where LAEP data was both materially different to the DFES and reached a high confidence level of coming forward, this data was then incorporated into the UK Power Networks DFES. Similarly, LAEP outputs have been considered within the SSEN DFES process. Through

⁷ Through their [LAEP support framework - Your Local Net Zero Hub](#)

collaboration between DNOs and NESO, these LAEPs have also been used to inform the tRESP pathways.

- 3.20 The government has high ambitions for housing and growth across England, including for London, reflected in the housing need number that is the starting point for plan-making. Increasing growth to these levels will place substantial new demands on the electricity network. There is therefore a need for DNOs to support the delivery of this ambition and resultant targets, including those brought forward through the new London Plan. Spatial planning data (e.g. data from Local Plans) is already routinely shared with DNOs, focusing on data from adopted spatial planning documents. In contrast, this Utilities Impact Assessment is proactive, early engagement to test potential growth targets with DNOs to understand any network implications.
- 3.21 Ongoing engagement and collaborative approaches will be required to support delivery of growth identified through the new London Plan and to ensure that network investment planning remains aligned with London's evolving development and decarbonisation priorities.

Electricity baseline

UK Power Networks

- 3.22 UK Power Networks is a Distribution Network Operator (DNO) which serves the majority of the Greater London through its London Power Networks license area, with the exception of parts of three boroughs in west London (Hillingdon, Hounslow and Ealing), as well as fractional overlap with areas of Harrow, Brent, Hammersmith & Fulham and Richmond upon Thames, which are served by SSEN. It serves approximately 8.5 million customers across London, the South East and East of England.

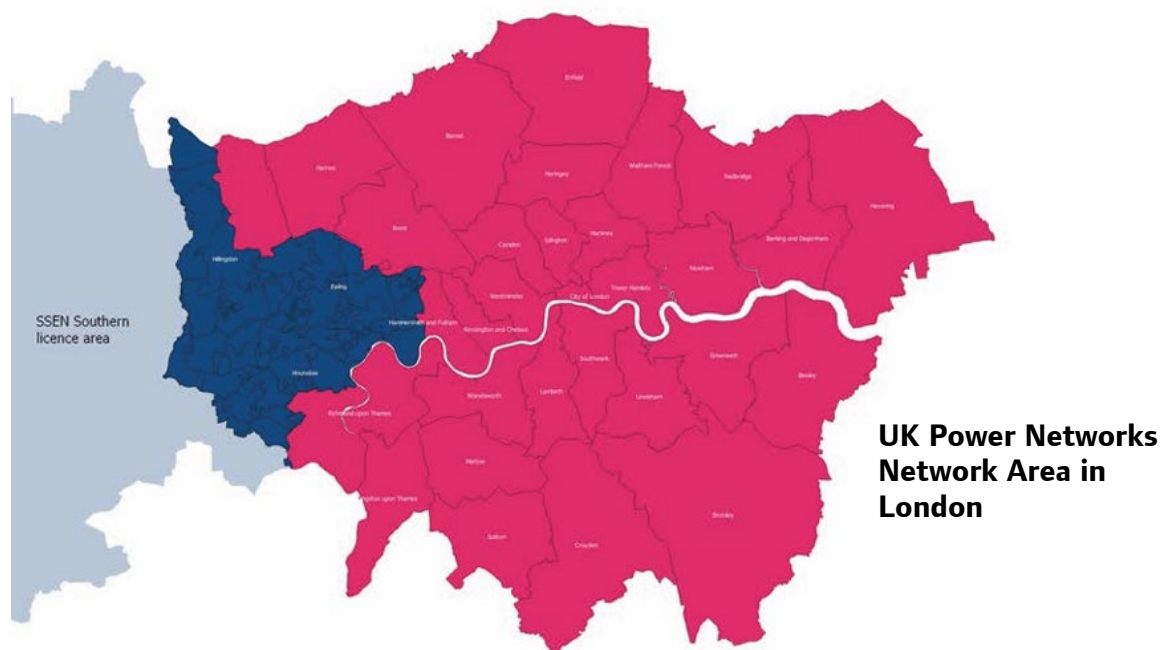


Figure 5: map showing UK Power Networks license area in Greater London (in pink)

- 3.23 The GLA works with UK Power Networks extensively, including on strategic development matters, collaborative street works and data sharing to support local authority energy

planning and UK Power Networks' network investment planning. This Utilities Impact Assessment for the new London Plan builds upon that established partnership and ongoing efforts to improve infrastructure coordination.

- 3.24 UK Power Networks' Regulated Asset Value stood at £9.2 billion as at March 2025, expected to reach £10.5 billion by the end of RIIO-ED2 in March 2028.⁸ Under RIIO-ED2, UK Power Networks committed to a £4.5 billion investment programme across its three network areas, with a further £1.1 billion of contingent investment identified should the highest forecast uptake of low carbon technologies materialise.⁹
- 3.25 Within London, investment is driven by two concurrent pressures: the need to renew ageing assets and rapidly increasing electricity demand associated with decarbonisation. UK Power Networks projects uptake of 1.8 million electric vehicles and 198,000 additional heat pumps in the Greater London region by 2030¹⁰. This represents a substantial shift in demand patterns that the existing distribution network was not originally designed to accommodate. This decarbonisation-driven demand growth is in addition to that arising from new housing delivery, meaning that network reinforcement requirements exist regardless of housing growth.
- 3.26 UK Power Network's DFES underpins its network investment planning and provides a forward view of capacity requirements for local authorities and developers.¹¹ Data indicates that available headroom at primary substation level has remained broadly stable in aggregate across the UK Power Networks area in recent years, but it is more difficult to characterise localised challenges and constraints which may still be present.¹² The DNOA process identifies where and when reinforcement is required and assesses flexibility solutions as alternatives or complements to physical upgrades.
- 3.27 UK Power Networks have not provided detail on how their current forecasts (not accounting for growth in the new London Plan) result in land take requirements. However, they have indicated that to respond to capacity shortfalls, planned capacity improvement schemes are required in several locations. This does not exempt other areas from potential upgrade works and necessary land-take should additional capacity be required in future years.¹³
- 3.28 Key issues and opportunities in UK Power Network's area include:
- ensuring that the RIIO-ED2 and successor RIIO-ED3 programmes are sufficient to accommodate both the backlog of renewal and the additional demand from new housing and decarbonisation.
 - the role of demand flexibility and smart technologies to deliver lowest cost capacity solutions - deferring or avoiding network upgrades.
 - Early engagement to plan the lowest-cost solutions for developments in the pipeline.
 - how LAEP outputs and other local data are integrated into UK Power Network's DFES on a continuing basis to provide the forward planning basis for coordinated investment.

⁸ <https://www.engie.co.uk/news/engie-announces-the-acquisition-of-uk-power-networks>

⁹ <https://library.ukpowernetworks.co.uk/library/en/RIIO/>

¹⁰ Holistic transition, [Distribution Future Energy Scenarios - UKPN DSO](#)

¹¹ <https://dso.ukpowernetworks.co.uk/dso-data>

¹² https://www.savills.co.uk/research_articles/229130/382184-0

¹³ UK Power Networks (2025) Network Scenario Headroom Report

Scottish and Southern Electricity Networks (SSEN)

- 3.29 Scottish and Southern Electricity Networks (SSEN) is the electricity Distribution Network Operator (DNO) serving parts of the western Greater London area, namely within the boroughs of Hounslow, Hillingdon and Ealing. It also overlaps fractionally with UK Power Networks in parts of Harrow, Brent, Hammersmith & Fulham and Richmond upon Thames.

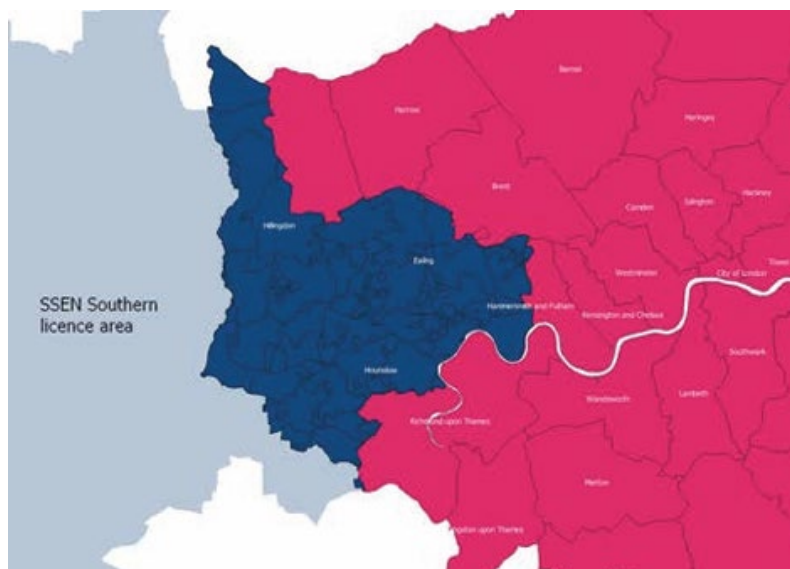


Figure 6: map showing SSEN license area in Greater London (dark blue)

- 3.30 In addition to the DFES and DNOA produced, SSEN produces Strategic Development Plan¹⁴ documents, which set out long-term electricity system needs for a specific part of their network (usually a Grid Supply Point). The SDPs allow SSEN to work with other stakeholders to design the interventions needed to assist with growth and decarbonisation.
- 3.31 The GLA and SSEN have collaborated for many years, including on capacity-related issues in west London and on local energy planning, where SSEN has accounted for plans prepared by boroughs in their area. This area has been a focus area for energy planning activity in London since 2022, when the GLA and boroughs were made aware of electricity network capacity constraints at both transmission and distribution level. These constraints primarily resulted from a sharp increase in connection applications from large energy users, reducing available network headroom ahead of residential and mixed-use development proposals¹⁵.
- 3.32 At the height of the constraints, some developments in the affected boroughs were given grid connection dates as far out as 2037, pending transmission-level upgrades by National Grid Electricity Transmission (NGET). Collaboration between the GLA, SSEN, NGET and NESO has helped implement a range of short-term mitigation measures. This included ramped capacity connections (allowing phased increases in electricity supply over time), SSEN's electricity capacity allocation study, and procurement of network flexibility services. Collectively these interventions enabled approximately 16,944 permitted new homes to progress by early 2025.¹⁶ The GLA has engaged with 74

¹⁴ [Strategic Development Plan \(SDP\) - SSEN](#)

¹⁵ [West London electricity capacity constraints | London City Hall](#)

¹⁶ <https://www.london.gov.uk/media/108378/download>

development schemes in the affected area, of which 56 have had their point of connection confirmed. The underlying transmission constraint remains however, with NGET upgrades not expected to fully resolve the issue until the mid-2030s.¹⁷

- 3.33 For the SSEN area, medium term distribution reinforcement combined with flexibility and demand management solutions should enable housing to proceed ahead of full transmission upgrades, but it is important for schemes to be included in SSEN's DFES and engage early with the connection process to support this.
- 3.34 The West London situation highlights wider systemic issues with the connection process. These include limitations with a first-come, first-served connections approach to allocating network capacity, as well as the need to improve transparency of the connection process, with a view to ensuring the cost and lead in times associated with developer connections is appropriate. This is area of the energy regulatory landscape has multiple systemic changes in train, including queue reform and management, and Ofgem's Connections End-to-End Review relating to DNO performance standards.
- 3.35 Within the GLA's Economic Uses Demand and Supply study¹⁸, a high-level assessment has identified that SSEN have forecasted 3.4 hectares will be required for new bulk supply points, primary substations, and secondary substations based on capacity driven requirements between 2025 and 2050. SSEN have indicated that land-take is most likely around the west of Hounslow, Hayes, Northolt and Southall.
- 3.36 Overall, this baseline picture indicates the importance of continued collaboration between GLA, SSEN and stakeholders, to manage energy supply and demand in an effective way in support of growth and decarbonisation objectives.

National Grid Electricity Transmission

- 3.37 As mentioned in Section 2.2, assessment of the transmission network is outside the scope of this study. However, for completeness it should be noted that parallel evidence work for the new London Plan (the aforementioned Economic Uses Demand and Supply study) has indicated that substantial land take may be required to support new or expanded sites for substations and transmission between 2025 and 2050¹⁹. The National Grid T3 Business Plan Regional View as well as the GLA's Industrial Land Study should be referred to for further information.

Summary

- 3.38 Across London's electricity networks, several baseline conditions are particularly relevant to understanding the implications of future growth:
- Significant investment is already being undertaken to support wider decarbonisation objectives, regardless of housing growth. Electricity demand is expected to increase substantially, driven by economic development and the electrification of heat, transport and other sectors as well as housing growth.
 - Broadly, primary substation headroom has remained stable across the region with some local variability. Local network constraints may exist despite aggregate capacity remaining relatively available. The west London experience demonstrates the

¹⁷ <https://www.ssen.co.uk/news-views/2024/Networks-collaborate-connection-timescales-west-london/>

¹⁸ Economic Uses Demand and Supply Study (GLA, 2026)

¹⁹ National Grid T3 Business Plan Regional View
<https://riiot3.nationalgrid.com/document/30141/download>

importance of early identification and understanding of constraints and engaging proactively with network operators.

- The baseline position is that flexibility (demand management) will play an increasingly important role in supporting growth. In addition to network reinforcement, energy efficiency measures, demand flexibility and smart technologies are required to contribute to managing future electricity demand and reducing pressure on network infrastructure, although they are unlikely to eliminate the need for significant investment.
- Ongoing regulatory reform, including changes to connections processes and strategic energy planning arrangements, will influence how future capacity is allocated and delivered.

Water and wastewater networks

Water system and regulatory context

3.39 Water and wastewater services in London are provided by licensed undertakers, which operate within a national regulatory framework. Unlike electricity, water planning relies on multiple complementary statutory planning frameworks that operate over different timescales. Economic regulation is undertaken by the water services regulation authority (Ofwat), which sets price controls and performance targets through price review (PR) cycles. This ensures that companies such as Thames Water and Affinity Water deliver value for money, maintain service standards and invest appropriately in infrastructure.

3.40 The relevant PR periods are:

- PR14: Running from 2015 to 2020, this period introduced stronger outcome-based regulation and greater emphasis on customer engagement in business planning.
- PR19: Covering 2020 to 2025, this period increased performance stretch, incentivised leakage reduction and resilience, and reinforced requirements for long term water resource planning in response to climate pressures.
- PR24: The current price control (2025 to 2030), with final determinations confirmed in 2024 – 2025. PR24 places stronger emphasis on affordability, long term asset health, nature-based solutions, catchment-based approaches and operational resilience to drought, flood and water quality risks.
- PR29: Covering 2030 to 2035, the main business planning activity launches in 2027. Asset Management Plans (AMPs) are the 5-year period of operation and investment that follows the Price Review. It represents the delivery phase where the company executes the business plan approved during the PR. For example, PR24 dictates the actions and funding for AMP8 (2025-2030).

3.41 Environmental regulation is led by the Environment Agency, which manages water abstraction licensing, wastewater discharge permits and river basin planning under the Water Framework Directive (WFD). In London, this includes oversight of the Thames catchment, tributary systems, groundwater bodies and ecological objectives associated with the Thames estuary.

3.42 Within this framework, water companies are required to prepare statutory investment and resource planning documents:

- Water Resources Management Plans (WRMPs): These set out 25-year strategies to balance supply and demand, drawing on regional growth projections, climate scenarios, leakage reduction, demand management, strategic resource options and customer behaviour. WRMP29 engagement is programmed between late 2027 and mid-2028.
 - Drought Plans: Required under the Water Industry Act, these outline company-specific actions to manage water shortages during dry weather.
 - Drainage and Wastewater Management Plans (DWMPs): Introduced nationally in 2022, DWMPs provide long-term planning for drainage, surface water, sewer flooding, infiltration and resilience of wastewater networks. They set out catchment-level risks and investment need across multiple future scenarios. DWMP28 engagement is programmed from late 2027 through to early 2028.
 - River Basin Management Plans (RBMPs): these statutory plans set out legally binding objectives to protect and improve the water environment for communities, wildlife and the economy.
 - Catchment Plans (CPs): local, detailed plans focusing on a specific area within a watershed, often developed by local partnerships.
 - Business Plans: Submitted during each price review cycle, these set out detailed investment proposals, performance commitments and outcomes for PR periods.
 - Asset Management Plans (AMPs): strategic, 5-year documents outlining how water companies manage their infrastructure to meet service, regulatory and environmental standards. They align asset performance with customer bill limits set by Ofwat
- 3.43 Of particular importance to this study, the Thames Water WRMP and DWMP and Affinity WRMP, which are relevant for London, are in the process of being refreshed. They currently draw from growth projections that are prepared separately to the new London Plan growth figures, based on their own assumptions of what growth will come forward. This work predates the new London Plan growth figures being shared with utilities. Where appropriate the refreshed WRMPs and DWMP could consider implications of the new London Plan growth figures, and account for these growth figures to ensure they can be supported by the network.
- 3.44 To support long-term planning, water companies also draw on wider regional initiatives. Thames Water participates in the Regional Water Resources South East (WRSE) group, which develops regional water resource scenarios that feed directly into WRMPs. These regional scenarios consider growth trajectories, climate projections, environmental requirements and strategic water supply options such as reservoirs, transfer and reuse schemes.

Collaborative water planning

- 3.45 There is a wide range of water planning activity underway across London, spanning strategic investigative studies to detailed local studies. Unlike the energy sector, which now benefits from London-wide Local Area Energy Planning coverage, water planning remains relatively uneven, with studies concentrated in areas of significant growth or where clear risks and constraints have already been identified.
- 3.46 In London, multiple Integrated Water Management Strategies have been prepared, mainly by the GLA in partnership with boroughs, Thames Water and other stakeholders. IWMS are a non-statutory, whole-system, spatial approach to water management, considering

water supply, demand, wastewater capacity, surface water management, sustainable drainage systems (SuDS) and flood risk.

- 3.47 IWMS act as a bridge between local authority plans and regulated water companies, providing a picture of the current water environment and the capacity of water supply, wastewater and surface water systems to support planned housing and employment growth.
- 3.48 IWMS support land use planning policy, particularly on climate resilience, flood risk and sustainable drainage, considering elements such as growth, regeneration and infrastructure provision. Whilst they do not have statutory weight, they can influence water companies' investment planning by providing evidence on local constraints and opportunities, assisting engagement between local authorities and water companies during WRMP, DWMP and PR cycles. In London, this is particularly important due to the scale of growth, ageing infrastructure and increasing frequency of extreme weather events.
- 3.49 In London, **IWMS at the local scale** have focussed on London Plan 2021 Opportunity Areas such as the Royal Docks & Beckton Riverside, Isle of Dogs & South Poplar, and Vauxhall, Nine Elms & Battersea.
- 3.50 These IWMS draw on baseline evidence from Thames Water, London Boroughs and the Environment Agency to assess current network performance, flood risk and environmental constraints. They then test future scenarios that combine local growth trajectories with climate change and infrastructure requirements.
- 3.51 In addition to the local IWMS, a pilot **Subregional IWMS** (SIWMS) was undertaken between 2023 to 2024 for East London. The SIWMS was coordinated by the GLA in partnership with boroughs within the catchment, Thames Water, the Environment Agency and Natural England. The pilot SIWMS explored how a catchment-scale approach can better capture interdependencies between water supply, wastewater capacity, surface water systems, fluvial flood risk and planned growth corridors. The subregional work helped to establish consistent spatial evidence base and provided early lessons for a London-wide approach. The SIWMS approach was listed in the London Climate Resilience Review as a recommendation to take forward.
- 3.52 Building on this, the GLA initiated a **London-wide investigation** programme in 2025 to understand catchments of greatest need and where system interdependencies are most acute. This work examined water supply, wastewater and drainage pressures across London, helping to identify priority areas for further IWMS development. This work necessarily worked with several simplifying assumptions, most notably an assumption of unconstrained water supply (noting this assumption was justified in context of the modelling approach and objective of the study).
- 3.53 Emerging findings from the London wide investigations have identified the Marsh Dykes Catchment as an area facing both significant planned growth and risks. Subsequent stakeholder engagement also flagged potential early signs of drainage capacity stress. In response, further technical work is now underway. This pre IWMS study has been commissioned by the GLA and is being delivered collaboratively with the boroughs, Catchment Partnerships, Thames Water, Peabody and the Environment Agency. Its purpose is to build a shared understanding of the catchment's constraints, particularly around drainage

capacity, asset maintenance and governance arrangements. Because of substantial data gaps and inconsistent baseline information, this work is being undertaken as a pre-IWMS, without the conventional hydraulic modelling typically used in a full IWMS. The findings and recommendations will form the basis for developing a comprehensive, detailed IWMS for the Marsh Dykes Catchment in the next phase.

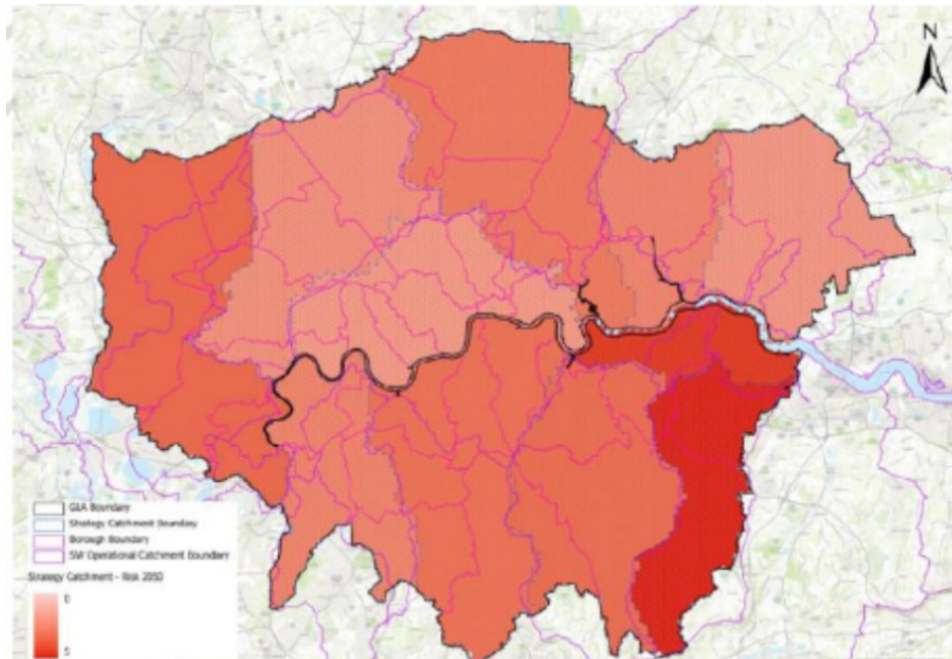


Figure 7: Map showing areas of highest risk and planned interventions as identified by the London wide investigations. The Marsh Dykes Catchment and South East Catchment are ranked as the highest.

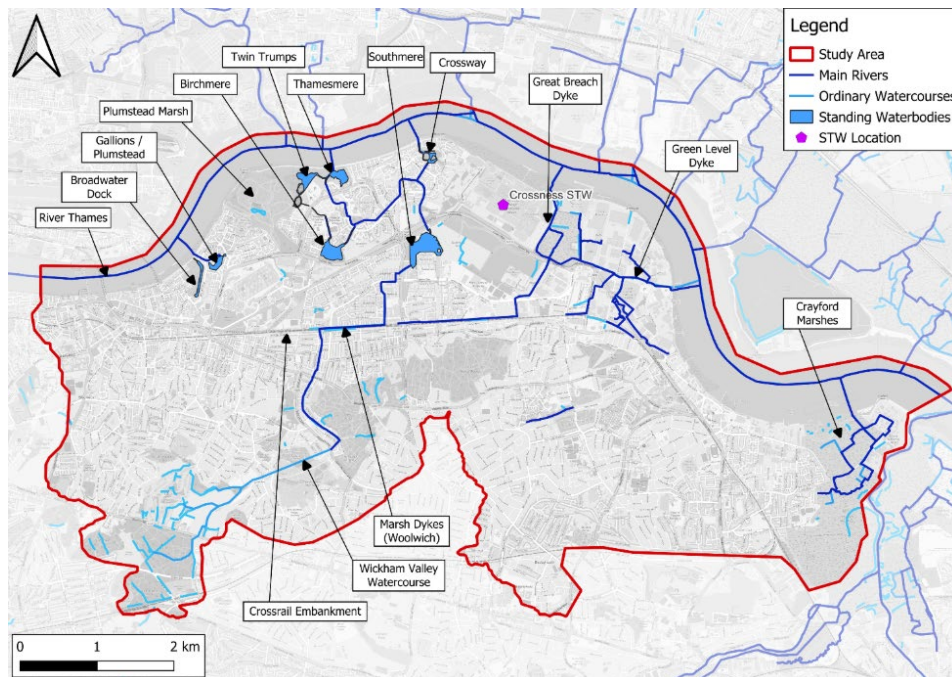


Figure 8: Map showing the extent of the Marsh Dykes pre-IWMS study area.

- 3.54 At a more local scale, Bexley and Greenwich have undertaken targeted water and drainage assessments to support ongoing flood risk management and resilience programmes.
- 3.55 London also benefits from a suite of strategic evidence on flood and surface water risk that underpins the London Plan. The [London Surface Water Strategy](#) provides a comprehensive assessment of how surface water flooding occurs across the city, identifying areas most susceptible to exceedance events, sewer surcharge, and runoff from impermeable surfaces. It highlights priority locations for mitigation, and sets out opportunities for SuDS, blue-green infrastructure and nature-based interventions to enhance resilience.
- 3.56 Complementing this, the **Regional Flood Risk Assessment** (RFRA) offers a London wide spatial overview of fluvial, tidal and surface water flood risk, integrating climate change projections, infrastructure vulnerabilities and growth pressures. Together, these evidence bases provide a robust picture of London's flood risk mechanisms and future pressures.
- 3.57 Across these different workstreams, there is now broad agreement that a catchment-based approach is necessary to manage water supply, wastewater, drainage and flood risk in a coordinated way. The emerging IWMS programme, the London wide investigations, the East London SIWMS pilot and ongoing borough level work are increasingly aligned, creating a coherent framework for future planning. However, there remains a gap in London wide coverage compared with the energy sector. This highlights the challenge of identifying suitable scales of integrated modelling to meet catchment specific concerns, and the importance of a continued programme of water planning as London develops its new spatial strategy.

Water and wastewater baseline

Thames Water

- 3.58 Thames Water is the UK's largest water and wastewater services provider, serving London and the Thames Valley, as well as part of Gloucestershire, Wiltshire, Kent and Essex.



Figure 9: Map showing areas served by Thames Water for clean water supply and wastewater and drainage.²⁰

- 3.59 Thames Water is the water and wastewater undertaker for the vast majority of Greater London. Its WRMP24, approved by the Secretary of State in August 2024, sets out the company's strategy for managing supply and demand to 2075.²¹ The plan identifies a forecast shortfall of up to one billion litres per day (lpd) by 2050, driven by population and housing growth, climate change (particularly increased drought frequency and severity), and environmental obligations to reduce abstraction.
- 3.60 Thames Water's plan addresses approximately 80% of this projected shortfall through demand management: reducing leakage by more than half by 2050 (from a current rate of approximately 22.5% of distribution input) and reducing per capita consumption (PCC) from approximately 140 lpd currently to 110 lpd by 2050²². Over one million smart meters have already been installed across London and the Thames Valley, with plans to install or upgrade a further 1.1 million over the AMP8 period (2025–2030)¹⁵. The remaining 20% of the shortfall is to be addressed through two nationally significant infrastructure projects: the Teddington Direct River Abstraction scheme (providing up to 75 million litres per day from 2033 under drought conditions) and the White Horse Reservoir, planned to serve up to 15 million customers from 2040. Both projects are expected to be submitted to the Planning Inspectorate in 2026.
- 3.61 Thames Water's AMP8 capital programme (2025–2030) is nearly doubling its infrastructure investment compared with the preceding period, with £840 million of capital projects at water and wastewater treatment sites already in procurement to improve infrastructure resilience, environmental performance and capacity to manage population growth. Despite this, multiple risks exist to Thames Water achieving its demand management commitments, including financial and delivery challenges.

²⁰ Source: [Where our pipes are | Developer services | Thames Water](https://www.thameswater.co.uk/about-us/regulation/water-resources)

²¹ <https://www.thameswater.co.uk/about-us/regulation/water-resources>

²² <https://www.gov.uk/government/publications/water-resources-2024-2025>

3.62 A key consideration for the London Plan is the relationship between its own policy standard and water company planning assumptions. The London Plan 2021 requires new residential development to achieve mains water consumption of 105 lpd, which is more demanding than the national building regulations optional standard of 110 lpd and more stretching than the 110 lpd industry-wide target set for 2050 in WRMPs.²³ However, this standard applies only to new build, not to the existing stock. Thames Water's WRMP24 demand management assumptions rely on reductions across all customers (new and existing) and the company acknowledges that achieving the 110 lpd target by 2050 will require coordinated action across government, regulators, customers and the company itself, not solely through metering and efficiency programmes within its own control.¹⁵ Whatever the level of housing growth coming forward, a substantial element of demand management will need to address consumption in the existing stock, which accounts for the overwhelming majority of total demand.

Affinity Water

3.63 Affinity Water supplies clean water (but not wastewater services) to parts of outer north and north-west London as well as Hertfordshire, Bedfordshire and Surrey. Further detail may be found on their website²⁴. The final Affinity WRMP24, approved in October 2024, identifies a potential supply shortfall of up to 449 million litres per day by 2050 without action, driven by population growth, climate change impacts on abstraction, and environmental obligations to reduce chalk stream and aquifer abstraction, particularly in the Lee and Colne catchments.²⁵

3.64 Affinity Water's WRMP24 adopts a demand-first approach; the key components are: a 50% leakage reduction target by 2050, accelerated smart metering, and water efficiency programmes. To address remaining supply shortfalls, Affinity is pursuing new source options including upstream transfers from the River Thames and the Grand Union Canal Strategic Resource Option (up to 100 Ml/d, planned by 2032), with the Thames to Affinity Transfer SRO and White Horse Reservoir contributing post-2040. Like Thames Water, Affinity acknowledges that achieving sustained reductions in per capita demand is uncertain and dependent on factors substantially outside the water company's direct control.

3.65 The London Plan's 105 lpd standard does not extend to Affinity Water's supply area, as that falls outside the GLA boundary. However, housing growth in outer north and north-west London boroughs within the GLA boundary (which Affinity supplies) falls within the scope of London Plan policy. Growth in functionally linked areas immediately beyond the GLA boundary, such as Hertsmere, Three Rivers and South Hertfordshire, will generate additional demand on an already constrained system. This underlines the importance of cross-boundary collaboration between London and neighbouring authorities to ensure that water resource planning reflects cumulative growth pressures across the wider South East.

Summary

3.66 Across Thames Water and Affinity Water, several baseline conditions are particularly relevant to understanding the implications of future housing growth in London:

²³ HM Government (2021) Environment Act 2021. Available at: <https://www.legislation.gov.uk/ukpga/2021/30>

²⁴ [The areas that we supply | Affinity Water](#)

²⁵ Affinity Water (2024) Water Resources Management Plan 2024 (WRMP24). Published October 2024. Available at: <https://www.affinitywater.co.uk/about/regulation/water-resources-management-plan>

- Significant supply-demand deficits are already projected under current growth trajectories, before any uplift from new London Plan housing targets. New housing growth will add to a pre-existing challenge.
- Strategic infrastructure with long lead-in times has limited near-term impact. White Horse Reservoir and the Teddington Direct River Abstraction project will not be operational until 2033 and 2040 respectively, meaning near-term housing growth must be accommodated within existing supply margins and the demand management trajectory (as per both WRMPs).
- Demand management assumptions are ambitious and carry delivery risk. Thames Water's WRMP24 target of 110 lpd by 2050 represents a substantial reduction from the current 140 lpd average. It is dependent on smart metering rollout, tariff reform and cultural change across the whole customer base, not just new developments.
- The London Plan 2021 standard of 105 lpd for new residential development is more stringent than both the national baseline (110 lpd optional standard) and WRMP24 assumptions, but applies only to new build. The existing stock, which generates the overwhelming majority of total demand, remains subject only to water companies' own efficiency and metering programmes.
- Whatever the level of housing growth, a substantial element of demand management must address the existing stock. The new London Plan will need to consider how to best reinforce demand reduction ambitions.

Notable local joint working

- 3.67 A significant amount of collaborative work has already taken place between utilities, the GLA, boroughs and other partners to address infrastructure challenges and support planned growth. Key areas of joint working include:
- West London electricity network constraints – as detailed online: [West London electricity capacity constraints | London City Hall](#)
 - Opportunity Areas – areas identified for high levels of growth in the current London Plan such as Tower Hamlets and Royal Docks, have benefitted from collaborative efforts between utilities, GLA and the boroughs to ensure sufficient infrastructure and capacity is in place to support these growth targets. This includes Integrated Water Management Strategies, Local Area Energy Planning, and other matters such as waste and connectivity.
 - Policy development – typically infrastructure strategies prepared by the GLA ICS consider how planning policy might be used to support infrastructure requirements resulting from proposed growth of homes and jobs. For example, consideration of water consumption standards for new homes within planning policy, and how planning should consider elements of the energy system such as data centres and land for substations.
- 3.68 It is anticipated that this type of work would continue beyond adoption of the new London Plan, helping to support its delivery.

4 Future scenarios – how much growth and when?

- 4.1 The quantity, location, and timing of growth has a critical impact on infrastructure requirements. This section sets out the level of development that was assessed in this study.
- 4.2 Three potential development scenarios were prepared by the London Plan team using early draft development capacity outputs from the SHLAA. These scenarios were then provided to utilities companies for assessment:

Scenario 1: Baseline growth scenario

This scenario reflected work undertaken by the Mayor and London Boroughs through the Land 4 London programme. Draft development growth areas provided through this programme were aggregated to LSOA level, alongside a windfall assumption (the continuation of the current Policy H2 of the London Plan). The aim of this scenario was to understand the impacts of a continuation of the current (London Plan 2021) development levels and distribution of growth.

Scenario 2: High growth scenario

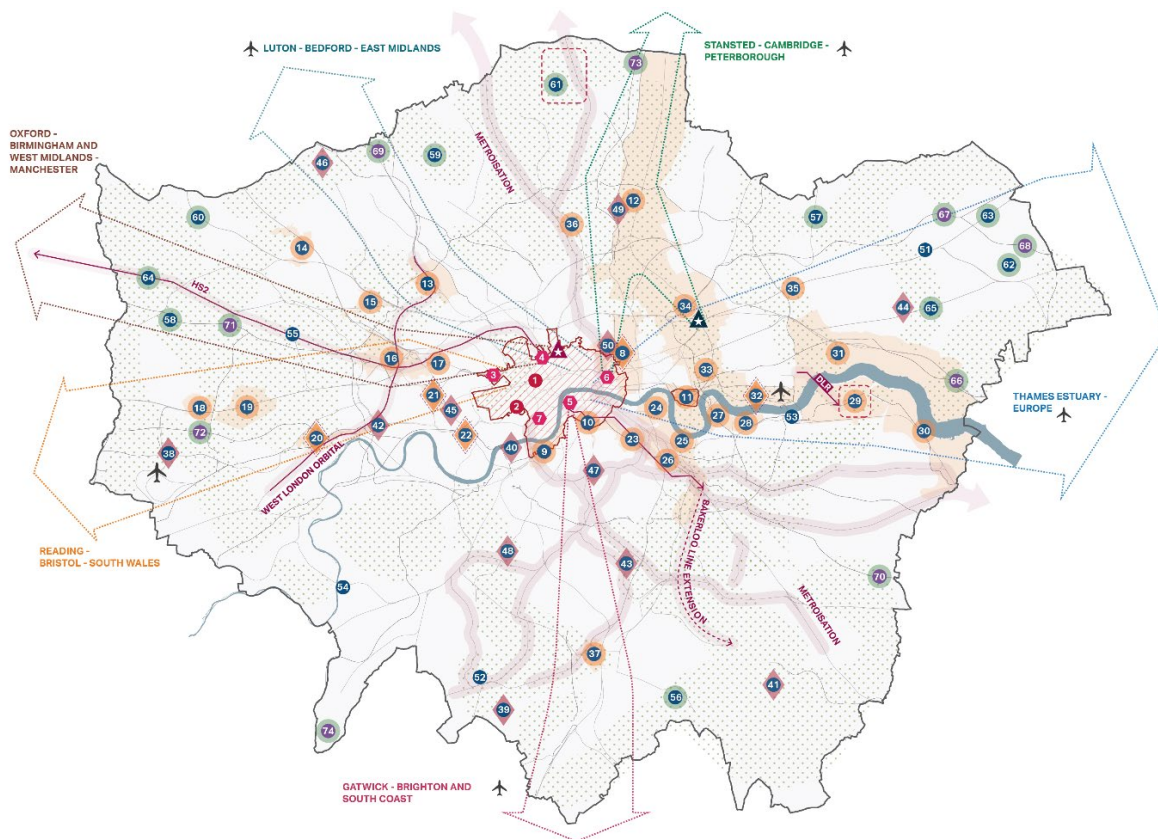
This scenario considered a higher quantum of development aimed at getting closer to the Government's assessed housing need for London of 88,000 new homes per year. The same growth areas as in the Baseline growth scenario were used, but at higher densities, a higher assumption windfall assumption was used, and new areas for development including industrial and green belt release were introduced.

Data was provided in the form of domestic units per year, for each year up to 2049. Only residential development was assessed.

Scenario 3: Mid growth scenario

The mid- (and ultimately preferred) growth scenario is considered to be a middle ground between the Baseline growth scenario and the High growth scenario, given that the latter is concluded to be unachievable in 10 years.

It should be noted that due to various factors the final scenario taken forward into the Draft London Plan consultation is 558k homes, which is slightly less than for the Mid Growth Scenario tested as part of this assessment. However, it continues to be a very different distribution of growth to the current plan, including with large scale development in the green belt, significant numbers of small sites and industrial release in addition to other intensification.



KEY DIAGRAM 10 Year

International Centres

- 1 West End
- 2 Knightsbridge

BLG: Transformational Gateways

- 3 Paddington
- 4 Euston
- 5 Waterloo
- 6 Liverpool Street
- 7 Victoria

- Environment Opportunity Areas (see green and blue infrastructure sub-diagram)
- Strategic Transport Improvements (see infrastructure sub-diagram)
- Airport
- St Pancras International
- Stratford International
- Shortlisted New Town
- Opportunity Areas

Strategic Growth Corridors

- Lea Valley (Stratford to Cambridge)
- Elizabeth Line West and Heathrow (Paddington to Reading and Heathrow)
- Thameslink South (Central London to Croydon and Brighton)
- Elizabeth Line East, DLR extension and Thames Gateway (Liverpool Street to Woolwich and Shenfield)
- HS2 (Euston and Old Oak to Birmingham)
- Thameslink North (Kings Cross to Luton and Bedford)

BLG: Central Activities Zone (CAZ) inc. Northern Isle of Dogs (NIOD)

BLG: Brownfield First Opportunity Areas (BFOAs)

- | | | |
|---|-----------------------------------|---------------------------------------|
| 8 City Fringe/Tech City* | 19 Southall | 29 Thamesmead and Abbey Wood |
| 9 Vauxhall, Nine Elms and Battersea | 20 Great West Corridor* | 30 Bexley Riverside |
| 10 Elephant and Castle | 21 White City* | 31 London Riverside |
| 11 Isle of Dogs and South Poplar | 22 Earl's Court/West Kensington* | 32 Royal Docks and Beckton Riverside* |
| 12 Lee Valley | 23 Old Kent Road | 33 Poplar Riverside |
| 13 Brent Cross/Cricklewood/Staples Corner | 24 Canada Water | 34 Olympic Legacy |
| 14 Harrow and Wealdstone | 25 Greenwich Riverside | 35 Ilford |
| 15 Wembley | 26 New Cross - Lewisham - Catford | 36 Wood Green |
| 16 Old Oak/Park Royal | 27 Greenwich Peninsula | 37 Croydon |
| 17 Kensal Canalside | 28 Charlton Riverside | |
| 18 Hayes | | |

BLG: Strategic Economic Clusters

- | | | |
|-------------------------------|--|--|
| 38 Heathrow Economic Area | 43 Crystal Palace | 47 SC1 King's College Hospital, Denmark Hill |
| 39 London Cancer Hub | 44 Dagenham East | 48 St George's Hospital |
| 40 Battersea (Ransome's Dock) | 45 Olympia | 49 Tottenham |
| 41 Biggin Hill | 46 Royal National Orthopaedic Hospital | 50 Whitechapel |
| 42 Chiswick Park | | |

BLG: Brownfield Town Centre and Other

- 51 Romford
- 52 Sutton
- 53 Woolwich
- 54 Kingston
- 55 Greenford

BLG: Green Belt Residential-led Mixed Use

- 56 Croydon-New Addington
- 57 Eastern Hainault Loop
- 58 East of Ickenham
- 59 Mill Hill and Barnet
- 60 Northwood
- 61 Crews Hill and Chase Park
- 62 Upminster
- 63 Harold Park
- 64 West Ruslip
- 65 Dagenham

BLG: Green Belt Industrial

- 66 A13 (Rainham Area)
- 67 A12 (Romford Area)
- 68 A127 (Upminster Area)
- 69 M1 (Borehamwood West Area)
- 70 M20 (Swanley Area)
- 71 M40 (Northolt Area)
- 72 M4 (Heathrow Area)
- 73 M25/A10 (Northern Lea Valley Area)
- 74 M25 South (South Chessington Area)

Figure 10: Draft London Plan: key diagram

5 Assessments

- 5.1 This section summarises the assessments undertaken by each utility provider for the GLA's Baseline, High and Mid growth scenarios. It presents the findings for electricity (UK Power Networks and SSEN) and water (Thames Water and Affinity Water), followed by cross-cutting analysis and recommendations.

Electricity - UK Power Networks

Method

- 5.2 UK Power Networks assessed the GLA's Baseline, High growth, and Mid scenario data against their network. This report focuses on the method and results for the Mid-scenario, which was ultimately preferred, and will be taken forward into the Draft London Plan. The focus of the assessment was to study how demand from future growth would impact primary substations.
- 5.3 Primary substations were the focus of this analysis due to the longer timelines required for potential reinforcements or build compared with secondary substations (lower voltage assets). This asset class is therefore considered to be impactful for timely housing delivery. Furthermore, substantial new developments would often connect to a new secondary substation rather than requiring reinforcement of an existing one. Other assets were also scoped out, for example, circuits above primary substations are accounted for at the Engineering Justification Papers stage of utilities investment planning and were not considered appropriate to assess here. Other considerations for the low voltage network such as cable capacity and sites for new substations were also not considered appropriate to assess as part of this high-level exercise.
- 5.4 Datasets used to perform the assessment for the Final growth scenario were the Q1 2026 network headroom report, and UK Power Networks' published Long-Term Development Statement (LTDS) from November 2025, and the Distribution Network Options Assessment from March 2026. It is important to note that network data and forecasts are regularly reviewed, and results are taken as the best view at the point at which the assessment was carried out.
- 5.5 To ensure consideration of timely housing delivery, UK Power Networks looked at the assumed timing of the housing development, assessed capacity, and considered ongoing and planned reinforcement work. It is important to note that UK Power Networks will always look to deliver connections to facilitate growth as seamlessly as possible, by considering phasing of developments and opportunities for flexible connections in close collaboration with the customer.

UK Power Networks' assessment followed five steps:

- (1) subtracting London Plan demand from headroom forecasts to find the remaining headroom by year and substation.
- (2) comparing the resulting "year over firm" (when a substation is expected to exceed capacity) against the baseline forecast, to identify substations affected sooner than previously expected.
- (3) flagging these substations and the revised year over firm.

(4) checking the Long-Term Development Statement to see whether planned reinforcement or asset replacement already addresses the flagged substations; and

(5) checking DNOA outputs to identify where flexibility services are managing load instead of physical reinforcement.

Full detail of the Methodology including datasets used and assumptions made is set out in the Appendices.

Results

- 5.6 The housing developments shared by the GLA for the prospective London Plan are supplied by 225 primary substations within the UK Power Networks licence area.
- 5.7 Electricity network load and capacity are monitored on a quarterly basis and updates to network plans are published annually by UK Power Networks through dynamic and robust processes rooted in data-driven analysis and stakeholder input.
- 5.8 The UK Power Networks' [2026 Distribution Future Energy Scenarios \(DFES\)](#), annually updated and published, provide a comprehensive outlook for UK Power Networks' licence areas as the UK transitions towards Net Zero by 2050, building upon a strong foundation of collaboration between local and national stakeholders. The 2026 DFES leverages the latest data, including alignment with the National Energy System Operator's (NESO) transitional Regional Energy Strategic Plans (tRESP). The 2026 DFES set out a detailed, spatial forecast of future demand and generation driven primarily by consumer led technologies, informed by Local Area Energy Plans (LAEPs), including subregional Phase 1 LAEPs across London, and local plan housing data for London Boroughs shared by the Greater London Authority (GLA). The network operator will continue to monitor growth in demand closely for all substations as per the processes outlined above.
- 5.9 UK Power Networks has confirmed it is able to deliver the capacity required to support the mid growth scenario in the London Plan. Assessment results indicate that if all the proposed development in this scenario comes forward, on average it will bring forward the need for an investment or flexibility intervention on any primary substation it impacts by 18 months.
- 5.10 However, to secure capacity, a formal connection application needs to be submitted through the established connection process by local authorities and/or developers. UK Power Networks is proactively engaging with the GLA and London Boroughs and will continue doing so to help enable delivery. Boroughs are encouraged to share further information and data with UK Power Networks, especially where high levels of growth are expected. Specifically, the following London Boroughs may require reviews to current network investment plans depending on which developments come forward:
- Brent
 - Enfield
 - Hackney
 - Haringey
 - Redbridge
 - Southwark

- Sutton

5.11 The GLA note that:

- For the new London Plan, early engagement with UK Power Networks on the potential growth scenarios has delivered analysis showing it is able to accommodate the levels of growth in all scenarios provided, although there are primary substations identified as needing earlier intervention as a result of the scenario figures.
- UK Power Networks intends to engage and work closely with the GLA and Boroughs on delivery and connection timelines in areas where a need for additional reinforcement or flexibility has been identified.
- UK Power Networks will submit its ED3 Business Plan to Ofgem in December 2026. UK Power Networks will continue to update its plans annually, meaning network plans will stay aligned with London's evolving priorities.
- It is for UK Power Networks to work to integrate the new London Plan growth figures into their network investment plans, including their Business Plan for ED3, caveated with an appropriate certainty marker. This will help to ensure interventions can be provided at relevant primary substation assets to ensure the final growth scenario figures can be met.

Electricity - SSEN

Method

5.12 For this assessment exercise, SSEN undertook a forecast comparison, to ensure they are building a future network in line with potential London Plan growth ambitions. Housing figures from the GLA's growth scenarios were assigned geospatially to the relevant SSEN primary substation. SSEN compared the growth scenario figures to the housing figures used for the DFES 2024 and DFES 2025, to understand how these differed.

5.13 Separately SSEN used insights from their Strategic Development Plans (SDPs) to identify where primary substations intervention year would be brought forward as a result of the increased demand from the growth scenarios.

5.14 Further detail on the methodology including data used and assumptions is in the Appendix.

Results

5.15 The most recent SSEN DFES 2025 forecasts show a comparable total level of new housing when compared to the GLA mid- (i.e. preferred) growth scenario (see table 1 below).

Table 1: Forecasted number of new homes for SSEN DFES 2025 compared to GLA mid growth scenario

Year	SSEN DFES 2025	GLA Mid Growth Scenario
2030	36,439	30,427
2035	80,578	71,641
2040	87,941	95,218
2050	101,404	128,559

- 5.16 For the mid growth scenario, SSEN DFES 2025 overall figures remain in-step (or slightly above) the scenario figures until 2035, meaning at a subregional west London level the distribution network is being planned for in alignment with the proposed London Plan housing figures.
- 5.17 Beyond 2035 and through to 2050, the London Plan mid growth scenario is significantly higher than the DFES. This is likely due to the method used to develop the DFES which relies on local authority input. Local authority plans are more detailed in the near term and the forecast growth beyond that provided by local authorities is then mostly driven by ONS housing figures.
- 5.18 However, the GLA growth scenarios offer spatial insight additional to the overarching figures. This allows assignment of new housing to the relevant electricity network areas. Analysis from this assignment indicates that under SSEN's current network planning approach fourteen SSEN primary substations have equivalent or larger forecast housing growth than the mid London Plan growth scenario growth figures up to 2050. The remaining 24 primary substations have lower forecast housing growth than the GLA's mid- growth scenario and are therefore expected to require intervention additional to or ahead of that set out in current investment plans.
- 5.19 The analysis shows that for four primary substations, the London Plan mid growth scenario exceeds the SSEN forecasts from 2025 onwards (which were informed by previous information from boroughs), and this continues to be the case through to 2050. These primary substations are Copley Dene, East Bedfont, Goldsmiths, Ironbridge, and Park Royal.
- 5.20 For most other substations, the development figures in the mid growth scenario (when considered alongside other drivers of electricity demand growth) would trigger an earlier requirement for planned interventions either during ED3 or during ED4 and ED5.
- 5.21 While total housing growth across west London is broadly comparable between DFES 2025 and the GLA's mid scenario, the two are not spatially aligned at the primary substation level.
- 5.22 SSEN will consider the feasibility and timing of including the GLA new London Plan growth figures and locations into their business planning. This will seek to ensure interventions can be made for these primary substation assets to ensure the final proposed London Plan growth figures can be met.
- 5.23 Although growth needs can in theory be met, there are still several risks:
- There are many assets identified as needing additional reinforcement over the new London Plan period. Some of this reinforcement is not solely driven by the increased London Plan growth figures but would be required due to growth in electricity demand through other low carbon technologies (e.g. heat pumps and electric vehicles). The additional housing growth becomes a question of installing higher capacity new assets at accelerated timescales rather than reinforcement or no reinforcement.
 - Furthermore, given SSEN is already part-way through preparing its ED3 Business Plan, there will need to be consideration of how best to accommodate the new London Plan growth figures. This either means adjustment to the Distribution Future Energy Scenarios (DFES) or assessing the proposed London Plan growth figures as a sensitivity to the forecast and sizing the reinforcement accordingly. The Strategic Energy Needs

set out in NESO's tRESP and the process for accounting for these in SSEN business plans also presents an opportunity for these housing targets to be reflected but timescales would be challenging. A further opportunity may be to utilise a "within price control" mechanism, such as the recent Load Related Expenditure uncertainty mechanism utilised by SSEN in the ED2 period.

- This analysis of capacity within the SSEN area is within the context of substantial transmission network constraints in west London. Interim solutions are in place while upstream reinforcement is being progressed, including incremental ramping of demand.

5.24 It is noted that additional detail is reported here compared with UK Power Networks assessment, due to the context of historic challenges relating to network capacity in the SSEN served area of West London.

Electricity - analysis, insights, recommendations

5.25 The results of this assessment exercise provide an indication of current and future constraints on the networks, as well as timings of these and when interventions would be needed, based on the growth data supplied.

5.26 They show that although areas of constraint have been identified resulting from the growth figures from both high and mid scenarios, the electricity companies consider that all requirements are being met through existing network investment plans and processes. Therefore, it is their view that any areas identified as having future constraint are likely to be addressed ahead of these constraints occurring, through the utilities' investment planning processes.

5.27 Although this study focuses on the distribution network, for the majority of housing developments (apart from extremely large new developments) the ramping solution in place by DNOs is a mechanism to enable these developments to connect to the distribution network ahead of transmission works being complete. Existing data sharing processes between both SSEN and NGET and UK Power Networks and NGET provides visibility of DNO's forecast load growth at the interface with transmission.

5.28 Further to the above, SSEN and UK Power Networks continue to work constructively with the Greater London Authority (GLA), building a strong partnership to ensure London's future energy needs are clearly understood and reflected in national and regional planning. Through coordinated engagement, the DNOs are jointly supporting the GLA's ongoing dialogue with the National Energy System Operator (NESO), particularly on the development of Regional Strategic Energy Plans (RESP). This collaboration helps translate strategic energy needs identified by local and city-level stakeholders into the NESO process, strengthening alignment between local priorities and national system planning and ensuring regional growth, decarbonisation and resilience requirements are effectively represented.

5.29 Despite the assurances above, there are still risks associated with future demands on the electricity networks from growth and decarbonisation. Recent experience indicates that there is particular risk where there are areas of high growth, with development coming forward at high densities and therefore with substantial electricity demand. Challenges occur where this development comes forward with a short period for delivery and connection. Developers and Authorities partnering with the DNO to identify lead in times and support identification of land availability and land rights will help to mitigate this impact, to prevent delays to housing delivery.

5.30 The following additional points are considerations for the new London Plan and the work of GLA, Local Authorities and utilities:

- Transparency for utilities on rates of development are critical, as timings for infrastructure delivery are linked to that. An ongoing challenge is managing supply infrastructure to be timed with growth delivery rates and electricity demand, as build rates often differ to targets. The Boroughs are advised to engage with DNOs about their long-term plans at the earliest opportunity so the network can integrate them into its own investment planning.
- Development connections information for GLA and Local Authorities (provided by developers) is key to supporting visibility of connections status and solutions to enable timely connections, such as demand ramping. This approach has been used in West London as a solution to West London capacity constraints and received positively by relevant parties. This is a dynamic area of policy and opportunities should be leveraged to influence the connections process to improve delivery outcomes and support the delivery of growth.
- Early identification of issues is critical, facilitated through the ongoing sharing of data on future demand (where, when, how much), which enables forward planning. The certainty of growth coming forward changes at different stages in the planning process, for example from the local plan site allocation stage (which has medium certainty) to the planning application stage (which has higher certainty), to connections request and completion (which has high certainty). Typically, utilities are most confident to invest when they have high certainty of development coming forwards, but sharing data at the local plan stage, pre-application stage or planning application stage may help with early identification of issues.
- Engineering solutions for challenges relating to network reinforcement may come at a substantial cost, which is borne by billpayers. Proactive early collaboration and coordination can help ensure cost optimal solutions are identified and implemented by infrastructure providers.
- It is important for DNOs to consider less traditional solutions to issues, given a changing energy system in response to decarbonisation. A clear example of this has been DNOs collaborating in partnership with the GLA, Mayoral Development Corporations and Local Authorities, given these organisations' roles in supporting broader priorities such as housing, economic growth, decarbonisation, as well as assisting with incoming proposals, such as prioritisation of strategic demand in the electricity connection process.
- Challenges relating to delivery of power can sit elsewhere in the energy system, for example at transmission level, therefore interaction between distribution and transmission levels is important. Connections to the distribution network may be held up by transmission level constraints, which have a longer build out time due to the scale of infrastructure. This is the case in West London²⁶. Despite being sought, this assessment was unable to secure direct engagement with NGET on the transmission-level implications of the new London Plan growth scenarios. Future iterations of this assessment and ongoing GLA engagement (potentially via NESO and the RESP process), should seek to include NGET's perspective on transmission-level implications of London's growth.

²⁶ [West London electricity capacity constraints | London City Hall](#)

- Major energy system actors, such as data centres, play a critical role, presenting shocks to the system which greatly impact on capacity and headroom and undermine future planning. Strategic work to manage this is important and it is expected that Government's forthcoming national data centre strategy will help to establish an expectation of need for data centres to be planned for. The GLA has also published a Data Centre forecasts and insights study²⁷ which indicates that London's electricity connection queue for data centres has grown to ~11.2GW.
- In future, NESO RESP will play a role in helping to ensure that DNOs are responsive to demand growth and local needs.

5.31 These results and considerations highlight the importance of the continuation of collaborative ways of working and coordination of work between GLA, Local Authorities and the utilities, and the need for appropriate resourcing for this.

Water - Thames Water

Method

5.32 Thames Water undertook a strategic assessment of Scenario 1 (Baseline) and Scenario 2 (High growth). The method and results are shown in the Appendix. The mid growth scenario was assessed at a strategic level, as data granularity and timelines meant a full assessment was not possible. Thames Water also compared the GLA's mid housing growth scenario with their Drainage and Wastewater Management Plan (DWMP) dwelling forecasts.

Results

5.33 The scale of growth under consideration by the GLA is broadly deliverable from Thames Water's capacity perspective. This is subject to ongoing robust alignment between spatial planning and regulated network investment planning. Strategic comparison between the GLA's mid scenario housing growth trajectory and Thames Water's DWMP indicates strong alignment on figures up to 2050.

5.34 The key determinants for delivering the London Plan are the locations of growth, early engagement between Thames Water, Local Authorities and developers, and the timing of development.

5.35 Key considerations for the new London Plan from a water supply and wastewater / drainage perspective are:

- Safeguarding land (and where appropriate, development capacity within schemes) for utilities infrastructure - this is critical to avoid future delivery blockages and cost escalation, particularly in dense urban locations. Land requirements around Thames Water infrastructure, especially land around Sewage Treatment Works, needs to be safeguarded to allow for additional treatment capacity and not be restricted by future development footprints. Typically, this applies to all Sewage Treatment Works but there is greater risk for those located in more dense areas, such as Becton, Mogden and Hogsmill.
- The phasing and growth assumptions need to consider that infrastructure lead times and funding cycles will shape the deliverability of strategic upgrade needs. Water and Wastewater network reinforcement typically requires detailed modelling and delivery

²⁷ [London's Data Centre Future Growth Forecasts and Strategic Insights | London City Hall](#)

once the certainty of development has been confirmed, which may result in a reinforcement being delivered within between 18 months to three years.

- To ensure growth is deliverable and environmentally sustainable, Thames Water consider that the new London Plan should include policy mirroring London Plan (2021) Policy S15 (Part D(2)), requiring borough Development Plans to safeguard, facilitate and actively support the timely delivery of wastewater treatment capacity and network reinforcements to unlock sustainable development.
- Phasing is one of the most effective levers available to planning authorities to avoid reactive network reinforcements. The new London Plan should therefore require boroughs to phase and sequence growth in discussion with Thames water to seek to secure alignment with infrastructure investment plans²⁸, so demand is introduced where capacity is available or programmed. Local authorities and developers can identify information on capacity alignment through the Drainage and Wastewater Management Plans (DWMP). This will allow delivery to be smoothed across the adjacent area. Growth in areas with high-risk catchments should be aligned with investment and IWMS-led mitigation to avoid piecemeal upgrades.

5.36 Thames Water's water and wastewater infrastructure underpins London's growth. The new London Plan should ensure that development is delivered efficiently and in an environmentally sustainable manner, though safeguarding land, recognising Thames Water's lead times and promoting phasing and alignment of growth to that of regulated network investment.

Water – Affinity Water

Method

5.37 Affinity Water undertook a two-tier assessment approach. The first stage involved a strategic-level review of total supply versus projected demand, providing an overall understanding of whether the wider water resource zone could accommodate planned growth. The second stage assessed the spatial distribution of development relative to the existing Affinity Water network, enabling a clearer view of local constraints, reinforcement needs, and the interaction between proposed growth areas and current supply infrastructure.

5.38 Affinity Water undertook assessment of the growth scenario data by:

- Mapping growth areas onto their geographic areas of responsibility.
- Reviewing growth against Affinity Water internal supply zone and network information, including assumed supply areas, demand zones and indicative reinforcement needs.

5.39 Each growth area was reviewed against the relevant Affinity Water supply zone and an assumed point of connection based on proximity to existing demand management areas (DMAs) and strategic water supply infrastructure. A high-level capacity screen was undertaken to identify:

- Areas where the existing network is likely to have sufficient capacity to accommodate additional development demand with minimal intervention.

²⁸ [AMP8 Delivery Plan](#)

- Areas where localised upgrades or network modelling may be required to confirm available capacity.
- Areas where significant local or strategic reinforcement is anticipated to be necessary to support the scale and timing of development growth.

Results

5.40 Results for the High Growth scenario are included in the appendix. The results and analysis below relate to the mid- growth scenario.

5.41 Affinity Water have noted that they consider the mid growth scenario to be credible and deliverable in water infrastructure terms. Affinity Water considers that the scenario broadly aligns with their current view of future demand from housing and note that the GLA mid scenario accounts for government priorities as well as the realities of the construction market.

5.42 However, there are critical considerations to help ensure that water infrastructure capacity is in place to meet growth requirements:

- The safeguarding of land for new treatment works is a priority. This is a technical necessity to support the White Horse Reservoir Strategic Resource Option (WHR SRO) and Thames to Affinity Transfer (T2A) projects, alongside delivery of essential infrastructure for Affinity Water's East region. Early site protection is vital to avoid future design compromises. Affinity Water will engage with Planning Authorities to help identify land required to be safeguarded.
- Affinity Water consider the projected rate of growth over the next five years to be of particular importance. Affinity Water are anticipating a 95% increase in demand compared to the previous five-year period, followed by this trend settling to a 23% increase through to 2051. From a delivery perspective, this front-loaded "surge" creates significant pressure on infrastructure lead times, which must be managed closely to ensure network resilience.
- the importance of developers and local authorities engaging to provide early notice on site allocations cannot be overstated. Engineering solutions on the periphery of the Affinity Water network (specifically within the Stort Water Resource Zone 5 which incorporates parts of north London) are technically complex. Early engagement allows Affinity Water to mitigate these "edge of network" challenges before they become bottlenecks.
- Developer contributions provide a mechanism to accelerate upgrades and reduces Affinity Water's singular reliance on the Ofwat Price Review cycle. By leveraging the WRMP alongside developer funding, Affinity Water can adopt a "no-regrets" engineering approach—ensuring affordability while building in the capacity needed to manage growth uncertainty.
- A clearer view on the implications of altering phasing for reinforcement requirements, timings and costs can be provided when further detail is available on specific site locations.

5.43 Affinity Water have noted that the phasing of development is a substantial consideration, often impacting their network more than the total amount of development planned. This is due to the nature and timeframes of network planning and investment: where growth is indicated to come forward over longer timeframes it is more easily planned for by utilities. Affinity Water has schemes that are already programmed to come online which can be

adjusted, but development coming forward in the shorter term (up to 10 years) is likely to be most challenging to plan for and accommodate. Appropriate coordination with water companies' planning periods is therefore of strategic importance to housing delivery.

Water - analysis, insights and recommendations

- 5.44 Both Thames Water and Affinity Water have indicated their networks would be able to accommodate the levels of growth set out in the GLA's mid growth scenario, with several caveats as outlined in the analysis above, namely the importance of land safeguarding, lead in times, early engagement, funding and phasing.
- 5.45 In particular, water companies have highlighted the importance of Local Authorities and developers consulting water companies on both Local Plan site allocations and individual planning applications that come forward in the areas identified for future growth in the new London Plan. Currently water companies are not statutory consultees, but improved understanding of what is coming through the planning process and is being delivered in Local Plan Infrastructure Delivery Plans will assist water companies in their network planning.
- 5.46 It is evident that alignment of spatial planning targets and network investment planning is critical. Opportunities for spatial planning to influence water network planning is closely linked to water companies' statutory planning cycles, notably WRMPs, DWMPs, and the five-year Asset Management Periods (AMPs) linked to Price Reviews (PRs). Engagement ahead of business plan submission is particularly important, as once investment priorities are fixed within an AMP there is limited flexibility to respond to emerging growth pressures. Improved alignment between Local Plans, Infrastructure Delivery Plans and statutory water planning cycles therefore represents a key opportunity to support timely, efficient and coordinated network investment.
- 5.47 More specifically, it is noted that generally any referable development located on brownfield land in a combined sewer and drainage area is likely to be acceptable in drainage and wastewater terms where it is compliant with London Plan drainage policy. This is because new development meeting requirements around greenfield run off rates is likely to improve the drainage situation over the baseline and alleviate pressure on the combined sewer system.

6 Conclusions

- 6.1 All growth scenarios tested (including the GLA's mid scenario which is ultimately the basis of the final spatial strategy) are considered deliverable from each utility's perspective, taking account of their current business plans, future investment planning, and policy settings such as demand management. However, the scenarios place substantial pressure on specific assets and bring forward reinforcement requirements that would not otherwise arise within current investment timeframes. This pressure is compounded by wider demands on utilities' infrastructure, including maintenance of ageing assets, increased demand from decarbonisation and electrification, climate adaptation and resilience upgrades, and demand from major energy users such as data centres.
- 6.2 Both utilities' current business plans (RIIO-ED2/ED3 for electricity, AMP8/PR25 for water) and the recently published London Infrastructure Framework point to a substantial

programme of network reinforcement that will be needed across London over the coming decades, largely independent of which London Plan growth scenario is ultimately adopted. Much of this reinforcement (whether transmission and primary substation upgrades, strategic water resource schemes such as White Horse Reservoir and the Grand Union Canal transfer, or wastewater treatment capacity) has lead-in times measured in years to over a decade, meaning that decisions taken in the current and forthcoming investment cycles will determine the infrastructure available to support growth well into the 2030s and beyond.

- 6.3 However reinforcement is not the only part of the picture: demand management (including water efficiency and reuse, SUDs, leakage reduction, smart metering and flexible electricity demand) and the continued expansion of heat networks both have a material role in moderating the scale and timing of reinforcement required, and should be considered alongside (but not in alternative to) physical network investment when planning for growth. The role of London Plan policies in supporting these is acknowledged, and should be continued and reinforced, with a systems-based perspective being particularly beneficial.
- 6.4 A further consideration is the proximity of growth to the existing network. Developers will pay for new connections, and costs increase with the amount of new infrastructure required, which is potentially greater in less developed areas such as Green Belt, Grey Belt or other greenfield sites. It may also take longer to provide utilities to new areas compared to reinforcing the infrastructure in existing areas, whether through permanent or temporary solutions. In both existing and new areas, network extensions and reinforcement will involve land both at existing and new sites, and this should be factored in when considering net development densities, and the release of industrial land in utilities use (which would ideally be avoided).
- 6.5 Utilities have a statutory duty to connect residential properties to their networks and view that growth ambitions must be accommodated, but recent experience informs a GLA view that a high influx of demand has potential to create connections delays and additional expense to developers without mitigating action (for example, West London electricity network capacity constraints). The growth scenarios proposed, whilst assessed as deliverable by utilities, therefore still carry delivery risks. The rate and scale of development proposed, and the extent to which new areas are involved influence the degree of risk. Areas of existing utilities stress, notably West London for electricity and Marsh Dykes in South London for wastewater add additional complexity, though much of this is already being worked through proactively.
- 6.6 Whilst GLA and stakeholders are committed to working towards better alignment between utilities planning and spatial planning, utilities are ultimately obligated to respond to the development that the market delivers, regardless of whether this aligns with the London Plan or not. GLA engagement with utilities indicates that utilities are uncertain that the levels of growth outlined in the Development Plan will actually come forwards. Future demand forecasts by utilities are also recognised ultimately to be forecasts which carry margins of error. Proactive monitoring, data sharing and ongoing collaboration by relevant authorities with utilities to identify potential issues and mitigate these early, as well as appropriate resourcing for this, is therefore important. Early engagement should take place with GLA, Boroughs, developers and utilities infrastructure providers relating to the planned growth, to ensure that as it becomes more clearly specified and then confirmed in planning consents and build-out plans, this can be reflected in their network investment plans. This is particularly important as utilities

prepare for their next investment cycle (ED3, PR29/AMP9 and future WRMP/DWMP updates – see paragraphs 3.6 and 3.40). Engagement should include information sharing on location, quantum, and phasing of development as this becomes more certain, as well as any land requirements for infrastructure assets. Other more detailed information such as building typologies is also welcomed by utilities to help inform their understanding of development (and associated demand) coming forwards. Tools such as the Planning London Datahub (PLD) may support reducing the resource burden of this through proactive collection of data through the planning applications process.

- 6.7 In areas where high growth will be concentrated, further consideration should be given to additional collaborative work between the GLA, local authorities and utilities (including on strategies such as IWMS and energy plans) in support of delivering growth ambitions. This includes collaboration on co-ordinating streetworks to ensure that any works (and associated disruption) are minimised through aligning timings with other required works.
- 6.8 It is therefore evident that further work and coordination between the GLA, boroughs and utilities is necessary to deliver the infrastructure needed to support the growth identified in the new London Plan. This Utilities Impact Assessment is only the first step towards this. Engagement with NGET on transmission-level implications was sought but not achieved for this assessment and remains a priority for future work.

7 Glossary

AMP – Asset Management Plan: A five-year investment and delivery plan for water companies, aligned with Ofwat’s Price Review cycles.

DNO – Distribution Network Operator: A company licensed to distribute electricity at regional level.

DNOA – Distribution Network Options Assessment: A process used by DNOs to evaluate reinforcement and flexibility options.

DFES – Distribution Future Energy Scenarios: Annual projections of future electricity demand and decarbonisation pathways at local level.

DSO – Distribution System Operator: part of the same parent utility company as the DNO, the DSO actively manage and balances local energy supply and demand to support renewable energy and smart grids. They operate local flexibility markets and play a role in integrating net zero initiatives and demand into DNO plans.

DWMP – Drainage and Wastewater Management Plan: Long-term planning document for wastewater and drainage networks.

FES – Future Energy Scenarios: National projections of future energy demand and supply, produced by NESO.

ICS – Infrastructure Coordination Service: team at the GLA comprising planning, streetworks and development service lines.

IDNO – Independent Distribution Network Operator: A company licensed to operate electricity distribution networks independent of the main DNOs.

IWMS – Integrated Water Management Strategy: A non-statutory, whole-system assessment of water supply, wastewater and surface water capacity.

LAEP – Local Area Energy Plan: A detailed plan assessing current and future energy needs at local level.

NESO – National Energy System Operator: Responsible for balancing electricity supply and demand and for strategic energy planning.

NPPF – National Planning Policy Framework.

NPPG – National Planning Practice Guidance.

PR – Price Review: Ofwat’s periodic review of water company performance and investment needs.

RESP / tRESP – Regional Energy Strategic Plan / transitional RESP: NESO’s strategic energy planning documents for each region.

RIIO – Revenue = Incentives + Innovation + Outputs: Ofgem’s regulatory framework for electricity networks.

SuDS – Sustainable Drainage Systems.

WRMP – Water Resources Management Plan: A statutory long-term plan for balancing water supply and demand.

Appendices

UK Power Networks Methodology

Baseline scenario assessment

The steps in the methodology were as follows:

- GLA Growth areas with 500 homes or more and with a start date of 2028 onward were taken forward for analysis. The remainder were discarded from analysis (see assumption 4 below).
- GLA Growth data is structured as number of units per year by LSOA. UK Power Networks joined each LSOA to primary substation supply areas using GIS, to assign the growth figures for each LSOA to primary substations.
- Housing numbers were aggregated by year and by primary substation.
- Number of homes/units were converted to MW using assumptions 1 and 2 outlined below.
- The latest Network Headroom dataset (internal to UK Power Networks) from 2025 Q4 was used to view the amount of unused network capacity by primary substation for demand over time to 2050. Values are in MW and follow the Holistic Transition scenario (see assumption 6).
- The MW values were subtracted from the London Plan growth demand figures to calculate the remaining headroom by year for each primary substation.
- UK Power Networks compared the expected year over firm (the year when a substation is expected to be overloaded) with the new year over firm (year when a substation is expected to be overloaded with London Plan baseline scenario added) to identify which primary substations exceed firm capacity faster than expected.
- Primary substations that showed as exceeding firm capacity faster than expected because of the housing units from the new London Plan baseline scenario were flagged and the new year over firm capacity was highlighted.
- UK Power Networks also looked at their latest Long-Term Development Statement – Infrastructure Projects (current plans for the development of UK Power Networks' three license areas over the next five years) to identify if any reinforcement or asset replacement work will be done on any of the substations identified to exceed firm capacity faster. Added to 'Commentary' column in output file.

- UK Power Networks looked at the latest Distribution Network Options Assessment (DNOA) outputs to identify which substations' load and capacity are being managed or planned to be managed using flexibility services. This information was added to the 'Commentary' column in the output file.

High-growth scenario assessment

The steps in the methodology were as follows:

- UK Power Networks used QGIS to join shapefile data of both industrial and greenbelt zones with primary substation supply areas to assign primary substations to each growth area.
- UK Power Networks included all growth areas in their analysis except for ones which were outside UK Power Network's supply area.
- UK Power Networks aggregated housing numbers by year and by substation.
- Added housing numbers by substation by year from the step above to numbers from step 3 in the baseline scenario method, to calculate the total number of new units within the high growth scenario.
- All steps from the baseline scenario were followed starting from step 4.

Datasets used

- Primary substation supply area: [Local Authority by Primary Feeding Area — UK Power Networks](#)
- Used latest Network Headroom dataset (internal) from 2025 Q4 to view amount of unused network capacity for demand over time to 2050 by primary substation. Values are in MW. This is the latest network headroom dataset available, however latest external [Network Scenario Headroom Report](#) from May 2025 is a good alternative for analysis.
- [Long-Term Development Statement – Infrastructure Projects](#): current plans for the development of UK Power Networks ' three license areas over the next five years
- Distribution Network Options Assessment (DNOA): Decision-making framework designed to explore all options, including flexibility, to meet capacity needs and to deliver a reduction of up to £410 million in load-related expenditure during up until end of March 2028. [long-term-system-needs-march-2025.xlsx](#)

Assumptions

1. Each home/unit has 2kW load up to and including 2029
2. Each home/unit has 3.5kW load from 2030 onward following the Future Homes Standard. This is an after-diversity peak demand. For context, an 8-10kW Air Source Heat Pump typically contributes 2.5kW and modern homes with LEDs and efficient appliances
3. Some areas are served by multiple substations. The assumption is that load is spread evenly across substations. For example, three substations serve one area where 1500 homes/units are expected to be built. Each substation is assigned 500 homes.
4. For the baseline scenario, areas with fewer than 500 homes were excluded from substation analysis. Larger developments i.e. 500+ homes usually affect primary substation capacity.
5. All developments with a start year before 2028 were excluded from substation analysis as developers are expected to already have an accepted connection within this timeframe.

6. Demand on the network follows the Holistic Transition scenario within the 2025 Distribution Future Energy Scenarios (DFES). The Holistic Transition scenario was used as this is the scenario that UK Power Networks use to plan the network.

SSEN methodology

SSEN assessed both the Baseline and High growth scenario data.

Overview

The methodology used follows the steps below:

- Each housing figure was assigned to the relevant primary substation to compare with DFES 2024 and DFES 2025.
- As the SSEN Distribution Future Energy Scenarios (DFES) only gathers information from local authorities for growth areas larger than 100 homes, the data received was filtered to remove developments with less than 100 homes from the baseline scenario. This allows for better comparison with the DFES and focuses on growth areas that are more likely to require a network/system planning assessment when applying for a connection to the distribution network.
- To allow for comparison with SSEN data, the projections were split to a geography that SSEN can compare with existing forecasts (DFES). For this assessment the SSEN Primary Substation Electricity Supply Areas were used (Primary Substation Electricity Supply Areas - Data Asset - SSEN Distribution Data Portal).
- For the baseline scenario the proportion of the LSOA area that overlapped with each primary substation supply area was applied to the housing projection for that LSOA and assigned to each overlapping primary substation area. For the growth scenario, the same assignment was carried out using the custom areas for the growth area developments.
- To provide insight on the housing targets to the GLA, SSEN then prepared two datasets:
 - DFES_2024_2025_GLA_Full.csv - The first was a year-by-year forecast of the cumulative housing requirement under each primary substation for the DFES Holistic Transition (HT) Scenario for DFES 2024 and DFES 2025, and the baseline and growth scenarios aligned to primary substations. The purpose of this is to show how the GLA scenarios compare with our most recent DFES scenarios that will inform planning for SSEN's next price control.
 - SDP_Data.csv – Insights from SSENs most recent Strategic Development plans for each relevant primary substation. This shows the modelled intervention year for each of these substations and the number of domestic homes that were projected to connect ahead of this date. In cases where there was no modelled intervention year (where work is already being carried out at the primary substation, or there is no forecasted intervention required ahead of 2050), the 2050 DFES projection for the number of properties was included.

Assumptions

- Each new home has a load profile. A proportion of new developments shared by Local Authorities is assumed to have a Heat Pump and/or Electric Vehicle Charge Point.
- As an example for heat pumps, a new development would initially assume 50% of properties to have a heat pump, with this increased to around 80% beyond 2029.

- The projected network impact/loading for EVs and HPs is then determined through NESO tRESP Common Planning Assumptions so should be common across all DNOs

Thames Water Methodology and Results – Baseline Growth Scenario and High Growth Scenario

The methodology used to assess the baseline growth scenario and high growth scenario was different to that used for the mid growth scenario. The method and results for the baseline growth scenario and high growth scenario are therefore set out below.

Method

The following data inputs were used:

- Growth area location data provided by the GLA in GIS format.
- Thames Water internal asset spatial information and assumed point of connection.

The following steps were undertaken:

Each growth area was assessed against an assumed point of connection to the sewer network. The sewer size and downstream network were screened at a high level for capacity. This process was used to identify parts of the network that are likely to accommodate the additional foul flows without intervention, those where hydraulic modelling is likely to be required to confirm capacity, and those where our network is anticipated to require network upgrades to accommodate the scale and timing of growth. The capacity assessment was undertaken on a discrete phase-by-phase basis. The industrial growth areas and the three-phase Greenfield locations were each assessed independently to reflect the different scale, timing and infrastructure implications of each phase.

This enabled a clear understanding of the infrastructure risk attributed to each phase in isolation. The outcomes were categorised using a Red/Amber/Green (RAG) approach.

- Green – No anticipated network constraints subject to development drainage strategy.
- Amber – Likely requirement for hydraulic modelling and/or localised upgrades; and
- Red – Extensive local and/or strategic network upgrades anticipated.

Where areas are designated as red, it indicates that long lead times and early engagement may be required to understand any implications of the development going ahead without further network reinforcement.

Given the limited level of information, the following assumptions apply:

- Connections will be made via gravity to the closest and largest available foul or
 - combined sewer.
- Phases one, two, and three do not refer to the progress of the development area but are based on distance from transportation links.
- All surface water will be disposed of on-site where feasible, in accordance with the current London Plan drainage hierarchy.

- Network modelling and detailed capacity confirmation will only be undertaken on a site-by-site basis through the planning application procedures.
- Where infrastructure upgrades are required following the network modelling, the typical lead-in times for network reinforcement are 18 months to 3 years.
- RAG status is based on broad assumptions and will be subject to review of the development drainage strategy submitted as part of planning applications.

Results

The results of the high-level capacity assessment for the greenfield growth areas are shown in Table 1 and the results for the redevelopment of the industrial growth areas are shown in Table 2. The tables identify the relevant water undertakers, the connection points and data limitations.

There are several growth areas where it is envisaged that Thames Water do not have any infrastructure concerns. Several growth areas require different levels of hydraulic modelling, and it is anticipated that extensive upgrades to the local sewerage and water networks will be necessary. Based on the information available, the potential growth locations were assessed against the capacity of the network, and each development was categorised as Red (insufficient capacity/Significant constraints), Amber (some constraints / capacity uncertain) or Green (capacity available/ low risk). With appropriate phasing, early engagement, and targeted network upgrades where required, the planned growth can be accommodated within the existing and planned sewerage network capacity. Where areas are designated as red, it indicates that long lead times and early engagement may be required to understand any implications of the development going ahead without further network reinforcement.

Local Plans can include phasing policies that require development to come forward in a manner aligned with water companies' investment cycles to ensure development does not outpace available supply capacity. At the London Plan level, strategic policies can emphasise the need for coordinated infrastructure planning and promote collaborative working between developers, utilities and planning authorities.

Water and wastewater capacity assessment results

Growth area	Wastewater - Phase 1	Wastewater - Phase 2	Wastewater - Phase 3	Water - Phase 1	Water - Phase 2	Water - Phase 3	Comments
Bedfont Lakes							Affinity manages water services in this area
Chislehurst & Petts Wood							
Crews Hill & Chase Park							Affinity manages water services in this area
Croydon-New Addington							Multiple growth areas. X,Y are used as the central point for assessment
East of Ickenham							Affinity
Eastern Hainault Loop							Multiple growth areas. X,Y are used as the central point for assessment. Essex & Suffolk Water manages water services in this area
Harold Park							Multiple growth areas. X,Y are used as the central point for assessment. Essex & Suffolk Water manages water services in this area

Growth area	Wastewater - Phase 1	Wastewater - Phase 2	Wastewater - Phase 3	Water - Phase 1	Water - Phase 2	Water - Phase 3	Comments
Hayes & Bromley Common							
Mill Hill & Barnet							Affinity manages water services in this area
Northwood							Multiple growth areas. X,Y are used as the central point for assessment. Affinity manages water services in this area
Sidcup & Bexley							
Southern Croydon							No map unable to assess
St Mary Cray							No figures to assess
Stanmore & Scratchwood							Affinity manages water services in this area
Stockley Park							Affinity manages water services in this area
Upminster & Dagenham							Essex and Suffolk water manages water services in this area
Upper Lea Valley							Multiple growth areas. X,Y are used as the central point for assessment
Wanstead Flats							

Growth area	Wastewater - Phase 1	Wastewater - Phase 2	Wastewater - Phase 3	Water - Phase 1	Water - Phase 2	Water - Phase 3	Comments
West Ruislip							Multiple growth areas. X,Y are used as the central point for assessment Affinity manages water services in this area
Western Hainault Loop							
Whalebone Lane							Essex & Suffolk manages water services in this area

Industrial growth areas

Growth area reference	PMA	WW Network RAG	CW Network RAG
SIL00000015	Lea Valley		
SIL00000046	Lea Valley		
SIL00000002	Park Royal/A40/Heathrow		Affinity
SIL00000029	Park Royal/A40/Heathrow		Affinity
LSI00000074	Wandle Valley		
LSI00000103	Lea Valley		
LSI00000105	Lea Valley		
LSI00000106	Lea Valley		
LSI00000108	Lea Valley		
LSI00000272	Lea Valley		
LSI00000278	Lea Valley		
LSI00000279	Lea Valley		
LSI00000281	Lea Valley		
LSI00000283	Lea Valley		
LSI00000284	Lea Valley		
LSI00000287	Lea Valley		
LSI00000288	Lea Valley		
LSI00000291	Lea Valley		
LSI00000292	Lea Valley		
LSI00000010	Park Royal/A40/Heathrow		Affinity

Growth area reference	PMA	WW Network RAG	CW Network RAG
LSI00000023	Park Royal/A40/Heathrow		Affinity
LSI00000025	Park Royal/A40/Heathrow		Affinity
LSI00000110	Park Royal/A40/Heathrow		Affinity
LSI00000111	Park Royal/A40/Heathrow		Affinity
LSI00000112	Park Royal/A40/Heathrow		Affinity
LSI00000115	Park Royal/A40/Heathrow		Affinity
LSI00000116	Park Royal/A40/Heathrow		Affinity
LSI00000118	Park Royal/A40/Heathrow		Affinity
LSI00000058	Thames Gateway		
LSI00000120	Thames Gateway		Essex & Suffolk

Affinity Water – Results for the High Growth scenario

Affinity Water's capacity assessment for the identified growth areas was summarised through a Red/Amber/Green (RAG) classification:

- Red – Significant local and/or strategic reinforcement required.
- Amber – Some issues but reinforcement required or planned.
- Green – network should have capacity to accommodate the growth.

Some locations fall outside Affinity Water's supply area and therefore were not assessed.

Affinity considers that growth identified in the high growth scenario can be accommodated across their network. Across the assessed areas:

- Green-rated areas indicate that the existing network is expected to have sufficient capacity (e.g. Northwood, Stanmore & Scratchwood, Stockley Park)
- Amber-rated areas are typically associated with localised reinforcement requirements or uncertain supply, for example:
 - Bedfont Lakes – supply issues near Hatton Cross
 - West Ruislip – likely need for local reinforcement
 - East of Ickenham – potential impacts from neighbouring DMAs.
- Red-rated areas indicate that significant strategic reinforcement is likely, notably Mill Hill & Barnet and West of Ickenham in later phase scenarios.

Where areas are designated as red, longer lead times and early developer engagement will be required to understand the implications if the development progresses without reinforcement.