



Infrastructure Delivery Plan

Greater Cambridge Local Plan strategic spatial options assessment

Final report

On behalf of **Greater Cambridge Shared Planning**



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1 Introduction

Stantec UK with LUC have been appointed by the Greater Cambridge Planning Service (GCSPS) to produce an Infrastructure Delivery Plan (IDP) to guide and support the preferred spatial strategy for Greater Cambridge Local Plan.

In July 2020 we prepared a Scoping Report that identified the scope and method for preparing the IDP (Appendix A). This report represents an interim stage in the preparation of IDP by setting out the high-level infrastructure implications of the range strategic spatial options that GCSPS have developed; these findings will be used by the GCSPS to help develop the preferred option for the Local Plan’s spatial strategy. The IDP will then be developed with reference to this preferred option.

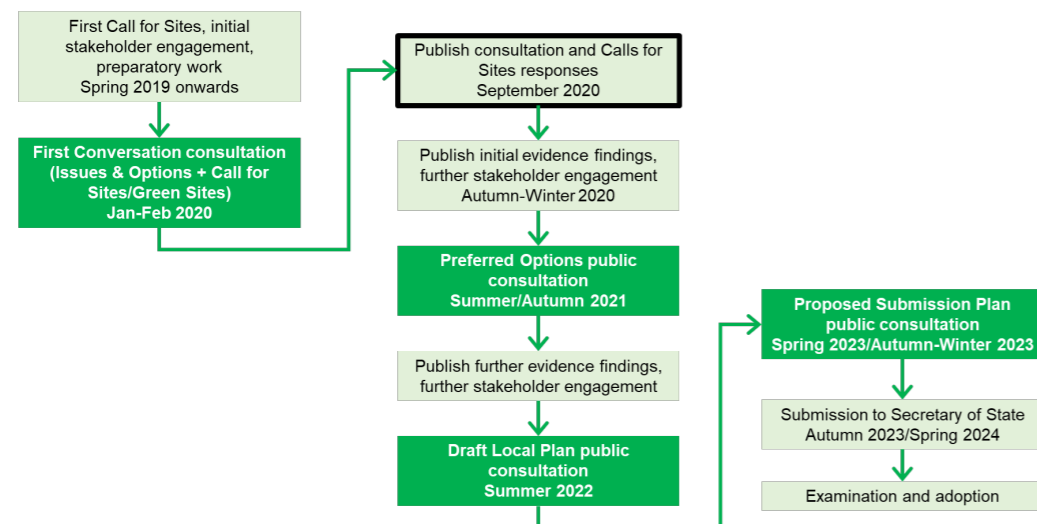
1.1 Background

Public consultation on the Greater Cambridge Local Plan First Conversation (Issues and Options) was completed in early 2020. Building on the initial options set out in the First Conversation, the Councils (Cambridge City Council and South Cambridgeshire District Council) have identified three growth level options for homes and jobs and eight strategic (non-site specific) spatial options for testing. Description of the options and explanation of how they were developed is set out in the Greater Cambridge Local Plan: strategic spatial options for testing – methodology document.

The Councils have asked consultants producing Local Plan evidence studies, including the IDP, to provide a high-level assessment of the strategic options with reference to their specific workstream. This report forms one element of that assessment.

The initial evidence findings will be reported to the Joint Local Plan Advisory Group in autumn 2020, and help to inform further engagement with stakeholders. Preferred Options public consultation is planned for summer/autumn 2021, including a preferred strategy and draft allocations. The process of Local Plan preparation is set out below in Figure 1.

Figure 1 Process of Local Plan preparation



Source: GCSPS

The testing of the options will support the selection of a preferred spatial strategy, and associated site allocations in a way that meets statutory and national policy requirements.

The purpose of the IDP will be to demonstrate the deliverability of the preferred spatial strategy for Greater Cambridge, by ensuring that infrastructure, across a variety of categories, is planned in the right place and at the right time to enable growth.

1.2 Spatial scenarios

This report considers the high-level infrastructure implications of the eight spatial scenarios currently being explored for the emerging Greater Cambridge Local Plan, which are:

1. Densification of existing urban areas
2. Edge of Cambridge – outside the Green Belt
3. Edge of Cambridge – Green Belt
4. Dispersal – new settlements
5. Dispersal – villages
6. Public transport corridors
7. Supporting a high-tech corridor by integrating homes and jobs
8. Expanding a growth area around transport nodes

A table for each scenario showing the growth levels and broad locations is provided at Appendix B.

1.3 Infrastructure considerations

This is a high-level report, assessing in broad terms the infrastructure required to support growth at these eight spatial scenarios. The categories of infrastructure considered are transport, social and community, green infrastructure, sport and leisure, and utilities. In Section 2 of this report we consider the requirements for each type and the related issues. The levels of growth described for each scenario are tested in terms of the infrastructure likely to be generated in general terms; we do not at this stage to consider site-specific issues.

In order to inform GCSPS’s strategic thinking, this report also considers in broad terms where there may be significant infrastructure constraints and opportunities, focusing on broad risks associated with specific types of infrastructure, and whether some of the strategic options may be better able to support infrastructure delivery than others.

To ensure conciseness, our approach has been to report by exception rather than exhaustively. For this reason, we focus on the scenarios and infrastructure which generate non-linear requirements and less on for example on some social infrastructure types where the infrastructure needs are proportionate to the scale of growth being considered.

In this report we set out the method used and general issues before considering the infrastructure implications of the spatial options.

1.4 Growth level options

The three growth level options tested through this report are:

- Minimum – Standard Method homes-led

- Medium – central scenario employment-led
- Maximum – higher employment-led

The approach taken to determining growth aspirations under each scenario is summarised below.

The **minimum growth option** is based on the standard method, which is the minimum level of growth the councils should be planning for according to national policy. This was determined to be 1,743 homes per annum as of 2020, or 36,603 in total to 2041¹. *However, changes to the Standard Method are currently being consulted on. For information using the new method, the figure reduces to 1,518 homes per annum or 31,878 in total to 2041.*

The **medium** and **maximum options** both exceed the number of homes prescribed by the standard method, but reflect the higher than anticipated economic growth that has occurred in recent years. This has been incorporated into analysis led by GL Hearn, which has produced a range of employment forecasts and land use requirements. The Greater Cambridge Housing and Employment Relationships Report translates these into housing growth figures.

Housing numbers, for medium and maximum options, are therefore tied to economic growth forecasts. The **medium option** is based upon the lower end of the range and assumes a continuation of 2011 Census commuting patterns. However, the **maximum option** assumes that housing demand generated by the higher level of job growth is provided for within the Greater Cambridge area, rather than assuming in-commuting from neighbouring districts (referred to by GCSPS as a ‘consume own smoke scenario’).

Employment land can generate critical infrastructure needs, most obviously transport and utilities related. Business occupiers need to be able to access road or rail networks quickly and easily and to have adequate supplies of power and telecoms. There is a significant level of employment land supply identified through the Employment Land Review. As much of this has planning permission infrastructure has largely been accounted for in these existing commitments. While this report looks at general locations for growth, in the absence of firm employment allocations we do not consider this issue further and this will be addressed in more detail in the final IDP once a preferred option and sites are identified.

The growth levels are set out below:

Table 1: Growth options 2020-41 (rounded to the nearest hundred)

| Greater Cambridge | Minimum | Medium | Maximum |
|---------------------|---------|--------|---------|
| Employment (jobs) | 45,800 | 58,500 | 79,500 |
| Housing (dwellings) | 36,700 | 42,000 | 57,000 |

¹ For information changes to the Standard Method are currently being consulted on and using the new method, the figure reduces to 1,518 homes per annum or 31,878 in total to 2041. We do not refer to this again because anticipated further changes may yield a different number.

To ensure an adequate buffer and to provide flexibility within the supply, these growth figures have been increased by 10%. GCSPS have then offset these figures against the existing pipeline of supply including planning permissions, allocations and a windfall allowance.

1.5 Delivery rates

GCSPS have used different delivery rate assumptions in the medium and maximum growth options in order to make the focused spatial options deliverable. This means that the medium and maximum growth options are not comparable. Using higher delivery rates in the maximum option results in additional delivery within the plan period and consequently fewer sites are required and are built out quicker.

The table below shows the number of homes to be provided in the plan period by each of the growth options.

Table 2: Housing growth options, 2020-41 (with buffer, supply, additional delivery and balance to find)

| | Minimum | Medium | Maximum |
|-----------------------------|---------|--------|---------|
| Growth + 10% buffer | 40,300 | 46,200 | 62,700 |
| Supply (including windfall) | 36,400 | 36,400 | 36,400 |
| Additional delivery | - | - | 8,600 |
| Balance to find | 3,900 | 9,800 | 17,700 |

GCSPS have commissioned a Housing Delivery Study which will consider past rates of delivery as well as anticipated delivery timescales, rates and assumptions for future delivery. This evidence will be used to develop the Greater Cambridge Local Plan and is likely to have implications for the growth options and scenarios currently being explored.

The spatial scenarios set out broad supply areas to meet the needs from 2020-2041. This is the focus of this report. In addition, GCSPS also identify the total ‘all-time’ growth that will be delivered when all the sites associated with the scenarios have been fully built out i.e. extending beyond the plan period.

The ‘all-time’ figures vary considerably for each of the scenarios and growth levels. This is because it depends on the number of large sites required in each scenario and the rate of delivery. The ‘all-time’ figures are highest where the scenario includes North East Cambridge (NEC), Cambridge Airport (also known as Cambridge East) and any new settlements because they are expected to take longer to build out, especially in the medium scenario which is based

on historic delivery rates. In general, the trends and issues identified for development to 2041 will be more extreme under the 'all-time' figures.

While it is important for GCSPS to consider the total 'all-time' delivery, this is less relevant to the IDP, which is primarily concerned with setting trigger points for the delivery of necessary infrastructure over the plan period to 2041.

This report only considers the 'all time' figures when there is something specific to say, and not in every case. This is because they are the product of the delivery rates and are beyond the plan period, are likely to change and may not make a difference. Examples of when the 'all time' figures may be relevant are in instances where contributions may be needed to fund infrastructure such as big ticket transport schemes, and where social, community and leisure facilities such as swimming pools, sports halls may be justified on the basis of the longer term demand.

1.6 Population assumptions

On behalf of GCSPS, GL Hearn have produced population projections associated with the housing figures for each of the minimum, medium and maximum growth options. We have worked out the occupancy rates associated with these options and these are set out in the table below:

Table 3: Homes and population with derived occupancy rates

| | Minimum | Medium | Maximum |
|------------------------------|---------|--------|---------|
| Homes | 36,603 | 41,915 | 56,935 |
| Population | 73,943 | 87,982 | 127,545 |
| Persons/dwelling (occupancy) | 2.02 | 2.099 | 2.24 |

Although GCSPS has increased the provision of homes by 10%, there is no associated population with these numbers. However, using the same occupancy rates, we can attribute an indicative population to these homes. In all calculations that are based on population we have used these occupancy rates to identify the likely population. This is specifically the case for social and community infrastructure, green infrastructure, and sport and leisure where the standards have been applied using the following information.

Table 4: Homes and population, using the GL Hearn occupancy rates

| | Minimum | Medium | Maximum |
|--|---------|--------|---------|
| Homes + 10% buffer | 40,263 | 46,106 | 62,629 |
| Total population (using same occupancy rate) | 81,332 | 96,777 | 140,288 |
| Balance to find (homes) | 3,900 | 9,800 | 17,700 |
| Balance to find (population) | 7,878 | 20,570 | 39,648 |

2 Method and general infrastructure issues

In the sections below we demonstrate how we have approached the assessment of scenarios for each of the key infrastructure topics. Where there are findings applicable to all scenarios these are also included.

The IDP will ultimately identify the additional infrastructure that will be required to support the planned level of growth and the chosen spatial strategy, and that work will need to consider the existing 'baseline' position and all infrastructure already in the pipeline, effectively 'netting' existing and committed capacity off from the 'balance to find'. This is particularly relevant because the existing suite of development plan documents remains relatively recent and allocates a significant amount and distribution of growth. This report treats that allocated growth as part of the baseline and considers the likely infrastructure requirements from the additional growth set out in potential strategic approach options.

As part of our work on the overall IDP, we are continuing to develop our understanding any surplus capacity or infrastructure deficits and factor that in where we know about infrastructure in the pipeline, most evidently transport schemes, we comment on how they may support certain spatial options, focusing on net additional growth beyond that already set in the adopted development plan.

2.1 Transport infrastructure

The transport issues associated with these scenarios are being considered in detail by Cambridgeshire County Council (CCC) who are undertaking the Transport Study. Consequently, this report only considers the high-level implications on the highway network, walking and cycling and public transport, as well as opportunities for linking employment and housing and risks associated with any significant transport infrastructure projects.

An overview of some of the significant transport infrastructure projects within the Greater Cambridge region, and the status of these projects is provided below, starting with those with the greatest degree of certainty

- Cambourne to Cambridge Better Public Transport Project – this project aims to create a new public transport route that eases congestion, creates sustainable travel choices, connects communities and supports growth. In June 2020, the project was paused to allow a review of the developing proposals against the Cambridgeshire and Peterborough Combined Authority (CPCA) Local Transport Plan. This project remains a priority project for the Greater Cambridge Partnership (GCP).
- Cambridge South station – the new station is proposed to be located adjacent to the Guided Busway and will provide a new transport choice available to patients, visitors and employees when travelling to and from the Cambridge Biomedical Campus. The station will also provide direct access to a range of potential routes on the rail network for those in South Cambridgeshire and better connections across the southern fringe of the city. The Government's budget (March 2020) announced funding to build Cambridge South station. The first round of consultation on the proposals was completed early 2020 with the second round scheduled in late 2020.

- A10 improvements – the A10 is subject to two projects, the CPCA's A10 dualling and the GCP's Waterbeach to Cambridge Better Public Transport project. The CPCA has consulted on the options for dualling the A10 and submitted a strategic outline business case in August 2020. GCP's consultation on the options for improving public transport to Waterbeach closed in August 2020 with an Options Appraisal Report to be presented to the GCP Executive Board in October.
- Cambridge South East Transport – this project aims to provide better public transport, walking and cycling options for those who travel in the A1307 and A1301 area, improving journey times and linking communities and employment sites in the area south east of Cambridge. Following consultation of the Phase 2 proposals, a preferred route and location for a Travel Hub has been agreed. This project is now subject to preparation of a full EIA for its next stage.

Two major transport infrastructure projects are being promoted but remain aspirational. They do however have the potential to play an important role in supporting the maximum levels of growth in the area being testing by GCSPS:

- The Cambridge Autonomous Metro (CAM) – the vision for the CAM being promoted by the CPCA is for a metro-style network that connects key settlements, employment sites and growth areas across the Greater Cambridge region with the Cambridge railway stations and Cambridge city centre. A consultation for need and benefits of CAM as well as the city tunnel sections was completed in early 2020. An Outline Business Case is expected in late 2020.
- East West Rail – the East West Rail project aims to creating a new direct connection between Oxford and Cambridge with the first services expected to start running by the end of 2024. Construction of the western section phase 1 has been completed with a start made on enabling works for phase 2. The preferred option for the central section has been announced which links existing stations in Bedford and Cambridge with communities in Cambourne and the area north of Sandy and south of St Neots.

It is more than likely that transport infrastructure that is specific to a spatial option will be required in addition to the transport infrastructure that is planned and/or committed in the Greater Cambridge region.

2.2 Social and community infrastructure

Social and community infrastructure covers a broad range of infrastructure types, with diverse delivery agencies and standards for assessing need.

In the sections below, we briefly assess what some of the widely used requirements for different forms of social and community infrastructure might mean for the different scenarios.

We have applied relevant standards to the scenarios to determine requirements for the most substantial infrastructure categories (in terms of cost). These are for primary and secondary education, primary healthcare, community facilities and libraries.

Some caveats are set out below. The standards adopted here are generic and, while applicable at the time of writing, could be superseded by new policies and approaches. The means of

assessing provision at a strategic level, using global estimates, will not produce the same results as a more nuanced spatially-focused exercise which will be used within the IDP.

Primary and secondary education

Age-specific population estimates are used to determine the education requirements as Forms of Entry (FE), which can then inform requirements for new or expanded schools. CCC uses the following child population yield estimates per 100 dwellings as a basis for strategic planning:

- 30-40 children aged 4-10 (Primary)
- 18-25 children aged 11-16 (Secondary)

The balance of affordable housing, and the dwelling size mix have important implications for calculating child yields. For example, a spatial option that prioritises intensification and has might therefore have a greater proportion of smaller dwellings, may produce a lower child yield than a more dispersed spatial option with a higher proportion of larger dwellings. In the absence of a detailed tenure mix, it is CCC policy to base child yield assumptions on the top end of the range; we have adopted the same approach and therefore our findings are likely to be conservative by potentially overestimating of child yields. It is also relevant to note we have not made any adjustments for pupils that would attend private school. All the standards used are set out in the tables at Appendix C.

The number of FE in schools varies. At primary level it is common for schools to be two or three FE. There is greater variation in secondary school sizes but tend to be much larger – between six and 10 FE – and consolidated on much larger land holdings. This makes planning for new secondary schools, particularly within settlements, highly challenging due to the difficulty of assembling the land and the high costs.

It is expected that there will be some surplus capacity in the existing education infrastructure which can meet some school place demand; this will need to be analysed in the IDP on a school-by-school basis with reference to catchment areas and the location of future growth. It may also be the case that, once any spare capacity has been used, the CCC will explore the expansion of existing school sites to take on more pupils, which will reduce the burden and expense of new schools outright. This could be relevant to the Minimum scenario particularly, where the case for a new secondary school, with demand for less than 6FE, may be marginal.

The Medium and Maximum scenarios are more likely to require new secondary schools. The challenge thereafter is planning for the right level of provision in the right locations based on the spatial option.

Table 5 below summarises the headline requirements for primary and secondary education which are reported for the total growth figures. The spatial distribution of these requirements is shown in the more detailed tables in Appendix D.

Table 5: Primary and secondary education high-level requirements based on growth 2020-41

| | Minimum | Medium | Maximum |
|----------------------------|---------|--------|---------|
| Number of pupils (Primary) | 1,560 | 3,920 | 7,080 |

| | Minimum | Medium | Maximum |
|------------------------------|---------|--------|---------|
| Number of pupils (Secondary) | 975 | 2,450 | 4,425 |
| Number of FE (Primary) | 7.4 | 18.7 | 33.7 |
| Number of FE (Secondary) | 5.4 | 13.6 | 24.6 |

As part of this report, we have not looked at any existing surplus capacity within schools. While there may be some capacity in primary schools, because the catchment areas for primary schools are relatively local and between 1-3FE, it is the location of that capacity that is most relevant in determining whether it could go to offsetting some the requirements identified above. This is not the case with secondary schools which are larger, typically 6FE, and serve much wider catchments. It may therefore be the case that some of the requirements above may be met in existing provision or in committed provision. For example, CCC are in the advanced stages of planning a new secondary school in north-west Cambridge that is programmed to open in 2023. This will serve the Darwin Green development and others in north-west Cambridge.

The IDP work will look at the capacity of the existing and pipeline provision for both secondary and primary schools to assess if growth would result in additional need. This will take account of whether commitments like the new secondary school in north-west Cambridge will be meeting growth already allocated in the adopted development or whether some places will be catering to the new growth being tested here. However, based on average child yields, even if there are places available, it is likely that the higher growth options for a number of the spatial scenarios is likely to result in further requirement for secondary schools. As land hungry uses, any such requirements will have to carefully factored into a preferred option, particularly given a number of scenarios are focused on intensive growth where finding such sites in the right locations to meet needs could be challenging.

Primary healthcare

Primary healthcare here refers to GP surgeries, although it can include various out-of-hospital services too. There are no Government guidelines that identify a GP to population ratio, but a commonly used benchmark is one full-time equivalent (FTE) GP to 1,800 new residents based on guidance from the Royal College of General Practitioners to the Department of Health. Further details of the standards used are set out in the tables in Appendix C.

The total requirements are set out below with detailed spatial distribution of the scenarios included in the tables at Appendix D.

Table 6: GP surgeries – high-level requirements based on growth 2020-41

| | Minimum | Medium | Maximum |
|------------------------------|---------|--------|---------|
| FTE GP requirement | 4.4 | 11.4 | 22 |
| Floorspace requirement (sqm) | 919 | 2,400 | 4,626 |

Community facilities and libraries

Community facilities range in scale and use from traditional village halls, to multi-functional community hubs/ meeting spaces. South Cambridgeshire District Council produced a Community Facilities Assessment in 2009, which included an audit of 86 existing community facilities in the borough², and identified a ratio of 111 sqm of community facility floorspace per 1,000 residents. This will need to be reviewed as part of the Greater Cambridge Local Plan work to feed into the final IDP.

We have adopted this as a benchmark for new provision, although it is important to note that South Cambridgeshire is mostly made up of villages, and this floorspace is typically located in village halls. It is more likely that new facilities would be larger, and with a mix of functions. The standards used for community facilities and libraries are set out in Appendix C.

The tables below show the total requirements with detailed spatial distribution of the scenarios included in the tables at Appendix D.

Table 7: Community facilities high-level requirements based on growth 2020-41

| | Minimum | Medium | Maximum |
|------------------------------|---------|--------|---------|
| Floorspace requirement (sqm) | 874 | 2,283 | 4,401 |

Table 8: Libraries high-level requirements based on growth 2020-41

| | Minimum | Medium | Maximum |
|------------------------------|---------|--------|---------|
| Floorspace requirement (sqm) | 236 | 617 | 1,189 |

2.3 Green infrastructure, sports and leisure

Green infrastructure is also provided using a standards-based approach, and an understanding of the baseline position is important. Overall, the provision of sports facilities in the Greater Cambridge area is good; however, some of the existing facilities are ageing. The facilities do not provide sufficient capacity for the current population, and therefore it is critical that new developments provide for new facilities, to meet the demand of an increased population. Key issues facing sports facilities include the need to refurbish or replace ageing facilities (particularly swimming pools and sports halls), optimise and increase capacity of sports facilities on education sites and reduce reliance on these, the need to develop new sports halls, swimming pools (which are overcapacity) and health and fitness facilities, develop provision for cycling, walking and running and informal activities.

² We are awaiting updated information relating to community facilities within Cambridge City

For the purpose of this assessment it is assumed that the current policy position will remain, in that new development will be expected to provide open space, sport and recreation facilities to the existing standards and using the average occupancy rates set out above. These are set out below and in more detail in Table 13 and 14 at Appendix C.

- Area required to provide for outdoor sports and open space (including allotments)
- The number of new sports halls which would be justified
- The number of new swimming pools which would be justified

In terms of swimming pool provision, none of the scenarios would generate sufficient demand for a new swimming pool up to 2041, although there are plans to create new swimming pools at some of the existing planned new settlements. However in some scenarios (1, 2, 4, 6, 7 and 8) a new swimming pool would be justified in the long term based on the 'all-time' figures. In these scenarios for the medium and maximum growth options, a phased approach to provision could be undertaken and it could be provided in the relevant part of Cambridge City to serve the need of these new development areas.

These standards have been applied to the growth levels for the different scenarios. The resulting requirements are set out in the table below and in detail for each scenario at Appendix D.

Table 9: Open space, sports halls and swimming pools high-level requirements based on growth 2020-2041

| | Minimum | Medium | Maximum |
|--------------------|-------------------|-------------------|---------------------|
| Outside space (ha) | Between 25 and 32 | Between 65 and 84 | Between 127 and 162 |
| Sports halls | 0.6 | 1.6 | 3 |
| Swimming pools | 0.2 | 0.4 | 0.8 |

In considering how to apply open space standards and best meet local needs, there may be opportunities to use land more intensively but still achieving the necessary quality of provision e.g. through provision of artificial pitches rather than solely grass pitches. This approach and others are discussed in Section 4.3.

Greater Cambridge is rich in nationally important biodiversity assets, including Eversden & Wimpole Woods SAC, a significant amount of fenland habitat in the northern part of the area, and a total of 42 SSSI designations. Generally the more spatially dispersed options (Scenario 4, 5, 6, 7 and 8) and those including new settlements have the potential to affect SSSIs, although it is not possible to say exactly which will be affected at this stage or to what extent.

Critically though for understanding the high-level infrastructure implications, it means that offsetting green infrastructure, such as suitable alternative natural greenspace (SANG), may be required; conversely, scenarios which comprise growth from these protected locations are less likely to require such mitigating infrastructure. However, because the scenarios being reviewed

remain high-level and do not themselves have any physical boundaries, it is not possible to provide any specific findings at this stage.

Due to the nature of green infrastructure, the requirements will be influenced by the location of the growth, and the green infrastructure assets in proximity to that growth. LUC has been commissioned separately to prepare a green infrastructure opportunities assessment which is ongoing. As with other infrastructure implications considered in this report, the findings in relation to green infrastructure are at a high level.

2.4 Utilities

As part of the testing, a high-level utility review has considered the following:

- Possible risk of existing utility constraints.
- Ease of connections to existing utility networks for new supplies.
- Capacity / reinforcement risks on existing utility networks.

In all scenarios there may be existing utility infrastructure that crosses the sites, which would require diverting or protecting to enable any anticipated growth without constraint. Because reinforcement works can be very expensive and have long lead-in times, these will be considered in more detail when the preferred scenario is identified to ensure they are properly considered and included in the IDP.

Water resources

Water resources, supply and wastewater treatment are important utility infrastructure issues; these will be covered in detail by the forthcoming Greater Cambridge Integrated Water Management Study but in advance of that an interim report (October 2020) has been prepared which considers the GCSPS spatial options.

Water resources constraints are more dependent on the quantum rather than the location of the development. In time, the different growth scenarios will all exceed current planned water demand, with the maximum exceeding by the mid-2020s, the medium by late 2020s and the minimum in the early 2030s. While in the longer term i.e. by 2035, it is anticipated that the Lincolnshire water supply reservoir will be operational and will bolster supply, this will not in place early enough to address the supply constraints that will emerge for the medium and maximum options. There is scope to mitigate this under the medium option through investment early in AMP8 (2025-30); however, the high growth option presents significantly more challenges as investment would be required within the next five years i.e. AMP7, where the budget has already been set and does not make any such provisions. Alternative funding sources would therefore have to be identified to address this issue.

In terms of wastewater, there are some existing capacity constraints which may impact on the delivery rates envisaged within particularly the higher growth options if they are not resolved in a timely fashion. This includes specific impacts on some scenarios which are dependent on the relocation of the Cambridge water recycling centre as part of the NEC site, as well as potentially impacting on the higher delivery rates assumed in the maximum growth option.

Power

Capacity on the electricity network in the area is a key issue, and the CPIER report identified challenges in meeting the anticipated growth figures. This is due to capacity constraints on UKPN's electricity network up to 132kV which require grid reinforcement³. This has triggered a potential option for transition to smart grids where individuals buy and sell energy from local grid systems that are not connected to the National Grid.

This is confirmed by the more recent Local Network Analysis undertaken for GCP⁴ that explores the issues associated with the existing committed growth and identifies problems such as in North West Cambridge, where the University has not been able to switch on its Combined Heat and Power Unit until more capacity is provided. The report concludes that there is significant level of new demand for electricity for which there is no planned infrastructure to meet this requirement. However, the report examines possible strategic interventions that could reduce the risks, and these will need to be considered further if solutions are to be provided in a coherent and timely manner. Given the existing constraints and infrastructure reinforcements required to deliver existing committed growth, additional growth will have an increasing burden. Consequently, it is likely that all growth options, particularly the maximum growth option, will lead to considerable additional demand for electricity that poses a significant challenge to provide with associated risks to delivery and viability, although this is likely to be one of timing and financing of solutions rather than acting as an absolute constraint.

In terms of the geographical implications we know there are five 132kV grid substations all of which have capacity issues, with Histon having no capacity and Arbury and Burwell having enough capacity for a smaller development, and Fulbourn and Melbourne having too low a capacity for any future development. Histon requires significant reinforcement for existing residential commitments in the north-west, including Cambourne and Bourn Airfield as well as NEC going forward, and any additional growth in this area, as proposed in Scenarios (1, 2, 6 7 and 8). In terms of economic growth there is a constraint due to the capacity of the Fulbourn substation. This has implications for development in the southern fringe, and potentially for the southern cluster Scenario 7.

There are some predicted changes to utility usage over the plan period which need to be considered. We provide a general commentary on these below.

³ Note - the higher kV is managed by National Grid

⁴ Research undertaken by GCP

Electric vehicle charging

In July 2019, the Government published a consultation document on electric vehicle (EV) charging in Residential and Non-Residential Buildings. The aim of the consultation was to provide proposals to alter existing residential and non-residential Building Regulations to include EV infrastructure requirements. The consultation document includes a recommended requirement of a 7kW EV charge-point (EVCP) for every new residential dwelling with an associated parking space. For every non-residential building with more than 10 parking spaces, the recommended requirement is for a 7kW EV charge-point for every 1 in 5 car parking spaces.

This will increase the load requirement for proposed developments, which may trigger reinforcement on developments that, without EV charging, would not have required reinforcement on the networks.

With technology moving forward, the load requirement per EV charging point may increase; however, it is difficult to predict when and to what capacity. Therefore, at this stage it is reasonable to assume that 7kW points will be provided to all new developments.

Heating and hot water supply – gas versus electricity

With the UK's target to bring all greenhouse gas emissions to net zero by 2050 there is a push to reduce the use of fossil fuels in households. The gap between carbon emission factors for gas and electricity has been shrinking such that the carbon emission factor for electricity will soon be lower than gas. In addition to striving to use more energy efficient and renewable technologies across the UK it is therefore likely that electricity will become more common as a source for heating and hot water to buildings. This, in addition to EV charging, will result in a significant increase to the electrical loads across developments.

Incorporating 5G

The big four mobile network operators (EE, O2, Three and Vodafone) are currently upgrading their networks for 5G. Focus is currently on the larger cities across the UK, which doesn't include Cambridge at this stage. However, consideration may need to be given to making sites 5G ready.

5G runs at higher frequencies than 4G, such that more antenna will be required at the mast, as well as smaller antenna being located at regular locations around sites to enable consistent distribution, for example on streetlights. 5G waves are more susceptible to objects, which can completely block 5G waves, including trees and buildings, so antenna should be located in areas where they have a free route to another antenna.

2.5 Site-specific challenges

We know that there will be additional hurdles, such as decontamination to overcome in the delivery of large brownfield sites such as North East Cambridge and the Airport. While we know this will require the removal of the wastewater treatment works, there may also be other yet unknown, challenges to be overcome with brownfield sites that may have financial implications as well as low completion rates in the early years.

3 Spatial scenarios

In this section we review the high-level infrastructure requirements generated by each spatial scenario at the three potential levels of growth. Before commenting on the specifics of each option, we first make some overarching comments on the patterns of growth which form part of the different options:

- **Densification and intensification (scenario 1):** this brings opportunities in terms of sustainable transport and proximity to existing employment and services; however, the scope for expanding existing infrastructure to cope with increased demand is more challenging. This is particularly for the case for land-hungry uses such as primary substations and secondary schools which must be provided on scarce and therefore costly sites. Additionally, there may be reduced developer contributions available to pay for infrastructure because of the abnormal costs of derisking/remediating sites for development.
- **Edge of city expansion (scenarios 2, 3, 7, 8):** there are clear advantages with this approach to growth in terms of providing greatest opportunity to connect into or extend existing networks (transport, power, digital etc.). It also offers scope to use edge of city developments to bolster infrastructure provision for existing underserved residents as well as catering to new population, for example adding critical mass to make new public transport links more viable or allow greater frequency of service.
- **New settlements⁵ (scenarios 4, 6, 7, 8):** this approach has advantages in terms of allowing all infrastructure needs to be planned in from the outset. Further, new settlements can be planned to at the scale needed to provide the critical mass for infrastructure to be used more efficiently and sustainably by reducing the need to travel. However, this does present the challenge of high upfront costs, as well as slow delivery in early years as homes and other growth depends on infrastructure being in place.
- **Dispersed growth (scenarios 5, 6):** while this approach offer greater scope to incorporate green and blue infrastructure, it presents challenges in terms of needing proportionately more transport, social and utilities infrastructure in the form of either upgrading existing networks or adding new parts to the network in more places than a more focused settlement-specific approach. For larger infrastructure items, such as secondary education where a significant population is needed to generate demand, it is likely that there will be spin-off impacts on the transport network as a greater share of new population are forced to travel longer distances to larger settlements where these demands are likely to be met.

⁵ This typology could be treated interchangeably with large-scale urban extensions i.e. while the scenarios we have tested have referred to 'new settlements', it is possible that these new settlements are very significantly expanded existing places which will require wholesale new infrastructure to support growth

3.1 Spatial scenario 1: focus on densification of existing urban areas

This option focuses new homes within Cambridge, the main sources of supply are the brownfield site at North East Cambridge (NEC) and development within the urban area which would meet the minimum needs.

To meet the medium growth figures density would increase in the urban area and additional sites including Cambridge Airport and a site/broad location in the green belt would be required.

To meet the maximum growth figures development within the urban area and at NEC and Cambridge Airport would be developed at higher densities and delivery rates.

Transport infrastructure

In general, the minimum level of growth could be supported through existing, planned and identified transport infrastructure. For medium growth further corridor improvements in walking, cycling and public transport prioritisation would be necessary to achieve an uplift in numbers in the urban area. The transport evidence is currently examining what infrastructure will be needed to support growth but the current indications are that to achieve the maximum growth numbers big-ticket items, such as the CAM, for which the cost estimates are in region £3.7 to £4.5bn⁶, or an alternative would be required.

There is limited opportunity to improve highway infrastructure within the existing urban area. Junction and corridor improvements have potential to support housing growth; however, CCC are increasing the emphasis on sustainable transport infrastructure through implementation of a trip budget on number on new trips generated at NEC AAP. It is likely that significant investment in sustainable transport infrastructure (which supports all modes of travel) will be required if the same approach is used for Cambridge Airport.

A review of parking infrastructure and a policy stance towards low parking ratios / car-free development in sustainable locations would be required. Lower levels of car ownership in new development would reduce pressure on transport infrastructure within the urban area. This would need to be supported by increased walking, cycling and public transport provision.

Densification of the urban area would encourage trips by walking / cycling due to the proximity to existing services and facilities. Therefore, footways and cycleway infrastructure will be needed to provide a high-quality walking and cycling environment. Densification would also result in a release of brownfield sites within the city and make use of previously developed land. Infrastructure should be provided which increases permeability for walking and cycling in the urban area.

Opportunities to improve walking and cycling infrastructure, such as widening of footways, implementing cycleways, bicycle traffic signals, bridges etc. should be explored. While reducing travel demand and encouraging sustainable travel must be prioritised, there will also be a need

⁶ Source: SOBC

to improve highways infrastructure to enhance road safety and reduce congestion on the network. This could be through pinch point improvements. However, this must not incentivise car travel over sustainable modes.

This approach would be reliant on enhancing public transport corridors (bus lanes) within the city as well as facilitating easy access to Cambridge North station for NEC.

The two existing stations (Cambridge and Cambridge North) and the one planned at Cambridge South should accommodate demand from housing growth. Infrastructure to improve access to these facilities should be explored. The same is true of East West Rail; if this scheme were to be delivered and funding secured from central Government, it will be important to factor in the last mile (and last five mile) connecting infrastructure that will be needed to make the new and improved stations accessible to growth in those locations.

If the CAM were to be delivered, any housing growth planned would have to factor in the CAM infrastructure needs (both by safeguarding space for the route and to contribute to costs).

Social and community infrastructure

Densification is likely to result in disparate development across the urban area that would have an incremental impact on existing social and community facilities. Given that existing infrastructure Cambridge City is working at or beyond capacity, extra development is likely to have a detrimentally impact on existing facilities. However, because of the spread of development across the urban area, there may be an issue of lack of critical mass or sites to deliver new facilities and the focus is therefore likely to be placed on extensions to existing facilities, but this may not always be possible. A coordinated approach to delivery of new infrastructure is required to ensure that necessary facilities are provided within easy reach of the new population.

The large sites of NEC and the Airport would be expected to provide social and community infrastructure on site in line with standards. However, much of this is expected to continue to be delivered beyond 2041. Consequently, the trigger points to provide these in line with the development trajectory will be important and will need to be considered in more detail in the final IDP. An indication of the facilities required resulting from the development and population associated with this scenario is set out in Appendix D.

Green infrastructure, sports and leisure

The Regulation 18 consultation draft of the NEC AAP sets out that the whole area encompasses 182ha. The requirement for outdoor sport and open space to meet the maximum growth option would be approximately a third of the total area. This is unlikely to be achievable under traditional provision methods and so alternative approaches to provision which are off-site or more land efficient are likely to be required (as summarised in paragraph 4.3).

Development at the areas identified within this scenario would result in increased recreational pressure on surrounding green infrastructure assets such as Milton Park, Chesterton Fen, Coldham Common and the River Cam corridor, and the need for off-site provision or new ways of delivery (as suggested in the overarching comments above). Pressure on these assets would be increased by the delivery of sites within and to the east of Cambridge such as the Airport, due to proximity.

Green infrastructure opportunities which could be supported as a result of this scenario include increasing connectivity to the River Cam Corridor, Chesterton Fen and Milton Park, enhancement of the Cherry Hinton Brook corridor and enhancement / expansion of local nature reserves at Stourbridge Common, Coldhams Common, Norman Cement pits/Hystor open space, Cherry Hinton East Pit, Nine Wells LNR Extension, Coe Fen/Sheep's Green and Byron's Pool.

Appendix D shows specifically what is likely to be required. In terms of sports halls, the minimum growth scenario would fail to create sufficient demand for a new facility, which is likely to increase pressure on existing facilities, expansion and improvement of which may be challenging. The medium and maximum scenarios would justify new sports hall provision.

Utilities

In existing urban areas, with the likely large number of domestic and commercial areas all requiring utility connections, the existing utility infrastructure will be located underground along roads adjacent to the proposed site boundaries.

In Cambridge city, due to the limitation of space to run utility infrastructure, it is common to have existing utility infrastructure located underground within site boundaries in areas that are clear of buildings. Depending on the nature of these existing utility constraints, they will either require diverting to allow any future masterplan to be realised without constraint, or they may be too strategic to divert, in which case protection measures may be required and any masterplans would need to consider and incorporate the existing utility constraints.

This scenario, because it is premised on intensifying use, will give rise to greater flood risks because development plots are likely to be smaller and therefore offer fewer opportunities for mitigation measures within blue-green infrastructure, flood risk reduction and water recycling systems. There could be some opportunities to explore a more comprehensive approach to managing flood risk which also seeks to resolve existing issues; however, the challenge to this will be funding this approach i.e. existing development cannot be obliged to contribute within the current planning regime.

Growth through this scenario is conditional on the relocation of the Cambridge WRC works, not only for land, but also because of limitations in the capacity of waste-water treatment. The new WRC works will have significantly more capacity than the existing facility. Various options for telecommunications providers may be available in Cambridge, due to the higher density of domestic and commercial properties. This would allow for a wider range, and potentially more competitive range, of options for connection to the sites.

Since Cambridge is a high-density area, capacity on existing local networks is likely to be at a maximum, with little to no available capacity for future developments. As such, there is a risk that reinforcement to the local network, and possibly the wider network, may be required to accommodate new load requirements from proposed developments.

3.2 Spatial scenario 2: focus on edge of Cambridge: outside Green Belt

This option focuses new homes in extensions on the edge of Cambridge at Cambridge Airport. NEC and one village site are required to make up the balance to meet the minimum growth figure.

To meet the medium growth figure there needs to be additional development of two smaller new settlements on public transport corridors and growth at a range of rural centres and minor rural centres outside the Green Belt.

To meet the maximum growth figures, the Airport will come forward at higher delivery rates, together with NEC and two new settlements (one smaller, one large) on public transport corridors also at increased delivery rates.

Transport infrastructure

All comments on transport infrastructure for Scenario 1 are relevant to Scenario 2. With the difference in these two scenarios related to housing growth at new settlements on public transport corridors, improvements and provision of public transport infrastructure is key to this scenario. For the medium and maximum growth options, infrastructure improvements are required to achieve sustainable new settlements that have links to jobs and Cambridge City.

While there will be a heavy reliance on public transport Infrastructure for this scenario, highways infrastructure demands must not be neglected. Journey times to work and leisure for public transport should be more attractive than those made by car; however, for that to be the case, there will still need to be investment on the highway infrastructure to overcome potential pinch points along public transport corridors.

It is expected that local amenities and some job growth will be planned within the new settlements. Walking and cycling infrastructure will need to be provided to a good standard to ensure those trips which are internal to the new settlement are undertaken by sustainable transport. This infrastructure will be required early on so that the new settlement is sustainable in transport terms.

Key to the success of this scenario is the reliability, frequency and cost of the public transport system.

Social and community infrastructure

It is expected that the two large sites of NEC and the Airport, as well as the new settlements in the maximum option, will provide adequate on-site social and community infrastructure in line with existing standards. Given that these large sites will continue to be developed beyond 2041 provision of adequate facilities in a timely manner and in line with the housing growth will need to be carefully managed through appropriate trigger points within the trajectory.

Some village growth is anticipated in the minimum option, although this is too small to warrant its own new facilities the capacity of existing provision will need to be considered and appropriate contribution made in the locality. Considerably more village growth is envisaged in

the medium option which will need to properly address social and community provision at an early stage in the process. The issue that this raises that has scale threshold implications, is that relatively modest incremental growth spread thinly does not generate the critical mass to justify social and community infrastructure. An indication of the facilities required resulting from the development and population associated with this scenario is set out in Appendix D.

Green infrastructure, sports and leisure

The minimum and medium growth options will result in growth at NEC and the Airport which will result in a requirement for the provision of a significant amount of outdoor sport and/or open space. While within the plan period we think it is feasible to accommodate the scale of provision needed to meet the extant standards within these sites using typical forms of provision (such as open areas featuring grass pitches, play provision, because some of these sites are anticipated to continue delivering beyond the plan period, it is still likely that a more innovative/intensive approach to provision will be needed.

The areas proposed for development under this scenario would result in increased pressure on surrounding green infrastructure assets such as Milton Park, Chesterton Fen, Coldhams Common and the River Cam corridor. Focusing solely on the plan period, because fewer units are envisaged there would be less pressure than forecast under Scenario 1 but looking over the longer term to completion of these sites, in effect the pressure is the same.

The maximum option will lead to a land requirement for outdoor sport and open space within the NEC area comprising approximately a third of its total area. This is unlikely to be achievable under traditional provision methods and so alternative approaches to provision which are off-site or more land efficient are likely to be required (as summarised in paragraph 4.3).

Development at the areas identified within this scenario would result in increased recreational pressure on the existing green infrastructure assets, and the need for off-site provision or new ways of delivery (as summarised in paragraph 4.3). However, given the lower level of growth within Cambridge, this pressure would be slightly less than that likely to result from Scenario 1.

A new settlement would need to provide sufficient open space and sports facilities to meet its own needs.

Appendix D shows specifically what is likely to be required. Only the medium and maximum options would justify the provision of new sports halls within the plan period, one in the eastern part of Cambridge and one in the new settlement. However, based on the 'all-time' figures, new sports halls would be justified at all growth locations

Utilities

Areas on the edge of Cambridge, including Cambridge Airport and NEC, are likely to be surrounded by residential estates and/or industrial estates. Therefore, it is likely that the surrounding areas will be well served by the utility networks, albeit additional capacity may be required.

Given the locations of the sites it is likely that existing utility infrastructure would be located within proximity to the proposed site boundary, which should allow for suitable nearby connections from existing utility networks to supply the future development. However, any new settlement location may be more isolated and not well served by the existing utility networks requiring longer connections and the considerations set out in relation to Scenario 4 are relevant.

Available capacity on existing local utility networks may not be as limited as urban areas; however, available capacity may be minimal, such that it can only support the first few properties. As such, it is likely that reinforcement to the local network, and possibly the wider network, will be required, with all the caveats that are set out in Scenario 1.

Because this scenario is based on the assumption that development will come forward on larger sites than under scenario 1, there is greater scope to incorporate blue-green infrastructure, flood risk reduction and water resilient recycling systems into growth and so offset flood risks.

3.3 Spatial scenario 3: focus on edge of Cambridge: Green Belt

This option focuses new homes in extensions on the edge of the city and will involve the release of green belt land. To meet the minimum need three sites/broad locations would be required.

To meet the medium growth figures, five edge of Cambridge sites/broad locations would be required together with additional limited development within the Cambridge urban area.

To meet the maximum growth figures, five edge of Cambridge sites/broad locations are required all to be delivered at high delivery rates.

Transport infrastructure

While it is likely that existing and planned infrastructure could support the minimum growth levels, a comprehensive Transport Strategy will be required for the broad locations envisaged in the medium and maximum options to provide viable linkages to jobs and Cambridge city centre. This could need considerable new infrastructure depending on their location particularly if they are to facilitate the maximum growth levels.

- Local junction improvements are expected to be required. There is the opportunity to include strategic link roads within/around the sites that are selected.
- Depending on the location, it is expected that existing local amenities will be within walking and cycling distance of the sites. Therefore, improvements to existing infrastructure as well as new connections will be required. Growth will need to be supported by either extension of Citi bus services and infrastructure or new dedicated services. Sites located close to existing and planned railway stations will require high-quality access routes to these facilities. All sites will need to be cognisant of the CAM in terms of safeguarding and its potential infrastructure requirements.

That said, for those sites located close to existing employment areas, there is scope to reduce infrastructure needs by encouraging more sustainable travel.

Social and community infrastructure

It is difficult to identify any specific implications for this scenario because it is assumed that any new Green Belt development would provide adequate on site social and community infrastructure in line with the existing standards.

However, there may be an issue of scale and lack of critical mass generated within the locations to deliver new facilities as part of the development. This would mean that capacity of existing local facilities will need to be considered and how adequate provision is best provided. An indication of the facilities required resulting from the development and population associated with this scenario is set out in Appendix D.

Green infrastructure, sports and leisure

At this strategic, rather than site specific, stage potential locations encircle Cambridge and do not suggest a single direction or location of growth. Focusing development to the Cambridge City area is likely to place pressure on the local green infrastructure assets and sports facilities. This development strategy could lead to efficiencies of development form given that open space and sports pitches are not considered inappropriate within Green Belt. However, it would still be recommended to integrate green infrastructure into the built form of the development to ensure habitat connectivity and other green infrastructure benefits such as urban cooling and provision of a more attractive development / public realm.

The tables at Appendix D show specifically what is likely to be required for sports halls, swimming pools and outside space. The quantum of development under the medium and maximum options (but not minimum) would justify the provision of new sports halls. These could also benefit Cambridge residents. Provision of green infrastructure as part of new development is also assumed, but the specific land-take required and form of this will depend on more detailed assessment once greater detail is available about the location and amount of development proposed.

Utilities

It is possible that being Green Belt, areas of land identified may not be well served by the utility networks. In addition, existing utility infrastructure constraints may exist across the sites, particularly larger strategic utility infrastructure, which may require diverting or protecting in order for the masterplan to be realised without constraint.

If existing utilities infrastructure is not located adjacent to the site longer offsite connections may be required. There are likely to be similar capacity and reinforcement issues on the existing local utility network as those identified in Scenario 2. While flood risk and therefore any potential mitigation is dependent on the specific sites taken forward, there are significant existing fluvial and surface water flood risks which may constrain development delivery or increase the cost of infrastructure on the edge of Cambridge within the Green Belt.

3.4 Spatial scenario 4: focus on new settlements

This option establishes new towns and villages providing homes, jobs and associated infrastructure. To meet the minimum need two smaller settlements of 4,500 homes on public transport corridors are required.

To meet the medium growth figures two larger new settlements and one smaller new settlement are required on public transport corridors and a further smaller new settlement on the road network.

To meet maximum growth figures the same as the medium scenario is required but delivered at higher delivery rates.

Transport infrastructure

Significant new infrastructure is required for all modes in this scenario and for all growth options. Depending on where the new settlements are located, the highways infrastructure from these locations to Cambridge will require improvement ranging from junction improvements to new links, all of which will have associated high costs. For example, the Cambourne to Cambridge Better Public Transport Project alone is estimated to cost £160m.

The funding for the C2C project will be supported by the City Deal. However, the GCP is seeking to recover an appropriate proportion of the cost from local developer contributions. Nevertheless, growth located on existing or planned corridors will likely have a lower cost associated with transport infrastructure than growth that is located in areas which require new and dedicated infrastructure.

It is expected that local amenities and some job growth will be planned within the new settlements. Walking and cycling infrastructure will need to be provided to a good standard to ensure those trips which are internal to the new settlement are undertaken by sustainable transport.

Significant transport infrastructure will be required to ensure that public transport is an attractive alternative to the car for journeys to and from employment, leisure and education.

Social and community infrastructure

It is assumed that all new settlements would provide all necessary social and community infrastructure as part of the development. The issue will be ensuring that these large sites that will continue to be developed beyond 2041 provide adequate facilities in a timely manner and in line with the housing growth. This should be carefully managed through appropriate trigger points within the trajectory. An indication of the facilities required resulting from the development and population associated with this scenario is set out in Appendix D.

In broad terms, using CCC current standards, a new settlement or urban extension in the order of 4,500 homes would trigger the need for a new 6FE secondary school. Therefore,

indicatively this scenario implies at new secondary schools would be needed in even the minimum option, as well as proportionately more and potentially expanded 8FE⁷ schools under the medium and maximum options. Note though that this does not take account of any existing surplus capacity and the location of that surplus capacity relative to the new settlements which might reduce the scale of requirement.

Green infrastructure, sports and leisure

It is assumed that all new settlements would be planned in a manner so as to provide sufficient open space and sports facilities as an integral part of their form and design. This is also assumed for green infrastructure, but the specific land-take required and form of this will depend on more detailed assessment once greater detail is available about the location and amount of development proposed.

Appendix D shows specifically what is likely to be required. The medium and maximum growth options would justify the provision of new sports halls and it would be anticipated these are provided within the new settlement.

Utilities

On the assumption that a new settlement would be located in a fairly rural area, there is a high possibility that the area is not well served by the existing utility networks.

As outlined above, existing utilities infrastructure may not be located near to sites, and longer offsite connections may be required.

There may also be limitations as to the type of utility networks available. For example, there may be a water main located within the area, but it may be too small to connect to with a longer connection required to the nearest suitably sized mains. It is also recommended to consider the strength of mobile phone signal and mobile data signal in the area. If low, consideration would need to be given as to applying for a new mast in the area.

There are likely to be similar capacity and reinforcement issues on the existing local utility network as those identified in Scenario 2 and 3.

With regard to flood risk, it is expected that because site selection will have to comply with the sequential test that growth will come forward on areas of low or medium flood risk where any risks can be mitigated/managed. Dependent on exact locations, new settlements may also provide an opportunity to incorporate on-site attenuation which would have the dual role of reducing downstream flood risks.

⁷ Indicatively needing 5,760 new homes to generate sufficient pupil yield

4 Spatial scenario 5: focus on dispersal: villages

This option spreads new homes to the villages. To meet the minimum, medium and maximum need growth will be distributed as follows:

- 40% at rural centres
- 40% at minor rural centres
- 17% at group villages
- 3% at infill villages

Transport infrastructure

As with the previous scenario significant new infrastructure required for all modes in this scenario and for all growth options. However, the dispersal of growth into numerous smaller developments will be much less able to support the funding of major new infrastructure.

Highways infrastructure improvements along routes from villages to Cambridge and employment areas will be required to accommodate existing reliance on travelling by car in these areas. This could include but not limited to junction improvement and village bypasses.

New local amenities and some job growth will be required within existing villages to increase sustainability. If this is planned, walking and cycling infrastructure will need to be improved to ensure those trips which are internal to the existing village are undertaken by sustainable transport.

Significant investment is required in public transport infrastructure to make viable alternatives to car. There is the opportunity to increase usage of existing train stations within villages, and this may require improving and increasing platforms.

Social and community infrastructure

This option disperses growth across the rural area with more development weighted towards the higher order settlements. The key issue will be understanding the existing capacity of social and community facilities and whether these are able to accommodate additional growth or if not, how they are best able to facilitate the requirements of the additional population.

The risk with this scenario is that the critical mass is not achieved to provide new facilities and consequently there is an adverse impact on existing facilities, or alternatively more travel is created for example as children are bussed to school elsewhere. There is also the danger that the current situation is likely to be exacerbated with more people living in locations where they are less able to access facilities. There are potential inefficiencies of dispersing the growth which leads to increased travel to higher order settlements to access a wider range of facilities. An indication of the facilities required resulting from the development and population associated with this scenario is set out in Appendix D.

Green infrastructure, sports and leisure

While distributing the development across South Cambridgeshire has the potential to dilute the potential pressure on green infrastructure and open space assets compared to a more urban-focused approach, it should be noted that several of the rural centres and minor rural centres are in close proximity to SSSIs. This may result in the need for offsetting infrastructure such as SANGs.

The likely scale of growth across the villages means that the current thresholds for open space provision are unlikely to be met and only informal provision and a local equipped area of play would be provided. It is probable that the higher levels of development could help to expand and improve the provision at the rural centres and minor rural centres, which would in turn decrease the distance travelled to access sport and open space. This said, the provision here is likely to be based on the needs of the rural centre or minor rural centre itself and may not take into account the needs of the surrounding settlements.

Appendix D shows specifically what is likely to be required. For sports halls it is unlikely that this scenario would provide sufficient critical mass to create significant new centres and contributions would most likely be taken for off-site provision rather than construction of new ones. Given the need to demonstrate a clear link between development and planning contributions under the s106 regime, this may result in achieving less funding for sports and recreation than would be possible with a more urban-focused approach – unless a contributions strategy is created to provide for this, which may be controversial and difficult to implement, and subject to the final distribution.

The result of this is that it is likely that this scenario is likely to generally exacerbate the current situation with regard to open space and sports provision. Specifically, it is likely that more people will be living in locations where they are less able to access sport and open space. To do so, people will need to travel to other settlements higher up the hierarchy to access a wider range of facilities. While this scenario may result in greater provision being closer to the more rural villages than at present, that provision would most likely be based on the needs of growth within that village and may not take into account the growth needs of the surrounding villages.

Utilities

It is assumed that any expansion would occur on the outskirts of rural villages, such that the nearby area may be partly served by the existing utility networks, with the likelihood that existing infrastructure may need to be extended from the village.

As outlined above existing utilities infrastructure may need to be extended from the village, i.e. there may not be a direct connection from an adjacent road. Consideration may need to be given to traffic management and timescales if infrastructure requires extending from the village centre.

The considerations about the limitations of the type of utility networks available, particularly water and telecommunications as set out in Scenario 4 are also relevant here. There are likely to be similar capacity and reinforcement issues on the existing local utility network as those identified in Scenario 2, 3 and 4.

With regard to flooding, there are constraints imposed by the extent of existing fluvial and surface water flood risks which may mean specific sites are challenging to deliver. However, there may be opportunities within sites to incorporate on-site attenuation within larger sites which would have the wider benefit of reducing flood risks downstream.

4.1 Spatial scenario 6: focus on public transport corridors

This option focuses homes along public transport corridors around transport hubs. The supply to meet the minimum needs are NEC, a small new settlement on a public transport corridor, and the balance spread across 18 villages sited along existing or proposed public transport corridors.

To meet the medium growth figures NEC, and a large new settlement of 9,000 homes on a public transport corridor is required, with the balance again spread across the 18 villages.

To meet the maximum growth figures the distribution is the same as medium except all delivered at higher delivery rates.

Transport infrastructure

While it is likely that existing and planned infrastructure could support the minimum growth levels, capacity enhancements will be required to deliver the medium growth option and big-ticket items such as the CAM required to realise the maximum levels.

High-quality public transport infrastructure would reduce car dependency, providing that the public transport nodes are within walking or cycling distance of new homes.

Existing walking and cycling infrastructure will need to be improved to provide links from new homes to public transport nodes.

Depending on the public transport corridor, infrastructure improvements are likely to be required to improve services, frequency and reliability.

Social and community infrastructure

The social and community infrastructure requirements required on NEC and in a new settlement are expected to come forward on site as part of the development. As with Scenario 1 and 4 any development that extends beyond 2041 will need to provide adequate facilities in a timely manner and in line with the housing growth. This should be carefully managed through appropriate trigger points within the trajectory.

There is an additional village element that is significant in the medium option and slightly less so in the maximum option. For the village growth there may be an issue with achieving critical mass at any of the villages and reaching the necessary thresholds required to provide new facilities on site.

Similar to Scenario 5 there are issues about the capacity of existing facilities and their ability to cater for the new population as well as the potential inefficiencies of dispersing the growth

which leads to increased travel to access a wider range of facilities. An indication of the facilities required resulting from the development and population associated with this scenario is set out in Appendix D.

Green infrastructure, sports and leisure

It is assumed that a new settlement would be planned in a manner so as to provide sufficient open space and sports facilities to meet its needs. The maximum growth option will lead to a land requirement for outdoor sport and recreation within the NEC area comprising approximately a third of its total area. This is unlikely to be achievable under traditional provision methods and so alternative approaches to provision which are off-site or more land efficient are likely to be required (as summarised in paragraph 4.3).

Having said this, due to the lower anticipated provision of units (this scenario proposes no growth in the city and less growth at the airport under the minimum growth scenario only), this pressure would not be as great as experienced under Scenario 1..

The other growth is distributed to nodes on public transport networks, and similar to scenario 5, whilst this is likely to expand the provision of open space and sports facilities locally, this growth is not likely to be sufficient to justify any new sports halls due to insufficient critical mass (with the exception of NEC which could support a sports hall under the maximum growth option, and in respect of the 'all-time' figures). This is likely to increase pressure on existing facilities and localised improvements to facilities may not be appropriate under the s106 regime. This is likely to exacerbate the current situation where people need to travel to access a wider range of sport and open space facilities compared to a more urban-focused approach.

The tables at Appendix D show specifically what is likely to be needed for sports halls, swimming pools and outdoor space. This scenario would not justify the provision of a new swimming pool in any location by 2041, but would in the all-time medium and maximum options, although there is unlikely to be sufficient critical mass at any one location to clearly define the location of such new facilities. Provision within Cambridge may be difficult to justify as this is not necessarily close to the new population so would have transport implications.

Provision of green infrastructure as part of new development is also assumed, but the specific land-take required and form of this will depend on more detailed assessment once greater detail is available about the location and amount of development proposed.

Utilities

This option combines a number of locations and sites already considered above. It includes NEC which is considered under Scenario 1 and 2, new settlements considered under Scenario 4 and some growth at villages considered under Scenario 5. The same issues are relevant here.

4.2 Spatial scenario 7: supporting a high-tech corridor by integrating homes and jobs (southern cluster)

This option focuses new homes close to existing and committed jobs around the south of Cambridge. The additional sources of supply to make up the balance to meet the minimum needs are one smaller new settlement of 4,500 homes on a public transport corridor within the

southern cluster and the balance equally distributed between the five villages in the core southern cluster and also on a public transport corridor.

To meet medium growth figures the distribution is as above with further villages included that are within the Southern Cluster but not in public transport corridors.

To meet the maximum growth figures one large new settlement of 9,000 homes on a public transport corridor in the south is required with less growth spread equally across the five southern villages. This option then adds the Airport and NEC to make up the numbers all of which are provided at higher delivery rates⁸.

Transport infrastructure

This scenario will be impacted by the findings from the A505 study about what transport infrastructure improvements are required for all modes.

The opportunity exists of placing homes close to jobs that will increase propensity for residents to walk and cycle. This must be matched with dedicated walking and cycling infrastructure, as well as public transport infrastructure from existing and new settlements to the surrounding employment hubs.

Social and community infrastructure

We expect that any new settlements would provide all necessary social and community infrastructure as part of those developments. Similar to Scenario 4, these sites will continue to be developed beyond 2041 and should provide adequate facilities in a timely manner and in line with the housing growth. This should be carefully managed through appropriate trigger points within the trajectory.

Similar to Scenario 5 there are issues about the capacity of existing facilities and their ability to cater for the new population as well as the potential dangers of dispersing the growth which leads to increased travel to access a wider range of facilities. This is particularly the case where small levels of growth are directed to the lower order villages. However, in the medium option, that seeks to provide approx. 5,110 homes to five villages, there may be more opportunity to concentrate a greater level of development and provide social and community facilities on site. Any new provision should complement existing provision and capacity at the villages. The maximum option adds sites in the north, which have been discussed in Scenario 1 and 2. An indication of the facilities required resulting from the development and population associated with this scenario is set out in Appendix D.

Green infrastructure, sports and leisure

All three growth options propose a new settlement to the south. It is assumed that a new settlement would be planned in a manner so as to provide sufficient open space, sports facilities and green infrastructure to meet its needs.

The distribution of growth within villages is likely to lead to similar trends identified in relation to Scenario 5, in that whilst this is likely to expand the provision of open space and sports facilities locally, this growth is not likely to be sufficient to justify any new sports halls or swimming pools due to insufficient critical mass (even though new sport halls would be justified by the overall total). This will increase pressure on existing facilities and is likely to exacerbate the current situation where people need to travel to access a wider range of sport and open space facilities compared to a more urban focused approach. It may be more difficult to secure sports and open space improvements from this type of development pattern unless a specific s106 strategy is developed. Provision of green infrastructure as part of new development is also assumed, but the specific land-take required and form of this will depend on more detailed assessment once greater detail is available about the location and amount of development proposed.

The tables at Appendix D show specifically what is likely to be required. The maximum option will lead to a significant land requirement for outdoor sport and open space within the NEC area and at the Airport site, and similar to scenario 1. However, given the reduced level of growth within Cambridge, this pressure would be slightly less.

Utilities

The question here is how closely new residential development will be located to commercial properties, and if they are in close proximity it is likely that the future development sites would be fairly well served by the existing utility networks serving the existing commercial properties.

As outlined above, existing utility infrastructure will likely be serving the existing commercial properties, such that any new connections may either be direct from an adjacent road or may require extending from nearby the commercial properties to the new development sites.

There are likely to be similar capacity and reinforcement issues on the existing local utility network as those identified in Scenario 2, 3, 4, 5 and 6.

4.3 Spatial scenario 8: Expanding a growth area around transport nodes

This option focuses homes at Cambourne: along the A428 public transport corridor that is due to be served by a new East West Rail station and the CAM. To meet the minimum needs Cambourne will be expanded by equivalent of a small new settlement (4,500 total), and the balance spread across three villages on the A428.

To meet medium growth figures a further four minor rural centres/group villages within 5km of Cambourne are required. In addition, NEC will also be developed.

⁸ It is not entirely clear how this option still retains a southern cluster focus with the northern sites included – it appears to become more of a hybrid concentrating on the north/south corridor when delivering the maximum growth levels.

To meet the maximum growth figures there will be greater expansion of Cambourne by the equivalent of a larger new settlement (9,000 total) together with growth spread across three villages on A428, one Minor Rural Centre and three Group villages within 5km of Cambourne all at higher delivery rates. In addition, Cambridge Airport and NEC are required at higher delivery rates.

Transport infrastructure

This scenario is reliant on the planned A428 scheme as well as new infrastructure for the new settlement. In addition, capacity enhancements to support the higher medium and maximum growth levels are likely to be required. These are likely to result in significant transport infrastructure costs and reliance on East West Rail and CAM.

Further, there is a risk that housing growth may be delayed by any delay in programme for the East West Rail and CAM. If the benefits of this major infrastructure are not realised, there will be an impact of local highways infrastructure due to creation on car reliant settlements.

Social and community infrastructure

The focus on Cambourne should mean that future social and community infrastructure can benefit from the current growth that is proposed and being delivered. There are opportunities to expand and increase current and expected provision and ensure that any new settlements fully meet the needs of the new population.

As with Scenario 7 the medium scenario envisages substantial growth at villages, this time providing approx. 1,000 homes at the three villages on the A428. This could provide the opportunity to deliver social and community facilities on site and any new provision should complement existing provision and capacity at the villages.

The medium option adds NEC, and the maximum option also includes Cambridge Airport, which have been discussed in Scenario 1 and 2. An indication of the facilities required resulting from the development and population associated with this scenario is set out in Appendix D.

Green infrastructure, sports and leisure

Development at Cambourne is likely to increase pressure on the existing green infrastructure and open space; however, it is assumed that development here would be planned so as to provide for policy requirements in relation to green infrastructure, open space, sport and recreation, as has generally been the case to date.

There is potential for impacts on SSSIs and ecological designations of local importance arising from development along the A428; while sensitive distribution may be able to avoid these, it is possible that in infrastructure terms, there will be a need for offsetting green infrastructure such as SANGs. The provision of development to villages along the A428 is considered likely to result in expanded and improved facilities for open space and outdoor sports, which may help to increase access for those in surrounding villages.

The tables at Appendix D show specifically what is likely to be required in relation to sports halls, swimming pools and outdoor space. None of the growth options would be sufficient to justify the provision of a new sports hall or swimming pool within the plan period within any one site, up to 2041. This will lead to increased pressure on existing facilities, and as set out in comments on the other scenarios, unless a tariff approach is adopted, this may result in less land value uplift being captured for sports and open space.

Based on the 'all-time' figures, a sports hall could be justified at NEC (medium and maximum growth options) and the Airport (maximum growth option only) and at Cambourne (maximum option). Although the maximum growth option comprises enough development to justify a new swimming pool, it may be difficult to achieve this given that no particular area would generate such need in itself. It may be appropriate to locate a new pool in the eastern part of Cambridge given that most of the new demand would arise in this location

The maximum growth option (and to a lesser extent the medium option) could allow for support to various green infrastructure projects such as increasing connectivity to the River Cam Corridor, Chesterton Fen and Milton Park, enhancement of the Cherry Hinton Brook corridor and enhancement / expansion of local nature reserves at Stourbridge Common, Coldhams Common, Norman Cement pits/Hystor open space, Cherry Hinton East Pit, Nine Wells LNR Extension, Coe Fen/Sheep's Green and Byron's Pool.

Utilities

Depending on the location of the new developments along the A428, the sites may not be well served by the existing utility networks. However, for any sites near to Cambourne or another village along the A428, these areas could be well served by the existing utility networks. However, as outlined in relation to previous scenarios, existing utilities infrastructure may not be located near to growth sites, and longer offsite connections may be required.

The considerations about the limitations of the type of utility networks available, particularly water and telecommunications as set out in Scenario 4 and 5 are also relevant here. There are likely to be similar capacity and reinforcement issues on the existing local utility network as those identified in Scenarios 2, 3, 4, 5, 6 and 7.

Specifically in relation to Cambourne, there are significant wastewater treatment capacity constraints which would need to be resolved to support growth in this area. The issue is not insurmountable but initial indications are that it could be technically challenging and/or costly.

5 Conclusions

At the beginning of Section 3 we set out the key issues arising from the different types and scales of growth. In this section, we draw this together by main infrastructure item and then in the context of the eight different spatial scenarios.

5.1 Transport infrastructure

The minimum growth figures in most of the scenarios can be supported through the substantial investment planned in the transport infrastructure associated with existing planned growth. However, it is likely that scenario specific additional transport infrastructure will be required. In general, locating homes close to jobs give the best chance to improve walking and cycling potential and this should be a key priority.

The maximum growth levels to 2041 and beyond, together with the associated higher delivery rates, will require significant investment in transport infrastructure items, as well as other projects related to the potential Green Belt sites and new settlements. There is currently uncertainty about the delivery of these items, and this will need to be achieved if these growth levels and scenarios are pursued. The transport infrastructure costs required for each growth scenario would depend on whether growth is located to benefit from existing schemes, or if there is a need for new standalone transport infrastructure.

It is essential that all the dispersal scenarios, together with Scenario 3, provide viable linkages to jobs in and around Cambridge. For all growth levels, the village dispersal Scenario 5 would require new transport infrastructure for all modes to make sustainable communities. The funding required by numerous smaller developments, with differing completion schedules, would pose difficulties and affect deliverability of the required significant transport infrastructure.

Scenario 7 explicitly seeks to locate homes where there is a large concentration of jobs south of Cambridge. However, it will still require new transport infrastructure to link new homes to Cambridge, potentially via the Cambridge south east transport scheme. Scenario 8 would likely require significant investment in public transport. Transport modeling would need to test if highway improvements are required for the A428. The potential impact of a new railway station would also need to be assessed, and the amount of growth needed to support this. For both the maximum and medium options, capacity enhancements to existing transport infrastructure are likely to be required to realise further growth around Cambourne.

5.2 Social and community infrastructure

Social and community infrastructure requirements are directly related to population growth and consequently the higher growth options generate the need for a considerable number of new educational, primary health care, community and library facilities to be provided. Our calculations indicate the need for between 7-34 new primary school forms of entry, 5-25 secondary forms of entry, 4-22 new full time equivalent GPs with between 920-4,600 sqm of new primary healthcare floorspace as well as between 870-4,400 sqm of community facilities and 130-1,200 sqm of library provision.

It is assumed that the scenarios that include large new development sites, such as NEC Cambridge, Cambridge Airport and new settlements will be better able to provide these community facilities on-site as part of the development. As there is likely to be more certainty about the delivery of these facilities where they are to be provided on site as part of a large scale planned new growth area. Conversely, these larger new settlements may struggle to access school places in existing schools, meaning delivery of places at new schools will need to take place in an early phase of the settlement's development.

The densification and rural dispersal scenarios (1 and 5) rely on the spare capacity of existing facilities, which in most cases does not exist. Therefore, there is a risk that there will be a detrimental impact on existing facilities. In addition, delivery is less certain because the distribution of growth may not be able to generate the critical mass to provide new facilities in the right locations easily accessible to the population that need them. This may also lead to increased travel to access a wider range of facilities.

5.3 Green infrastructure, sports and leisure

The maximum level options generate significant requirement for open space and sports provision, which in terms of the outdoor provision, will be very challenging to deliver the full 'space requirement' in compliance with the standards. This is due to the high numbers of people and also the high-density development assumptions. As such, to achieve the maximum scenarios, a radically different way of delivering and using open space is likely to be required. This will need to focus on maximising the use of any such provision and in particular land area used, which is challenging given the competing demands and expectations of multifunctionality. Achieving this may result in some compartmentalisation of uses; for example, provision of artificial sports pitches, sports pitches within buildings on multiple levels and provision of more naturalised green space on roofs and three-dimensional parks (i.e. provided in above or below ground structures). Such provision could be co-located with other types of community infrastructure such as nurseries, schools, and other civic functions.

This said, it would still be recommended to provide significant amounts of green infrastructure at ground level as this can better link into existing green infrastructure assets. Designing development around multifunctional corridors, for example routes which provide for motorised transport, walking and cycling, drainage and ecological connectivity, with pocket park areas – rather than the traditional road highways corridors – may be a solution to help achieve this. Indeed, many of the planning documents for Greater Cambridge promote a similar approach, although this is likely to need to be expanded further. Provision of green infrastructure, open space and sports provision in this manner is likely to result in proportionately greater costs than the traditional methods, which may affect viability. It is also likely that provision off site will be required, which could, for example, involve focusing green infrastructure improvements to important nature sites which are not necessarily near to development locations.

Whilst the above applies to the maximum growth options, the principles could also be applied to the minimum and medium options in specific locations where high growth is proposed, such as in Cambridge City under the medium growth option of scenario 1.

Any new provision of green infrastructure and open space should be supported by clear ownership and transfer arrangements, access rights, governance and management processes to ensure its effectiveness for the population in the long term.

The significant growth proposed under these scenarios may also result in loss of existing habitat and habitat fragmentation, due to the physical impact of development. It is important that development is designed to consider the current habitat networks which are found within a site and how impacts on these can be mitigated, taking account of the need to secure net gain and to double nature.

All scenarios result in a significant amount of growth in the Greater Cambridge area, which will result in increased pressure on water resources. This is a significant issue which would also affect green infrastructure assets. This is addressed in detail in the Greater Cambridge Integrated Water Management Study.

5.4 Utilities

The more rural options for development (Scenarios 4, 5 & 6, 7 and 8) will need to consider the availability of connecting to existing networks, looking at possibilities of longer offsite connections and lead in times for reinforcement works required. For these sites, it is recommended that location of the nearest existing utility infrastructure should be considered at an early stage, as this can impact both project cost and programme, and can make a location unviable. Until we have specific sites to consider, the generic consideration of rural options can only point out that there may be some existing capacity to draw on, The main consideration is that the rural options will inevitably be lower density and more dispersed, which compared to the urban options offer far less opportunities for economies of scale / concentration and will therefore be more expensive and require more land.

In both rural and urban areas, existing utility infrastructure could pose a constraint to the site. Smaller infrastructure will likely be able to be diverted, but strategic infrastructure could pose a significant constraint to a site. It is recommended that as soon as any areas of land are identified that an existing utility constraints review is undertaken to establish whether the land would be viable for development.

Across the country at present, utility networks are increasingly heading towards maximum capacity. With the introduction of EV charging requirements and the phasing out of gas-fired heating and hot water, there is a higher risk of reinforcement being required on the networks in order to supply new developments. The risk of reinforcement can affect both project cost and programme and should be highlighted at the early stages of every development. Our review indicates all the spatial options would be served by electricity substations with capacity issues, but, in our view, this is primary concern is around managing timely delivery potentially through forward funding rather than acting as an absolute constraint. An early review of sub-station capacity will be necessary once the spatial strategy is agreed.

Our analysis of water issues has flagged a number of constraints around wastewater treatment which need to be factored in when considering the scenarios and options: firstly in terms of the timing of relocating the WRC from NEC which may impact on delivery rates for the higher growth options and secondly in relation to Scenario 6 which focuses growth around Cambourne which is an area where the existing WRC will need to be bolstered.

In relation to water supply, we identified a key concern around the higher growth options (medium and maximum) where the timescale for the delivery of long-term improvements is nearly a decade too late, if growth were to be realised in line with the maximum growth option. For the medium growth option, we think that this disconnect is manageable with quite significant

interventions; however, the time lag on the maximum of option is such that even these interventions are unlikely to be sufficient.

5.5 Summary

We understand that the GCSPS will use our high-level findings as one of many considerations in selecting or further developing a scenario which will form the preferred option in the emerging plan. While we recommend that this report is read as a whole, particularly having regard to the caveats and issues identified as being common to all scenarios set out in Section 2, the following summarises our findings on the various scenarios:

1. **Focus on densification of existing urban areas:** this scenario offers opportunity through the existing network of infrastructure in place, and the much greater opportunities for economies of scale. However, we think much of Cambridge's infrastructure is at or close to capacity and therefore given general space limitations across the City the challenge is in terms of providing the necessary incremental infrastructure improvements. Less of a concern are the standalone brownfield development sites at the NEC (all growth levels) and Cambridge Airport (medium and maximum growth) as it is expected that master-planning can ensure that appropriate facilities are provided. Although there are likely to be additional issues associated with brownfield sites, such as decontamination, existing traffic levels and congestion, and removal of the wastewater treatment works at NEC.
2. **Focus on edge of Cambridge: outside Green Belt:** this is likely to require new infrastructure to support growth, including decontamination of brownfield land; this may mean that the cost profile of development is weighted to the early part of the plan period and could present financing issues and also that completions remain low in early years.
3. **Focus on edge of Cambridge: within the Green Belt:** as with Scenario 2, we anticipate similar cost profiling and slow delivery issues. However, in addition to Scenario 2, we expect that the transport costs associated with delivering public transport improvements will be greater given the reduced connection with existing urban areas.
4. **Focus on new settlements:** all levels of growth focus development on enhanced public transport corridors; this has benefits in terms of ensuring more sustainable development, particularly in the higher growth options which come with greater critical mass. Depending on the distribution of growth adopted, this could provide the necessary critical mass around new transport nodes required to fund those improvements. However, as identified above, there are high upfront costs as much of the infrastructure will be needed in advance or very early in the build-out. All these issues add substantially to costs.
5. **Focus on dispersal: villages:** this scenario will place burdens on existing infrastructure; combined with a dispersed pattern of development, this means that the proportionate cost of infrastructure is likely to be greater as it is used less intensively or generates the need to travel to remote infrastructure.
6. **Focus on public transport corridors:** the distribution of growth along public transport corridors which may mean that development can contribute to paying for new public transport infrastructure. However, the distribution of the balance of growth beyond the one new settlement risks giving rise to the inefficiencies identified in Scenario 5, particularly in relation to social, green and sport and leisure infrastructure.
7. **Supporting a high-tech corridor by integrating homes and jobs (southern cluster):** apart from under the minimum level of growth, this scenario results in dispersed growth across the area, including outside main public transport corridors which might result in a greater infrastructure cost burden. The maximum growth level would mitigate this risk to

some extent due to the large scale of the new settlement proposed which provides scope for critical mass and efficiencies.

8. **Expanding a growth area around transport nodes:** focusing growth at Cambourne is likely to tie development to the delivery of large-scale transport infrastructure; delays to the

delivery of that infrastructure which may be outside the control of the constituent authorities could act as a brake on development.

Appendix A IDP scoping report



Scoping Report

Greater Cambridge Infrastructure Delivery Plans

On behalf of **Greater Cambridge Shared Planning Authority**



Document Control Sheet

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1 Introduction

1.1.1 This Scoping Report has been written by Stantec UK (Stantec) with LUC for the Greater Cambridgeshire Planning Service (GCPS). It outlines the infrastructure topics to be included within each of two Infrastructure Delivery Plans (IDP), to inform the development of the North East Cambridge Area Action Plan (NEC AAP) and the Greater Cambridge Local Plan (GCLP).

1.1.2 The intention of this report is to confirm our approach to the study. We aim to use parts of this report in the final product. So that we can efficiently move to the final report without reworking text, we have written this report in the past tense. Please make necessary allowances when reviewing this scoping report.

1.1.3 For each topic, we have summarised relevant considerations and key data inputs that have been included to ensure we have sufficient information to reach evidenced conclusions on infrastructure requirements, costs, funding and delivery mechanisms. Viability consultants have been appointed separately and we will work with them to integrate the findings and explore the relevant delivery mechanism to secure contributions from development to deliver the required infrastructure.

1.1.4 This follows consultation with technical experts within GCSP on document requirements, building upon Table 1 of Stantec/LUC's response to tender document. This consultation is integral to building consensus and bridging any gaps in information.

1.1.5 The NEC AAP and GCLP IDPs share many of the same information requirements. However, these are at different stages of preparation, with the NEC AAP further advanced. This means we have less information for the GCLP, which is reflected in the programming for that study. Their current positions are outlined in the sections below.

1.2 North East Cambridge Area Action Plan

1.2.1 GCSP is leading planning for the comprehensive, mixed-use regeneration of the north east fringe of Cambridge through the NEC AAP. The NEC AAP area, shown in Figure 1.1, is located in the north-eastern edge of the city within Cambridge City and South Cambridgeshire local authority areas, abutting the A14 on its northern boundary. The eastern part of the area contains the Saint Johns Innovation Centre and the Cambridge Business Park, and the Cambridge Water Recycling Centre, and a number of smaller employment sites. The western part, on the other side of Milton Road, is made up mostly of the Cambridge Science Park (CSP).

1.2.2 Plans for regeneration were first consulted on in 2014. Consultation began again in 2019, where the area was proposed to be expanded to include the intensification plans of CSP, in order to comprehensively address the shared issues of the wider NEC area, particularly regarding transport. For this consultation, GCSP produced the NEC AAP Issues and Options 2019 Report, which identified the key issues, challenges and opportunities facing the area and set out the different options for responding to these. The report underwent consultation in early 2019, accompanied by a number of reports, such as the Interim Sustainability Appraisal, which have gone on to inform the

development of topic papers relevant to the preparation of the IDP, such as Education, Future Mobility, Open Space, and others. Fundamental to the development of the site is the relocation of the water recycling centre, which will be subject to the Development Consent Order process. The timescale for this will need to be kept under review.

1.2.3 A regulation 18 draft version has just been issued with consultation running until 5 October 2020.

1.2.4 The NEC AAP will be a statutory development plan, with an equivalent status to a local plan, or incorporation into the main Greater Cambridge Local Plan. The approach will be kept under review as plan making in Greater Cambridge progresses. Following this refinements will be made before moving towards a proposed submission version

Figure 1.1 NEC area boundary



Source: Draft NEC AAP Consultation Document, 2 June 2020

1.3 Greater Cambridge Local Plan

1.3.1 GCSP are preparing a new Local Plan for the period 2020-2040. This covers Cambridge City and South Cambridgeshire. When adopted, it will replace the current Local Plans, which run from 2011-2031, (adopted 2018).

1.3.2 GCSP carried out an Issues and Options consultation in early 2020 to consider, including, amongst other issues:

- The level of homes and jobs that should be planned for, including whether to plan for more homes than the minimum number required by the standard method;
- different options for growth from densification and the edge of Cambridge to dispersal and public transport corridors.

1.3.3 These are important for the IDP because all these options will have different infrastructure implications and requirements. Following this, GCSP is aiming to produce and consider broad strategic options in Autumn 2020, with subsequent stakeholder engagement. This will be followed by consultation on a preferred options stage in summer 2021.

1.4 Method

1.4.1 Scoping is an important early step in our approach to preparing the IDPs, particularly as it informed the contents of all subsequent tasks, from the baseline survey to the final infrastructure schedule and funding statement.

1.4.2 The method used to prepare the IDPs followed the approach set out below:

- Scoping to confirm the infrastructure types to be included
- Baseline assessment to review existing infrastructure, identify current provision, capacity issues or constraints, and explore future need, plans, timescales, phasing, priority and cost through discussions with infrastructure providers
- Support the testing of growth options for the GCLP through the high-level input of infrastructure issues related to options
- Assessment of the infrastructure requirements, costs, priorities, timescale and phasing of the NEC AAP, followed by the GCLP
- Identification of the costs of each infrastructure project identified, examining who is responsible for delivery, the funding courses and their timing linked to the trajectory
- Infrastructure schedule and Funding Statement

1.5 Limitations and assumptions

1.5.1 In this study we only identify primary infrastructure requirements. This is defined as infrastructure required to accompany development to allow new households and jobs to function within a wider community. This might include transport, social and utilities infrastructure.

1.5.2 We do not consider secondary infrastructure that is defined as infrastructure intended to create accessible, serviced and developable sites. Developers build these costs into their assessment of sites. Secondary infrastructure will typically include internal access roads within sites, and connections to the mains for drainage, sewage, gas, electricity and telecoms. Developers also generally pay for small-scale open and play spaces together with on site and adjacent landscaping, and so this falls within the definition.

1.5.3 For clarification the following categories of infrastructure are excluded from this study:

- Nationally provided infrastructure is generally outside our scope (e.g. courts, prisons).

- Privately owned 'infrastructure' is outside our scope (e.g. petrol stations, pubs, post offices, shops). Costs fall on the private sector, and so are excluded from this assessment.
- Care homes. These are excluded from infrastructure costs. Care homes are part of a quasi-private market in older peoples' residential care. Social care budgets pay for some places, whereas others are privately purchased.
- Adult social care. Mainstream budget allocations work on a per capita basis, so that a growing population will be broadly reflected in rising budgets.

1.5.4 In general, land costs for infrastructure are not included in these calculations. This is because we believe that the inclusion of land costs for infrastructure is likely to make the study less (not more) accurate, for the following reasons.

- When land is needed, its price will vary widely depending on development location and planned use. We cannot be certain what its value at that time and anticipated use is. Land for infrastructure can also sometimes be provided at nil cost, for a variety of reasons.
- In some instances, land is not needed, because infrastructure will be located on land already owned by the organisation or agency involved.

1.6 Caveats

1.6.1 There are a number of caveats that need to be borne in mind:

- Infrastructure providers will need to update the information provided and estimates will need to be refined.
- Service providers are at different stages in their planning process and in the case of the GCLP work is needed to identify specific infrastructure requirements.
- Estimates of infrastructure requirements, costs and finding involve generalisations and assumptions. As a larger area, GCLP in particular with require appropriate generalisations to be applied.
- The infrastructure assessment is not itself a policy document. Information included in it does not override or amend the various agreed/adopted strategies, policies and commitments which local authorities and other infrastructure providers currently have in place.
- We have not formally dealt with demographic changes but have taken current demographic trends into account. There are two demographic issues which need to be borne in mind:
 - The relationship between new housing stock and population
 - The demographic profile of the area, such as age profiles
- Time and budget do not allow us to deal with any changes in these profiles and relationships in future. We have relied on service providers being broadly aware of issues in order to give us a reasonably accurate picture of the infrastructure implications of growth in the area.
- Public services, and hence the infrastructure they demand for delivery, are in a constant state of flux. Policy or technology can change rapidly. Most service

providers do not plan beyond three years, and so cannot by definition be expected to know their precise requirements in, say, 10 years' time.

- Public finances are also uncertain. They may recover at some point, but we are currently unable to predict the extent to which this might take place, or when. This means that public service infrastructure requirements as a result of growth are difficult to predict and are necessarily subject to a margin of error. This is particularly important as we are in the midst of a pandemic that will have significant implications for the worldwide economy.

2 Definitions and scope of topic sections

2.1 Transport

2.1.1 The following transport-related infrastructure types are included in the scope of this study:

- Public transport, including bus, rail and metro, park & ride, park & cycle schemes
- Active transport – walking, cycling, horse riding
- Highways
- Car parking
- Waterways
- Electric vehicle infrastructure
- Hydrogen fuel infrastructure

2.1.2 Transport projects in this growing area with numerous different stakeholders involved in their regulation, planning, funding and delivery are highly complex. This complexity and the need for projects and the contribution to their funding will be explored through liaison with the various stakeholders including Cambridgeshire County Council (CCC), Cambridge and Peterborough Combined Authority (CPCA), and Greater Cambridge Partnership (GCP). Discussion has been undertaken and will be ongoing to clarify and understand the specific projects in both the AAP area and across Greater Cambridge.

2.1.3 The sources of information include:

- North East Cambridge Area Action Plan Transport Evidence Baseⁱ, and Addendum
- Transport Strategy for Cambridge and South Cambridgeshireⁱⁱ
- Long Term Transport Strategyⁱⁱⁱ
- Rights of Way Improvement Plan^{iv}
- Smart Infrastructure Topic Paper: Future Mobility^v
- The Cambridgeshire and Peterborough Local Transport Plan^{vi}

2.2 Education

2.2.1 The education infrastructure we are principally concerned with in this study is that provided by the local education authority (LEA) in respect of primary and secondary levels as defined in the Education Act 1996. Where relevant, the IDP incorporates nursery level and further education provision, including sixth form, as determined by the LEA.

2.2.2 Special educational needs (SEN) school places are also included, and can be provided either as standalone schools or as alongside mainstream provision in local authority-maintained schools. Forecast for this need will need to be determined by CCC.

2.2.3 Requirements for schools are normally measured in Forms of Entry (FE), which are driven by population growth. The demand for local authority-maintained school places can be offset with projected capacity within schools.

2.2.4 The most accurate requirements are therefore determined in consultation with the school place planning team at the relevant local education authority. Local education authorities will generally have other preferences for: the land requirement for different school types; the most efficient number of FE to comprise a new school; acceptable distances for schools with capacity; among others.

2.2.5 We have sought to include any identified infrastructure projects connected with adult skills training and education, and contributions to them, in discussion with CCC and GCSP.

2.2.6 Sources of information therefore include:

- NEC AAP: population estimates for children at each age level, according to each individual site, apportioned across the trajectory period; projected capacity at nearby schools for offsetting
- GCLP: population estimates for children at each age level, according to predetermined zones/planning areas, apportioned across the trajectory period; projected capacity at all local-authority maintained schools according to zone/planning area
- Other sources:
 - Education Topic Paper^{vii}
 - Skills Training and Employment Topic Paper^{viii}
 - Cultural Placemaking Strategy^{ix}
 - Relevant Department for Education guidance

2.3 Healthcare

2.3.1 We are principally concerned with primary healthcare provision within communities. The need for these facilities is determined by the Cambridgeshire & Peterborough NHS Clinical Commissioning Group (CCG). Stakeholder engagement with the CCG is ongoing, currently being carried out in the NEC AAP Health Facilities Sub-group (with a focus on NEC in the first instance).

2.3.2 Healthcare-related services, such as dentists and optometrists, are commercial providers and we have not approached these in the same way. However, we note the growing trend towards the provision of hub-style community health facilities, which incorporate a range of health facilities alongside primary care. Requirements for these will be determined by the CCG based on an assessment of need, and have been incorporated into the IDP where information is available.

2.3.3 NHS trust and foundation trust hospitals contract with local CCGs to provide secondary health services, funded by NHS England. In consultation with the CCG, where appropriate, we have included information on requirements for new hospitals or upgrades to existing as a result of population growth from new development.

2.3.4 The sources of information include:

- NEC AAP: population estimates according to each individual site, apportioned across the trajectory period;
- GCLP: population estimates according to predetermined zones/planning areas, apportioned across the trajectory period; projected capacity at all local-authority maintained schools according to zone/planning area
- Other sources:
 - Health and Wellbeing Topic Paper^x
 - CCG resources and guidance

2.4 Emergency services

2.4.1 The infrastructure types related to the following emergency services has been considered in the scope of the IDPs:

- Police – including stations, community check points, etc.
- Ambulance – infrastructure required as part of hospitals
- Fire brigade – stations and upgrades to fire stations

2.4.2 Little work has been done on these elements as part of the Issues and Options stages of either the NEC AAP or the GCLP. We will use the NEC AAP^{xi} Policy on Social and Community Infrastructure, but principally, we will rely on provider feedback.

2.5 Community facilities

2.5.1 This section focuses on both community facilities, libraries, public art, and cemeteries.

2.5.2 Community facilities are defined broadly in the NPPF; however, our use here refers to the typical range of local authority-maintained social infrastructure, which could include, for example, ‘traditional’ community centres/village halls, faith-based facilities, and libraries. It is common for these to be delivered as multifunctional facilities in a community ‘hub’. The precise contents of a community hub are determined by the provider based on a strategic assessment of need, and so the IDPs will reflect an up to date understanding of this, with as much detail that can be provided.

2.5.3 For the NEC AAP, we have consulted the Community and Cultural Facilities Audit^{xii}, Cultural Placemaking Strategy and Community Centres Strategy.^{xiii} These is the main source of projects, together with the Placemaking Strategy^{xiv} and draft Social and Community infrastructure policy. We have undertaken consultation with the authors of the Community Centres Strategy (at Cambridge City Council), who provided feedback to the Cultural Placemaking Strategy.

2.5.4 Public Art features prominently in the Cultural Placemaking Strategy. Where possible, and where explicitly included in policy we will include identified public art proposals within the public realm, in consultation with the relevant provider.

2.5.5 Cemeteries do not typically fall under the scope of community facilities, however, we have been requested to consider cemeteries following the work undertaken on this subject in the previous IDP. We will use the same approach as previously and have sought feedback from the relevant provider and await advice.

2.6 Open space and green infrastructure

2.6.1 Within the scope of this study, open space comprises: amenity greenspace; country parks; public parks and gardens; natural green space; children’s play areas; and allotments in line with the Cambridge Draft Planning Obligations Strategy Supplementary Planning Document (June 2014), South Cambridgeshire Open Space in New Development SPD (2009) and Natural England GI Standards Pilot (currently being prepared).

2.6.2 Green infrastructure items have been assembled from numerous sources, including: existing ecological designations and areas identified in relation to HRA (for example suitable alternative natural greenspaces AKA ‘SANGS’); masterplan information for strategic allocations; Wildlife Trusts Living Landscapes work; Cambs-Ox Arc Natural Capital work; Doubling Nature key habitat restoration opportunities; the nature partnership biodiversity offsetting strategy; two GI opportunity mapping projects.

2.6.3 Additionally, we have reviewed tree-related strategies and research to ascertain whether any elements of this work can be identified in the IDPs.

2.6.4 Key sources of information include:

- AAP Open Space Topic Paper^{xv}
- AAP Habitat Survey and Biodiversity Enhancement Plan (ongoing)
- Strategic Flood Risk Assessment / NEC AAP FRA 2020 (ongoing)
- Cambridgeshire Green Infrastructure Strategy^{xvi}
- Greater Cambridge Green infrastructure Opportunities Mapping Project^{xvii}
- Draft Sustainability Appraisal^{xviii}
- Draft Habitats Regulations Assessments^{xix}
- Draft Natural England National Green Infrastructure Standards^{xx}
- Mapping Natural Capital and Opportunities for Habitat Creation in Cambridgeshire report^{xxi}
- Greater Cambridge Landscape and GI opportunities mapping^{xxii}
- Wildlife Trust Living Landscapes workstreams
- Local Nature Partnership work e.g. Natural Capital investment plans for the Cambridge – Oxford Arc; Doubling Nature investment plan and identified opportunities; developing with nature toolkit; offsetting strategy (several ongoing)
- Fens for the Future project^{xxiii}
- Cambridge Tree Canopy Project^{xxiv}
- Water Cycle Strategy^{xxv}
- Greater Cambridge Open Space and Recreation Strategy

2.6.5 Related to this topic is cycling and walking – the open spaces / green infrastructure scope will take account of the cycling and walking infrastructure elements contained in the transport section. However, the cost of infrastructure will not be double counted and it is made clear where the cost has been placed.

2.7 Environmental

2.7.1 This section will pick up any specific environmental issues associated with development of sites and projects, including those related to land contamination, air quality management areas, mitigation, odour, noise and others as necessary. Environmental requirements such as decontamination, undergrounding of overhead power lines or other environmental health requirements will be considered on a site specific basis.

2.7.2 This is particularly relevant to the NEC AAP and includes, for example, the A14 noise barrier on this site. We understand discussions are ongoing about how and where this is to be constructed. This may be erected within the boundary of the road, or alternatively on the site which will have different land and design implications, but in all events will need to be paid for as part of the wider site development.

2.8 Sport and leisure

2.8.1 We consider the following types of sports and leisure facilities in the scope of the IDPs:

- Indoor and semi-enclosed sport facilities such as sports halls, or MUGAs
- Outdoor sports pitches, and ancillary buildings
- Sports pitches and grounds

2.8.2 We understand that a full update on the Greater Cambridge Open Space and Recreation Strategy is starting immediately. This will be an important source of information providing an audit of the quality of existing provision and seek to identify how provision will be met more innovatively in future. An update to the Indoor Facilities Audit together with the Planning Pitch strategy will be updated next year using the Sport England matrix.

2.8.3 The sources of information include:

- Playing Pitch Strategy 2015-2031^{xxvi}
- Indoor Sports Facility Strategy 2015 – 2031^{xxvii}
- Cambridge Open Space and Recreation Strategy 2011^{xxviii}
- South Cambridgeshire Recreation and Open Space Study^{xxix}
- NEC AAP Open Space and Sports Pitch Review
- Community and Cultural Facilities Audit 2020^{xxx}
- Swimming Pool Strategy
- Relevant Sports England Guidance

¹ We will seek to include this subject to confirmation of a costs per dwelling rate.

2.9 Utilities

2.9.1 The following utilities are included in the scope of the study:

- Water and waste water
- Electricity
- Gas
- Telecommunications
- Strategic waste provision, especially household recycling centres
- Non-strategic waste provision, including bins, boxes and promotional material¹
- Data infrastructure
- Power generation including renewable energy

2.9.2 We have established the proposed growth in power generation and the requirements in terms of load calculations from the agreed trajectory. As part of this we have considered the nature of economic growth and reciprocating growth of data infrastructure.

2.9.3 Site-specific issues for the NEC AAP include undergrounding overhead power lines which will be specified, costed and timetabled. We have worked with the landowner sub-groups on water potable and waste and electricity to approach the utility providers on a consistent basis. The site-wide energy infrastructure study and energy masterplan is a key document that we are also engaged in and will be delivered in conjunction with this study.

2.9.4 The sources of information include:

- Local Network Analysis (asset utilities)
- Growth in Greater Cambridge Network Expansion Programme^{xxxvi}
- Waste Service Topic Paper^{xxxvii}
- Climate Change Topic Paper^{xxxviii}
- Smart Infrastructure Topic Paper: Digital Infrastructure^{xxxix}
- Net Zero Carbon Study^{xl}
- Site Wide energy and Infrastructure Study and Energy Masterplan^{xli}
- Water Cycle Study, Water Attenuation Assessment and Flood Risk Assessment^{xlii}

- ⁱ North East Cambridge Area Action Plan Evidence Base (Final), Mott Macdonald on behalf of Cambridge County Council, September 2019
- ⁱⁱ Transport Strategy for Cambridge and South Cambridgeshire (Final), Cambridge County Council, March 2014. Web link: <https://www.cambridgeshire.gov.uk/residents/travel-roads-and-parking/transport-plans-and-policies/cambridge-city-and-south-cambs-transport-strategy>
- ⁱⁱⁱ Cambridgeshire Long Term Transport Strategy, Cambridgeshire County Council, July 2015. Web link: <https://www.cambridgeshire.gov.uk/residents/travel-roads-and-parking/transport-plans-and-policies/long-term-transport-strategy>
- ^{iv} Cambridgeshire Rights of Way Improvement Plan, Cambridgeshire County Council, 2006 (updated 2016). Web link: [https://www.cambridgeshire.gov.uk/asset-library/imported-assets/Cambridgeshire_ROWIP_update_April_2016%20\(1\).pdf](https://www.cambridgeshire.gov.uk/asset-library/imported-assets/Cambridgeshire_ROWIP_update_April_2016%20(1).pdf)
- ^v Smart Infrastructure Topic Paper: Future Mobility (Final draft), Greater Cambridge Shared Planning, February 2020
- ^{vi} The Cambridgeshire and Peterborough Local Transport plan June 2019
- ^{vii} Topic Paper: Education (Final), Cambridge County Council, May 2020
- ^{viii} Skills, Training and Local Employment Opportunities Topic Paper (first draft), Greater Cambridge Shared Planning, January 2020
- ^{ix} Cultural Placemaking Strategy: North East Cambridgeshire Area Action Plan Evidence Base, LDA Design, June 2020
- ^x North East Cambridge Area Action Plan - Health, Community and Wellbeing Topic Paper (First draft), Greater Cambridge Shared Planning, March 2020
- ^{xi} North East Cambridge Draft Area Action Plan (Version 2), Greater Cambridge Shared Planning, March 2020
- ^{xii} Community and Cultural Facilities Audit (in progress), Greater Cambridge Shared Planning, no date
- ^{xiii} Community Centres Strategy, Cambridge City Council, 2019
- ^{xiv} Cultural Placemaking Strategy: North East Cambridge Area Action Plan Evidence Base (Final draft), LDA Design, March 2020
- ^{xv} AAP Open Space topic paper (draft), Greater Cambridge Shared Planning Service, ongoing, anticipated completion 2020-21
- ^{xvi} Cambridgeshire Green Infrastructure Strategy (complete), LDA, 2011. Web link: <https://www.cambridge.gov.uk/cambridgeshire-green-infrastructure-strategy>
- ^{xvii} Greater Cambridge Green infrastructure Opportunities Mapping Project (unpublished), LUC, (unpublished but expected to be published Summer 2020)
- ^{xviii} Sustainability Appraisal (draft), LUC, ongoing - several staged reports are available from <https://www.greatercambridgeplanning.org/emerging-plans-and-guidance/greater-cambridge-local-plan/downloads/>
- ^{xix} Habitats Regulations Assessment (draft), LUC, ongoing - the scoping report is available from <https://www.greatercambridgeplanning.org/emerging-plans-and-guidance/greater-cambridge-local-plan/downloads/>
- ^{xx} Natural England National Green Infrastructure Standards project (draft), Natural England and LDA, unpublished.
- ^{xxi} Mapping natural capital and opportunities for habitat creation in Cambridgeshire (complete), Natural Capital Solutions, 2020, <http://www.cpbiodiversity.org.uk/wp-content/uploads/2018/08/Cambridgeshire-habitat-mapping-final-report-FINAL.pdf>
- ^{xxii} Greater Cambridge Landscape and GI opportunities mapping (unpublished), Wildlife Trust, Cambridge Past Present and Future and Cambridge Ahead, unpublished – due to complete October 2020.
- ^{xxiii} Fens for the future project (ongoing), Fens for the Future Partnership, <https://www.fensforthefuture.org.uk/creating-the-future/partner-projects>
- ^{xxiv} Cambridge Tree Canopy Project (ongoing), Cambridge City Council, <https://www.cambridge.gov.uk/cambridge-canopy-project>
- ^{xxv} Water Cycle Strategy, Stantec (ongoing)
- ^{xxvi} The Greater Cambridge Area Encompassing Cambridge City Council & South Cambridgeshire District Council Playing Pitch Strategy 2015-2031 (complete), Cambridge City Council and South Cambridgeshire District Council, 2016, https://www.scambs.gov.uk/media/3455/final_playing_pitch_strategy_2016_rd-csf-190_revised.pdf
- ^{xxvii} Indoor Sports Facility Strategy 2015 – 2031 (complete), Cambridge City Council and South Cambridgeshire District Council, 2016, https://www.scambs.gov.uk/media/3445/final_indoor_sports_facility_strategy_2016_rd-csf-200_revised.pdf
- ^{xxviii} Cambridge Open Space and Recreation Strategy (Complete), Cambridge City Council, 2011, <https://www.cambridge.gov.uk/media/2467/open-space-and-recreation-strategy-2011.pdf>
- ^{xxix} South Cambridgeshire Recreation and Open Space Study (complete), South Cambridgeshire District Council, 2013, <https://www.scambs.gov.uk/media/10290/recreation-open-space-study-2013.pdf>
- ^{xxx} Community and Cultural Facilities Audit (in progress), Greater Cambridge Shared Planning, no date
- ^{xxxi} Growth in Greater Cambridge: Network Expansion Programme (Final), Feasibility Study for the Greater Cambridge Partnership 8600015882, UK Power Networks, October 2019
- ^{xxxii} North East Cambridge Waste Service Topic Paper (Final draft), Greater Cambridge Shared Waste, January 2020
- ^{xxxiii} Climate Change Topic Paper (First draft), Greater Cambridge Shared Planning, January 2020
- ^{xxxiv} Smart Infrastructure Topic Paper: Digital Infrastructure (in progress)
- ^{xxxv} Net Zero Carbon Study (in progress)
- ^{xxxvi} Site Wide energy and Infrastructure Study and Energy Masterplan (in progress)
- ^{xxxvii} Outline Water Cycle Study (in progress)

Appendix C Existing standards

Table 10: Standards for provision of schools

| Infrastructure | Cambridge County Council requirement (children per 100 dwellings) | Cambridge County Council requirement (FE/pupil ratio) |
|----------------|---|---|
| Primary | 40 | 1 FE per 210 pupils |
| Secondary | 25 | 1FE per 180 pupils |

Table 11: Standards for provision of primary healthcare

| Infrastructure | Department of Health requirement (GP/population ratio) | Department of Health requirement (sqm/GP ratio) |
|----------------|--|---|
| GP | 1 GP per 1800 new residents | 210 sqm per GP |

Table 12: Standards for community facilities

| Infrastructure | South Cambridgeshire requirement (sqm per 1000 persons) |
|----------------------|---|
| Community facilities | 111 |
| Libraries | 30 |

Table 13: Standards for provision of open space

| Infrastructure | Cambridge City Council requirement per 1000 persons (ha) | Cambridge City Council requirement per person (ha) | Cambridge City Council requirement per person (sqm) | South Cambridgeshire Council requirement per 1000 person (ha) | South Cambridgeshire Council requirement per person (ha) | South Cambridgeshire Council requirement per person (sqm) |
|--------------------------------------|--|--|---|---|--|---|
| Informal open space | 2.2 | 0.0022 | 22 | 0.4 | 0.0004 | 4 |
| Provision for Children and Teenagers | 0.3 | 0.0003 | 3 | 0.8 | 0.0008 | 8 |
| Allotments (urban extensions only) | 0.4 | 0.0004 | 4 | 0.4 | 0.0004 | 4 |

Table 14: Standards for provision of sports facilities

| Infrastructure | Cambridge City Council requirement (ha per 1,000 persons unless otherwise stated) | Cambridge City Council requirement per person (ha) | Cambridge City Council requirement per person (sqm) | Cambridge City Council cost per sqm including maintenance (assumes 12-year maintenance) | South Cambridgeshire Council requirement (ha per 1,000 persons unless otherwise stated) | South Cambridgeshire Council requirement per person (ha) | South Cambridgeshire Council requirement per person (sqm) apart from indoor provision |
|--------------------------|---|--|---|---|---|--|---|
| Indoor sports facilities | sports hall - 1 for 13,000 persons; swimming pool - 1 for 50,000 persons | n/a | n/a | n/a - figure per person based on 2010 SPD | sports hall - 1 for 13,000 persons; swimming pool - 1 for 50,000 persons | | 0.0000969231 |
| Outdoor sports pitches | 1.2 | 0.0012 | 12000 | n/a - figure per person based on 2010 SPD | 1.6 | 0.0016 | 16000 |

