C4S

Centre for Sustainability

Dacorum Borough Council

Sustainability Appraisal (incorporating Strategic Environmental Assessment) Working Note

Emerging Core Strategy: Housing Growth Options at Hemel Hempstead

Appendices

August 2009

Contents

Appendix A: SA Framework

Objective	Criteria	Indicators (Bold indicates existing)
Biodiversity		
1. To protect, maintain and enhance biodiversity and geodiversity at all levels, including the maintenance and enhancement of Biodiversity Action Plan habitats and species in line with local targets	To protect, maintain and enhance designated wildlife and geological sites (international, national and local) and protected species to achieve favourable condition	**Herts QoL WH6 Condition of SSSIs (contextual indicator) and HBRC number, area and condition of SSSIs**
	To restore characteristic habitats and species, to achieve BAP targets	**HBRC Change in areas designated for their intrinsic value**
	To support farming and countryside practices that enhance wider biodiversity and landscape quality by economically and socially valuable activities (e.g. grazing, coppicing, nature reserves)	**HBRC Change in Priority Habitats**
		Herts QoL WH3 Wildlife Sites and HBRC number and area of Wildlife Sites
		HBRC no. of Wildlife Sites lost or degraded by development or gained/secured by agreements
		Herts QoL WH1 Water voles
		Herts QoL WH2 Birds (contextual indicator)
		Herts QoL WH4 Pipistrelle bats
		Herts QoL WH5 Butterflies
		HBRC distribution/change of key species in Herts
		HBRC distribution/change of protected species in Herts
		COI 8 Changes in areas and populations of biodiversity importance
	To manage woodlands and other habitats of value for biodiversity in a sustainable manner and protect them against conversion to other uses	% woodland cover in District
	To recognise the social/environmental value and increase access to woodlands, wildlife & geological sites and green spaces particularly near/in urban areas	Percentage of wildlife sites accessible by sustainable modes of travel

Objective	Criteria	Indicators (Bold indicates existing)
	To encourage people to come into contact with, understand, and enjoy nature	Number of visitors to wildlife sites
Water		
2. To protect, maintain and enhance water resources (including water quality and quantity) while taking into account the impacts of climate change	To raise awareness and encourage higher water efficiency and conservation by for instance promoting water reuse in new and existing developments	Level of awareness of water issues and the need for water saving (contextual indicator) Average household water consumption per capita
	To ensure water consumption does not exceed levels which can be supported by natural processes and storage systems	
	To improve chemical and biological quality and flow of rivers and encourage practices which reduce nitrate levels in groundwater	Commercial water consumption Proportion of housing (existing and new development) with installed water efficient devices/water metres
	To improve flow of rivers	**Herts QoL WR3 River quality objectives**
	To reduce the number and severity of pollution incidents	**EA Biological and chemical river quality (contextual indicator)**
	To maintain or restore the integrity of water dependent wildlife sites in the area	Number and severity of pollution incidents to surface water and groundwater
3. Ensure that new developments avoid areas which are at risk from flooding and natural flood storage areas	To avoid developments in areas being at risk from fluvial, sewer or groundwater flooding (for instance natural flood plains) while taking into account the impacts of climate change	Number of properties at risk from flooding Proportion of runoff from new developments which is directed into Sustainable Urban Drainage Systems (SUDs)[1]
	To ensure that developments, which are at risk from flooding or are likely to be at risk in future due to climate change, are sufficiently adapted	
	To promote properly maintained sustainable urban drainage systems to reduce flood risk and run off in areas outside Source Protection Zones 1 (SPZ)	
Soil		
4. Minimise development of land with high quality soils and	To safeguard high quality soils, such as agricultural land grades 1, 2 and 3a) from development	Amount of high quality agricultural land degraded/lost to development

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[1] Sustainable Urban Drainage Systems (SUDS) are management practices and physical structures designed to drain surface water in a more sustainable way than conventional systems.

Objective	Criteria	Indicators (Bold indicates existing)
minimise the degradation/loss of soils due to new developments	To limit contamination/degradation/loss of soils due to development	Area/percentage of contaminated land remediated
		Number of development sites having a policy to safeguard soils
		Area of proposed new developments on greenfield sites
Climatic Factors		
5. Reduce the impacts of climate change, with a particular focus on reducing the consumption of fossil fuels and levels of CO_2	To minimise greenhouse gas emissions (particularly CO_2) for instance through more energy efficient design and reducing the need to travel	**NAIE Emissions of greenhouse gases (particularly CO_2) per capita grouped per type of source**
	To promote increased carbon sequestration e.g. through increases in woodland cover	**BV 63 Energy efficiency - average SAP rating of authority dwellings**
	To adopt lifestyle changes which help to mitigate and adapt to climate change, such as promoting water and energy efficiency (through for instance higher levels of home insulation)	**BV 80a (i) Actual/'Typical' energy consumption LA buildings - electricity**
		BV 80a (ii) Actual/'Typical' energy consumption LA buildings - fossil fuels
		Herts QoL EN1 Energy efficiency in homes - overall reduction in CO_2 emissions %
		Herts QoL EN2 Energy efficiency in public buildings
6. Ensure that developments are capable of withstanding the effects of climate change (adaptation to climate change)	To promote design measures which enable developments to withstand and accommodate the likely impacts and results of climate change (for instance through robust and weather resistant building structures)	Percentage of new developments considered to be 'climate change proof'
		(For indicators regarding renewable energy see section on material assets)
Air Quality		
7. Achieve good air quality, especially in urban areas	To reduce the need to travel by car through planning settlement patterns and economic activity in a way that reduces dependence on the car and maintains access to work and essential services for non-car-owners	**NAIE Levels of key air pollutants (e.g. Benzene, 1,3-Butadiene, CO_2, Lead, NO_2, PM10, SO_2) within the local authority area, and within the East of England**
	To integrate land use and transport planning by for instance:	**Herts QoL QoL27 Air Pollution**

Objective	Criteria	Indicators (Bold indicates existing)
	• Promoting Green Transport Plans, including car pools, car sharing as part of new developments • Ensuring services and facilities are accessible by sustainable modes of transport	**Herts QoL TR1 Volume of motor traffic** **Herts QoL TR2 Modal spilt** Number of days when air pollution reported as moderate or higher within the local authority area Number of designated AQMAs
	To ensure that development proposals do not make existing air quality problems worse	
	To address existing or potential air quality problems	
Material Assets		
8. Maximise the use of previously developed land and buildings, and the efficient use of land	To concentrate new developments on previously developed land (PDL)	**COI 1(a) & (c) Amount of land developed for employment by type and percentage which is on previously developed land** **COI 1(b) Amount of land developed for employment by type, which is in development and/or regeneration areas defined in the LDF** **COI 2(b) Percentage of new and converted dwellings on previously developed land** **COI 2(c) Percentage of new dwellings completed at: less then 30, between 30 and 50 and above 50 dwellings per hectare** **Herts QoL LU3 Residential development on previously developed land** **BV106 % of new homes built on previously developed land**
	To avoid use of Greenfield sites for development	
	To maximise the efficient use of land and existing buildings by measures such as higher densities and mixed use developments	
	To encourage the remediation of contaminated and derelict land and buildings	
9. To use natural resources, both finite and renewable, as efficiently as possible, and re-use finite resources or recycled alternatives wherever possible	To encourage maximum efficiency and appropriate use of materials, particularly from local and regional sources	Amount and percentage of secondary and recycled materials (including minerals and aggregates) used in construction **BV82a Household waste - percentage recycled** **BV82b Household waste - percentage**
	To require new developments to incorporate renewable, secondary, or sustainably sourced local materials in buildings and infrastructure	
	To safeguard reserves of exploitable minerals from	

Objective	Criteria	Indicators (Bold indicates existing)
	sterilisation by other developments	**composted**
	To promote renewable energy sources as part of new or refurbished developments	**BV82c Household waste - percentage of heat, power and other energy recovered**
	To increase recycling and composting rates and encourage easily accessible recycling systems as part of new developments	**BV82d Household waste - percentage landfilled**
	To promote awareness regarding waste/recycling and renewable energy issues through education programmes in schools and the community	**BV84 Kg of household waste collected per head**
		Herts QoL WS1 Household waste per capita
		Herts QoL WS3 Percentage of waste recycled
		Proportion of developments which incorporates design measures to facilitate sustainable household waste management
Cultural Heritage		
10. To identify, maintain and enhance the historic environment and cultural assets	To safeguard and enhance the historic environment and restore historic character where appropriate, based on sound historical evidence	**Number of Listed Buildings at Risk**
		Number and condition **of Scheduled Ancient Monuments (SAMs)**
	To promote local distinctiveness by maintaining and restoring historic buildings and areas, encouraging the re-use of valued buildings and thoughtful high quality design in housing and mixed use developments – to a density which respects the local context and townscape character, and includes enhancement of the public realm	**Number** and condition **of Registered Parks and Gardens**
		Number of Conservation Areas
		% of Conservation Areas with character appraisals
	To promote public education, enjoyment and access of the built heritage and archaeology	Percentage of historic buildings and structures open to the public
		Numbers of historic assets taken from the 'at risk' category
		Number of historic assets restored/reused
		Number of locally important buildings to be demolished

Objective	Criteria	Indicators (Bold indicates existing)
		Changes inconsistent with historic landscape
		Quality in the built environment as measured by public perception surveys
		A measure of increased public access or interpretation of sites
Landscape		
11. To conserve and enhance landscape and townscape character and encourage local distinctiveness	To protect and enhance landscape and townscape character	**CQC Changes inconsistent with** (local) **landscape character**
	To evaluate the sensitivity of the landscape to new/inappropriate developments and avoid inappropriate developments in these areas	Area of designated landscapes affected by/lost to development
	To protect 'dark skies' from light pollution, and promote low energy and less invasive lighting sources while considering the balance between safety and environmental impacts	**CPRE Light pollution and tranquillity mapping**
	To minimise the visual impact of new developments	
Population and Human Health		
12. To encourage healthier lifestyles and reduce adverse health impacts of new developments	To promote the health advantages of walking and cycling and community based activities	Length and condition of cycle / footpath network
	To identify, protect and enhance open spaces, such as rivers and canals, parks and gardens, allotments and playing fields, and the links between them, for the benefit of people and wildlife	Number and condition of sports facilities
		COI 4(c) Percentage of eligible open spaces managed to green flag award standards
	To include specific design and amenity policies to minimise noise and odour pollution, particularly in residential areas	Percentage of population with access to public open space
	To narrow the income gap between the poorest and wealthiest parts of the area and to reduce health differential	**Herts QoL NO1 Noise complaints received per 1000 population**
		Herts QoL NO2 Source of noise complaints
13. To deliver more sustainable patterns of location of	To reduce the need to travel through closer integration of housing, jobs and services	Percentage of health facilities accessible by sustainable modes of travel

Objective	Criteria	Indicators (Bold indicates existing)
development	To promote better and more sustainable access to health facilities	**Herts QoL TR2 Modal spilt** Accessibility modelling
Social Factors		
14. Promote equity & address social exclusion by closing the gap between the poorest communities and the rest	To include measures which will improve everyone's access to high quality health, education, recreation, community facilities and public transport	**Index of Multiple Deprivation** **BV156 % of local authority buildings suitable for and accessible by disabled people**
	To ensure facilities and services are accessible by people with disabilities and minority groups	**BV170a Number of visits to/usage's of museums per 1,000 population** **BV 117 Visits to libraries Number per capita**
	To encourage people to access the learning and skills they need for high quality of life	**Herts QoL SE3 Transport: access to public services**
	To ensure that the LDF does not discriminate on the basis of disability, ethnic minority, or gender	**COI 3(b) Percentage of new residential development within 30 minutes of a GP, hospital, primary & secondary school, employment and major health centre**
		Herts QoL ED1 GCSE performance
		Herts QoL ED2 Adult education level 2*
		Herts QoL QoL9 Young people with Level 2 qualifications
		BV38 % of pupils achieving 5 or more GCSEs at grades A* - C or equivalent
		% pensioners in households with below average income
		% children in households with below have half average income
15. Ensure that everyone has access to good quality housing that meets their needs	Promote a range housing types and tenure, including high quality affordable and key worker housing	**COI 2(d) Affordable housing completions** **BV184a LA homes which were non-**

Objective	Criteria	Indicators (Bold indicates existing)
		decent at start of year
		BV184b Change in proportion on non-decent homes (negative means deterioration in stock)
		Herts QoL HS1 Affordable housing (house price/earnings affordability ratio)
		Herts QoL HS2 Statutorily unfit homes
		Herts QoL HS3 Homelessness
16. Enhance community identity and participation	To recognise the value of the multi-cultural/faith diversity of the peoples in the region	Number of community facilities per 10,000 population
	To improve the quality of life in urban areas by making them more attractive places in which to live and work, and to visit	Town centre health checks
		CABE design review of schemes with significant impacts (if conducted)
	To encourage high quality design in new developments, including mixed uses, to create local identity and encourage a sense of community pride	
17. Reduce both crime and fear of crime	To reduce all levels of crime with particular focus on violent, drug related, environmental and racially motivated crime	**BV126a Burglaries No. per 1,000 households**
		BV127a Robberies per 1000 population and percentage detected
	To plan new developments to help reducing crime and fear of crime through thoughtful design of the physical environment, and by promoting well-used streets and public spaces	**BV127b violent offences committed in a public place per 1,000 population**
		BV127c violent offences committed in connection with licensed premises per 1,000 population
	To support government-sponsored crime/safety initiatives, maximising the use of all tools available to police, local authorities and other agencies to tackle anti-social behaviour	**BV127d violent offences committed under the influence per 1,000 population**
		BV128a Vehicle crimes No. per 1,000 population
		BV174 Number of recorded racial

Objective	Criteria	Indicators (Bold indicates existing)
		incidents per 100,000 population
		Fear of crime statistics
Economic Factors		
18. Achieve sustainable levels of prosperity and economic growth	To support an economy in the Authority which draws on the knowledge base, creativity and enterprise of its people	**Herts QoL EC1 Percentage rise in GVA**
	To promote and support economic diversity, small and medium sized enterprises and community-based enterprises	**Herts QoL UN1 Long term unemployment**
		Herts QoL QoL1 Proportion of people of working age in employment
	To support the economy with high quality infrastructure and a high quality environment	**COI 1(f) Amount of employment land lost to residential development**
		Business start up failures
19. Achieve a more equitable sharing of the benefits of prosperity across all sectors of society and fairer access to services, focusing on deprived areas in the region	To encourage local provision of and access to jobs and services	**Herts QoL QoL5 The percentage increase/decrease in the number of local jobs**
	To improve the competitiveness of the rural economy	In/out commuting balance
		Rate of growth of businesses (urban and rural)
20. Revitalise town centres to promote a return to sustainable urban living	To promote the role of local centres as centres for sustainable development providing services, housing and employment, drawing on the principles of urban renaissance	**COI 4(b) Percentage of completed retail, office and leisure development in town centres**
	To encourage well-designed mixed-use developments in the heart of urban areas, create viable and attractive town centres that have vitality and life, and discourage out-of-town developments	

Appendix B: Housing Growth Options at Hemel Hempstead Assessment

The following tables outline the symbols and abbreviations used to document the results of the assessment process.

Key to Assessment Scores

Scale		
Symbol	**Meaning**	**Comment**
L	Local	Within Hemel Hempstead and its immediate vicinity
R	Regional	Affecting other areas of Dacorum Borough/St Albans District and their neighbouring authorities
N	National	UK or a wider global impact

Permanence		
Symbol	**Meaning**	**Comment**
P	Permanent	E.g. Effects lasting during and beyond the life of the plan
T	Temporary	E.g. Effects during construction

Timescale	
In the Short Term	0-10 years
In the Medium Term	10-20 years
In the Long Term	After life of plan

Significance Assessment	Description
✓✓	Very sustainable – Option is likely to contribute significantly to the SA/SEA objective
✓	Sustainable – Option is likely to contribute in some way to the SA/SEA objective
?	Uncertain – It is uncertain how or if the Option impacts on the SA/SEA objective
–	Neutral – Option is unlikely to impact on the SA/SEA objective
x	Unsustainable – Option is likely to have minor adverse impacts on the SA/SEA objective
xx	Very unsustainable – Option is likely to have significant adverse impacts on the SA/SEA objective

The table below outlines the Sustainability Objectives that have been used to focus the assessment process and details the reference term which is used in the assessment tables for the sake of brevity. The full framework of objectives and associated sub-objectives can be found in the Appendix A.

	SA Objective	Reference Term
1	To protect, maintain and enhance biodiversity and geodiversity at all levels, including the maintenance and enhancement of Biodiversity Action Plan habitats and species in line with local targets	Biodiversity
2	To protect, maintain and enhance water resources (including water quality and quantity) while taking into account the impacts of climate change	Water quality/ quantity
3	Ensure that new developments avoid areas which are at risk from flooding and natural flood storage areas	Flood risk
4	Minimise development of land with high quality soils and minimise the degradation/loss of soils due to new developments	Soils
5	Reduce the impacts of climate change, with a particular focus on reducing the consumption of fossil fuels and levels of CO_2	Greenhouse gas emissions
6	Ensure that developments are capable of withstanding the effects of climate change (adaptation to climate change)	Climate change proof
7	Achieve good air quality, especially in urban areas	Air Quality
8	Maximise the use of previously developed land and buildings, and the efficient use of land	Use of brownfield sites
9	To use natural resources, both finite and renewable, as efficiently as possible, and re-use finite resources or recycled alternatives wherever possible	Resource efficiency
10	To identify, maintain and enhance the historic environment and cultural assets	Historic & cultural assets
11	To conserve and enhance landscape and townscape character and encourage local distinctiveness	Landscape & Townscape
12	To encourage healthier lifestyles and reduce adverse health impacts of new developments	Health
13	To deliver more sustainable patterns of location of development.	Sustainable locations
14	Promote equity & address social exclusion by closing the gap between the poorest communities and the rest	Equality & social exclusion
15	Ensure that everyone has access to good quality housing that meets their needs	Good quality housing
16	Enhance community identity and participation	Community Identity &

			participation
17	Reduce both crime and fear of crime		Crime and fear of crime
18	Achieve sustainable levels of prosperity and economic growth		Sustainable prosperity and growth
19	Achieve a more equitable sharing of the benefits of prosperity across all sectors of society and fairer access to services, focusing on deprived areas in the region		Fairer access to services
20	Revitalise town centres to promote a return to sustainable urban living		Revitalise town centres

The following table provides as assessment of the features common to all of the growth strategies against the SA objectives. This assessment has focused on the general issues related to the proposed growth. The assessment of the alternative growth strategies is provided in Section 4.2 of the main working note.

Common features for all of the growth options

Number of new homes: All 3 growth options are based on the provision of about 7,000 new homes in the Green Belt around Hemel Hempstead between 2006 and 2031.

This figure is on top of the new development that will take place within the existing town boundaries, through the conversion of buildings to residential use, building upon vacant and underused sites and the reallocation of land for housing purposes.

Some small scale growth will also need to take place within the other towns and large villages within Dacorum Borough. However, the Government is very clear that the vast majority of growth must be located within and immediately surrounding Hemel Hempstead.

Employment growth: As well as providing new homes, we also need to ensure that additional job opportunities are also available. We therefore need to set aside land for the expansion of the existing Maylands Business Area. This expansion will need to take place whichever housing growth option the Councils choose.

Provision of new infrastructure: Growth at Hemel Hempstead is not simply about building new homes. We also need to make sure that we have the infrastructure in place to support these new homes and provide leisure opportunities for new (and existing) residents.

Town-wide facilities

Secondary school site	The County Council has asked that we set aside land for a new secondary school somewhere on the edge of the town, as existing school provision within the town may not be able to cope with the expected increase in pupil numbers.
Health facilities	The local Primary Care Trust has announced plans to develop a General Hospital with an Urgent Care Centre to replace the existing hospital.
Town Stadium	To ensure that the town has high quality sports and leisure facilities.
Park and Ride	This option is currently being considered by the Council and the Highway Authority. It would help reduce traffic congestion within the Maylands Business Area and could also link with the town centre and railway station.
Cemetery provision	A new cemetery is needed for the town.
Utilities	We will need to work with the utility companies to make sure the town has adequate water, electricity and gas supplies and sewage treatment facilities.
Shopping facilities	The Waterhouse Square development will help ensure that town centre shopping facilities are further improved.
New open space	To ensure all residents have access to high quality open space for informal recreation and leisure activities.
New woodlands	Significant new woodland planting is required by the East of England Plan for growth towns such as Hemel Hempstead.

Neighbourhood facilities

Hemel Hempstead is a New Town and was designed around neighbourhoods. New development is therefore expected to provide its own range of local services and facilities, continuing this 'Neighbourhood' approach to growth. We will also consider what spare capacity (if any) there is within existing facilities, whilst ensuring that they do not become over-burdened.

Due to changes in people's lifestyles and shopping behaviour since the original New Town was planned in the 1950s, a new residential neighbourhood is no longer of sufficient size to support a full local centre. However a local convenience store (and perhaps other outlets) will be provided. A local centre could be provided where 2 neigbourhoods are located adjacent to one another. Similarly, where two neighbourhoods adjoin, a two-form rather than one-form entry primary school would be provided to serve both areas. Two-form entry schools are the County Council's preferred way of providing primary schooling.

All new development will also be required to meet very high standards of design and energy efficiency. Due to the scale of the new housing required and its location within neighbourhood blocks there is the scope to develop highly sustainable schemes, using the most up-to-date construction techniques and materials and incorporating renewable energy production on-site. The sustainability of the developments will be measured using the national 'Code for Sustainable Homes' standard, with new housing expected to meet the national minimum standard (currently Code Level 3) and aspire to Code Level 6 (which equates to 'Carbon Neutral').

The Neighbourhood Concept

A typical residential neighbourhood has about 2,500 people in 1,000-1,250 dwellings. Each neighbourhood will be expected to deliver a high level of affordable housing. A neighbourhood is usually of sufficient size to require a one form entry primary school. Key infrastructure needs:

- Primary school or access to primary schooling (including nursery school provision);
- Local shop(s);
- Community hall/cultural facility;
- Access to health facilities and secondary schooling;
- Public open space and other green infrastructure (e.g. for biodiversity);
- New highways and links.

Typical distances to facilities and services:

Facility	Distance (in metres)
Primary schools	600
Bus stop	400
Local shop	800
Community hall	800
Local park	400
Secondary school	1,500
Health facility	1,000

	SA Objective	Nature of Effect Including where appropriate whether the effects are direct/indirect and likely/unlikely. Justification and Evidence	Permanence	Scale	Significance of Effects			Mitigation and Enhancement
					In the short term	In the medium term	In the long term	
1	Biodiversity	The development of 7,000 new homes and new employment on the Greenbelt surrounding Hemel Hempstead is likely have a negative effect on habitats and species found locally within the areas affected. The significance of the effect will be dependent on the biodiversity value of the land to be developed. Loss of this greenbelt land could also have a negative effect on habitats and species more widely due to increased traffic and transport and increased numbers of visitors putting pressure on local wildlife sites, for example Chilterns Beechwoods SAC and Shrubhill Common LNR.	P	L R	✗	✗	✗	
		Providing new open spaces, woodlands and other green infrastructure within the new neighbourhoods could have a positive effect on this SA objective. In addition, requiring the new developments to meet the national minimum standard for Code for Sustainable Homes could also help to mitigate adverse effects. The standards discourage development on ecologically valuable sites, require that existing ecological features are protected from damage and encourage ecological enhancement.	P	L	✓	✓	✓	
2	Water quality/ quantity	Dacorum Borough is within an area already identified as 'over-abstracted' (Colne CAMS, EA). Providing 7,000 new homes and new employment will put direct pressure on these already under pressure water resources. The effect is likely to become more significant over time as more dwellings are built and risk of periodic water shortages increase. Domestic	P	R	✗	✗	✗✗	Use of porous paving and green roofs may help to alleviate run off. Incorporation of Sustainable Drainage Systems (SUDS) which comprise of retention

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SA Objective	Nature of Effect Including where appropriate whether the effects are direct/indirect and likely/unlikely. Justification and Evidence	Permanence	Scale	Significance of Effects			Mitigation and Enhancement
				In the short term	In the medium term	In the long term	
	daily water consumption in the Borough is currently 192 litres per capita (Audit Commission, 2004) which is above the national average of 148 litres (EA, 2008). New development on greenbelt sites will inevitably increase impermeable surfaces resulting in increased water run-off and potential pollution to water courses.			🟧	🟧	🟥	and infiltration measures can help to minimise adverse effects on water quantity/ quality and will also have ecological benefits.
	Requiring the new developments to meet the national minimum standard for Code for Sustainable Homes could help to mitigate these adverse effects. Level 3 requires maximum average water consumption to be 105 litres per capita per day. The Code also encourages the recycling of rainwater and reducing the amount of mains potable water used for external water uses, i.e. through the use of rainwater butts and central rainwater collection systems. In addition, the Code for Sustainable Homes requires that peak rates of run-off into watercourses are no greater for the developed site than they were for the pre-development site and this could reduce the risk of run-off polluting water courses.	P	R	✔	✔	✔	
3 Flood risk	New development on greenbelt sites will inevitably increase impermeable surfaces resulting in increased water run-off and potential flood risk.	P	L	✘	✘	✘	The incorporation of SUDs into developments should be encouraged.
	Requiring the new developments to meet the national minimum standard for Code for Sustainable Homes could help to mitigate these adverse effects. The code for sustainable homes requires that peak rates of run-off into watercourses are no greater for	P	L	✔	✔	✔	

	SA Objective	Nature of Effect Including where appropriate whether the effects are direct/indirect and likely/unlikely. Justification and Evidence	Permanence	Scale	Significance of Effects			Mitigation and Enhancement
					In the short term	In the medium term	In the long term	
		the developed site than they were for the pre-development site. This should help to reduce the risk of localised flooding.						
4	Soils	The development of 7,000 new homes and new employment on the Greenbelt surrounding Hemel Hempstead will have adverse impacts on soils through soil sealing and potentially soil degradation.	P	L	✘	✘	✘	
5	Greenhouse gas emissions	Housing development will result in an increase in greenhouse gas emissions from new housing and associated activities. Building 7,000 new homes could lead to an increase in greenhouse gas emissions of approximately 41,160 tonnes of carbon per annum. This is based upon estimated per capita domestic CO_2 emissions of 2.4 tonnes multiplied by the average number of occupants per household in the boroughs of 2.45 [Source: Audit Commission Local Area Profile]. The development of employment land will also result in an increase in greenhouse gas emissions from the buildings and associated activities, particularly transport.	P	N	✘	✘	✘	
		Requiring new developments to meet very high standards of energy efficiency and incorporating renewable energy production on-site should help to mitigate these adverse effects. The Code for Sustainable Homes includes nine standards relating to energy and carbon emissions.	P	N	✔	✔	✔	
		Providing key neighbourhood facilities within the new developments could reduce the need to travel and also encourage use of more sustainable modes of transport thereby reducing growth in greenhouse gas	P	N	✔	✔	✔	

	SA Objective	Nature of Effect Including where appropriate whether the effects are direct/indirect and likely/unlikely. Justification and Evidence	Permanence	Scale	Significance of Effects			Mitigation and Enhancement
					In the short term	In the medium term	In the long term	
		emissions.						
6	Climate change proof	No predicted effects. The strategy does not outline measures which would require housing developments to withstand and accommodate the likely impacts and results of climate change.	-	-	-	-	-	The strategy should consider requiring new developments to be 'climate proof'.
7	Air Quality	Building 7,000 new homes and creating new employment will contribute to background emissions through an increase in vehicles on the road. During construction there could be adverse effects on local air quality close to the development sites (e.g. from dust and fumes).	P	L	✗	✗	✗	The strategy should encourage the use of more sustainable modes of transport, including public transport, cycling and walking.
		Providing key neighbourhood facilities within the new developments could reduce the need to travel and encourage use of more sustainable modes of transport thereby minimising emissions to air.	P	L	✓	✓	✓	
		Providing a park and ride could reduce traffic congestion within the Maylands Business Area thereby improving local air quality in this area.	P	L	✓	✓	✓	
8	Use of brownfield sites	The strategy to build 7,000 new homes and new employment on the Greenbelt will have significant adverse effects on this objective.	P	L	✗✗	✗✗	✗✗	
9	Resource efficiency	Housing and employment growth will increase demands on natural resources and will result in increased waste generation.	P	L	✗	✗	✗	
		Using the most up-to-date construction techniques and materials and incorporating renewable energy production on-site should have a positive effect on this objective by reducing natural resource use. During construction the Code for Sustainable Homes encourages the use of materials with lower	P	L	✓	✓	✓	

SA Objective		Nature of Effect Including where appropriate whether the effects are direct/indirect and likely/unlikely. Justification and Evidence	Permanence	Scale	Significance of Effects			Mitigation and Enhancement
		Assessment of Effect			In the short term	In the medium term	In the long term	
		environmental impacts over their lifecycle, responsible sourcing of materials and the reduction and effective management of construction waste. The Code for Sustainable Homes also encourages developments to include storage areas for recyclable waste and facilities for composting.						
10	Historic & cultural assets	Housing and employment development could involve the redevelopment of known or undiscovered cultural heritage resources.	P	L	✗	✗	✗	
11	Landscape & Townscape	Constructing 7,000 new homes and new employment opportunities in the Greenbelt around Hemel Hempstead will have significant adverse effects on this objective.	P	L	✗✗	✗✗	✗✗	
		Providing public open space, woodlands and other green infrastructure could help to mitigate these adverse effects. Also requiring all new development to meet very high standards of design could also reduce the adverse effects.	P	L	✓	✓	✓	
12	Health	Ensuring all residents have access to high quality open space for informal recreation and leisure activities through the provision of open space and woodlands should help to encourage healthier lifestyles. Providing key neighbourhood facilities within the new developments could encourage walking and cycling. Providing appropriate bus connections and high quality, well located pedestrian and cycle routes will help to connect the new development to existing services and facilities elsewhere within the town. The Code for Sustainable Homes includes standards	P	L	✓	✓	✓	

SA Objective	Nature of Effect Including where appropriate whether the effects are direct/indirect and likely/unlikely. Justification and Evidence	Permanence	Scale	Significance of Effects			Mitigation and Enhancement
				In the short term	In the medium term	In the long term	
	for ensuring the provision of improved sound insulation to reduce the likelihood of noise complaints from neighbours. The Code also contains other standards aimed at improving health and well-being, such as improving the quality of life in homes through good daylighting and provision of private open space. Replacing the existing hospital in Hemel Hempstead with a General Hospital with an Urgent Care Centre should help to progress this objective. Although should the new hospital be relocated from the town centre to Maylands it could make it more difficult for a larger proportion of people to access healthcare facilities.						
13 Sustainable locations	Developing new homes on the Greenbelt around Hemel Hempstead will not generally reduce the need to travel through closer integration of housing, jobs and services as the Greenbelt is located some distance from the town centre.	P	L	×	×	×	
	Providing key neighbourhood facilities within the new developments, including a primary school and a local convenience store could help to mitigate some of these effects. Providing appropriate bus connections and high quality, well located pedestrian and cycle routes will help to connect the new development to existing services and facilities elsewhere within the town.	P	L	✔	✔	✔	
14 Equality & social exclusion	Providing key neighbourhood facilities, including primary schools, local convenience stores, public open space and community halls, within the new	P	L	✔	✔	✔	

SA Objective	Assessment of Effect						Mitigation and Enhancement
	Nature of Effect Including where appropriate whether the effects are direct/indirect and likely/unlikely. **Justification and Evidence**	**Permanence**	**Scale**	**Significance of Effects**			
				In the short term	**In the medium term**	**In the long term**	
	developments should progress this objective by providing access to services for the new and existing neighbouring communities. Allocating land for a new secondary school should provide for education opportunities for the new neighbourhoods as well as improving provision for the town in general. Providing appropriate bus connections and high quality, well located pedestrian and cycle routes will help to connect the new development to existing services and facilities elsewhere within the town. Providing town-wide facilities, including a town stadium, open space and woodlands, could improve access to facilities and services for new and existing communities. Specifically, replacing the existing hospital in Hemel Hempstead with a General Hospital with an Urgent Care Centre could improve access to health care. In addition, the Waterhouse Square development should improve town centre shopping facilities benefitting both existing and new communities. Providing additional job opportunities in Hemel Hempstead should improve access to employment.						
15 Good quality housing	All new development will be required to meet very high standards of design and this should provide for good quality housing developments. Each neighbourhood will be expected to deliver a high level of affordable housing and this should	P	L	✓✓	✓✓	✓✓	

SA Objective		Nature of Effect Including where appropriate whether the effects are direct/indirect and likely/unlikely. Justification and Evidence	Permanence	Scale	Significance of Effects			Mitigation and Enhancement
					In the short term	In the medium term	In the long term	
		progress this objective.						
16	Community Identity & participation	All new development will be required to meet very high standards of design and this should have a positive effect on this SA objective. The Waterhouse Square development should improve town centre shopping facilities in Hemel Hempstead and therefore this could make the town a more attractive place to live, work and visit. Ensuring all residents have access to high quality open space should help to improve the quality of life in urban areas.	P	L	✓	✓	✓	
		Providing 7,000 new homes may affect the identity of existing neighbourhoods depending on how they relate and fit with the local communities. For example, local communities which were used to be being located adjacent to the Green Belt may lose identity of being a more rural area.	P	L	?	?	?	
17	Crime and fear of crime	The Code for Sustainable Homes encourages the design of developments where people feel safe and secure; where crime and disorder, or the fear of crime, does not undermine quality of life or community cohesion. This should help to progress this objective.	P	L	✓	✓	✓	
18	Sustainable prosperity & growth	Providing additional land for employment in the Maylands Business Area should allow for the provision of job opportunities for the new and existing communities. Providing 7,000 new homes and key community facilities will support the economy by providing necessary infrastructure and producing a high quality	P	L	✓✓	✓✓	✓✓	

SA Objective		Assessment of Effect						Mitigation and Enhancement
		Nature of Effect Including where appropriate whether the effects are direct/indirect and likely/unlikely. Justification and Evidence	Permanence	Scale	Significance of Effects			
					In the short term	In the medium term	In the long term	
		environment in which people will want to live and work. It should also result in a larger potential workforce which should benefit the local economy.						
19	Fairer access to services	Providing additional land for employment in the Maylands Business Area should allow for the provision of local job opportunities for the new and existing communities.	P	L	✓✓	✓✓	✓✓	
20	Revitalise town centres	By developing new homes on the Greenbelt around Hemel Hempstead the strategy is not encouraging development in the centre of urban areas. Thereby this strategy will not progress this objective.	P	L	✗	✗	✗	
		The Waterhouse Square development should provide for improved town centre shopping facilities.	P	L	✓	✓	✓	
		The Park and Ride could help to reduce traffic in the town centre, thereby improving the quality of the area.	P	L	✓	✓	✓	

Appendix C: Analysis of the Index of Multiple Deprivation (IMD)

In order to support the assessment of the growth options an analysis of the Index of Multiple was undertaken. The Index of Multiple Deprivation (2007) provides an Overall Index of Multiple Deprivation (IMD) based on seven individual Domain Indices. These indices are shown below along with their weighting in determining the overall IMD:

- Income (22.5%)
- Employment (22.5%)
- Health Deprivation and Disability (13.5%)
- Education, Skills and Training (13.5%)
- Barriers to Housing and Services (9.3%)
- Crime (9.3%)
- Living Environment (9.3%)

In order to undertake the analysis GIS was used to identify the Lower Super Output Areas[2] (LSOAs) within 500m of all the areas that make up the three growth strategies. Once the LSOAs in close proximity to the strategies were identified, the IMD results for each LSOA were extracted from the spreadsheet that contains the IMD detail for all LSOAs in England. The LSOAs were then classified into quartiles and colour coded to assist analysis.

Results from the overall IMD 2007 for the LSOAs in and around the growth options are provided in the three tables below along with results for three of the individual IMD domains that were considered to be the most appropriate for examining the issues relating to development on new neighbourhoods in close proximity to existing residential areas: health, education and barriers. These individual domains cover various issues as outlined below:

- The health deprivation and disability domain measures rates of poor health, early mortality and disability in an area and covers the entire age range.

- The education, skills and training deprivation domain captures data relating to education deprivation for children/young people in the area (i.e. average test score of pupils at key stage 2, 3 and 4) and relating to lack of skills and qualifications among the sub-set of the working age adult population.

- The barriers to housing and services domain measures both geographical and wider barriers to accessing housing and key local services. This includes household overcrowding, difficulty of access to owner occupation, and road distance to a GP surgery, supermarkets, primary schools and a post office.

As can be seen from the tables, for overall IMD, there are a number of LSOAs which fall in the second most deprived quartile (shaded yellow) when compared with the all other English LSOAs (32,482 in total). There are no LSOAs in the most deprived quartile for the overall IMD, howeverfor the 'education', 'skills and training' and 'barriers to housing and services' domains a number of the LSOAs fall in the most deprived quartile (shaded red).

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[2] Super Output Areas (SOAs) are a geographic hierarchy designed to improve the reporting of small area statistics. Within England and Wales a Lower Layer (minimum population 1000) and a Middle Layer (minimum population 5000) were introduced in 2004.
(Source: http://www.statistics.gov.uk/geography/glossary/s.asp)

Key to tables

1		LSOAs ranked 1 - 8,120 (the most deprived quartile)
2		LSOAs ranked 8,121 – 16,241
3		LSOAs ranked 16,242 – 24,361
4		LSOAs ranked 24,362 - 32,482 (the least deprived quartile)

IMD for LSOAs within 500m buffer of the Eastern Growth Strategy

LSOA		IMD		Health		Education		Barriers	
Code	Name	Rank	Quartile	Rank	Quartile	Rank	Quartile	Rank	Quartile
E01023345	Dacorum 013A	27734	4	27994	4	19133	3	21252	3
E01023346	Dacorum 013B	15400	2	21525	3	6624	1	24871	4
E01023355	Dacorum 006A	31374	4	31324	4	26714	4	17530	3
E01023378	Dacorum 021F	28583	4	30842	4	30657	4	4929	1
E01023383	Dacorum 016A	25134	4	28190	4	15976	2	31941	4
E01023384	Dacorum 016B	16978	3	20046	3	10152	2	31983	4
E01023385	Dacorum 016C	29243	4	27969	4	20126	3	28417	4
E01023393	Dacorum 007A	10953	2	9369	2	9075	2	29845	4
E01023394	Dacorum 007B	19173	3	24679	4	7935	1	26477	4
E01023395	Dacorum 007C	14429	2	19181	3	7126	1	23937	3
E01023396	Dacorum 007D	21688	3	26766	4	11280	2	30681	4
E01023397	Dacorum 007E	10904	2	15387	2	5163	1	21971	3
E01023399	Dacorum 010C	18824	3	22078	3	27526	4	23228	3
E01023401	Dacorum 008A	12760	2	15671	2	7532	1	24112	3
E01023402	Dacorum 008B	17571	3	23764	3	6367	1	31996	4
E01023403	Dacorum 008C	13376	2	12118	2	13263	2	29752	3
E01023404	Dacorum 008D	9583	2	16833	3	5245	1	19044	3
E01023405	Dacorum 008E	8788	2	12116	2	4205	1	30985	4
E01023409	Dacorum 017A	22288	3	22973	3	16280	3	22086	3
E01023410	Dacorum 017B	31575	4	30259	4	28954	4	32087	4
E01023413	Dacorum 017E	19366	3	22068	3	13385	2	21842	3
E01023415	Dacorum 020F	24960	4	27651	4	22457	3	25332	4
E01023427	Dacorum 011B	17681	3	17066	3	9859	2	30403	4
E01023428	Dacorum 011C	30798	4	29745	4	26798	4	17002	3
E01023431	Dacorum 001B	20990	3	30969	4	20528	3	2034	1
E01023434	Dacorum 005A	23445	3	25136	4	18026	3	27114	4
E01023435	Dacorum 005B	23388	3	27216	4	21715	3	21531	3
E01023436	Dacorum 005C	29239	4	29305	4	24399	4	22114	3
E01023437	Dacorum 005D	9856	2	13923	2	7624	1	30044	4
E01023722	St Albans 006A	18552	3	29742	4	30443	4	2168	1
E01023807	Three Rivers 001D	21552	3	28979	4	11322	2	16430	3

IMD for LSOAs within 500m buffer of the Northern Growth Strategy

LSOA		IMD		Health		Education		Barriers	
Code	Name	Rank	Quartile	Rank	Quartile	Rank	Quartile	Rank	Quartile
E01023346	Dacorum 013B	15400	2	21525	3	6624	1	24871	4
E01023355	Dacorum 006A	11914	2	31324	4	26714	4	17530	3
E01023378	Dacorum 021F	28583	4	30842	4	30657	4	4929	1
E01023383	Dacorum 016A	25134	4	28190	4	15976	2	31941	4
E01023384	Dacorum 016B	16978	3	20046	3	10152	2	31983	4
E01023385	Dacorum 016C	29243	4	27969	4	20126	3	28417	4
E01023390	Dacorum 010A	16861	3	22082	3	8980	2	24783	4
E01023391	Dacorum 010B	25211	4	24945	4	23698	3	16656	3
E01023392	Dacorum 011A	15642	2	18940	3	9149	2	24435	4
E01023393	Dacorum 007A	10953	2	9369	2	9075	2	29845	4
E01023394	Dacorum 007B	19173	3	24679	4	7935	1	26477	4
E01023395	Dacorum 007C	14429	2	19181	3	7126	1	23937	3
E01023396	Dacorum 007D	21688	3	26766	4	11280	2	30681	4
E01023397	Dacorum 007E	10904	2	15387	2	5163	1	21971	3
E01023399	Dacorum 010C	18824	3	22078	3	27526	4	23228	3
E01023427	Dacorum 011B	17681	3	17066	3	9859	2	30403	4
E01023428	Dacorum 011C	30798	4	29745	4	26798	4	17002	3
E01023431	Dacorum 001B	20990	3	30969	4	20528	3	2034	1
E01023434	Dacorum 005A	23445	3	25136	4	18026	3	27114	4
E01023435	Dacorum 005B	23388	3	27216	4	21715	3	21531	3
E01023436	Dacorum 005C	29239	4	29305	4	24399	4	22114	3
E01023437	Dacorum 005D	9856	2	13923	2	7624	1	30044	4
E01023722	St Albans 006A	18552	3	29742	4	30443	4	2168	1

IMD for LSOAs within 500m buffer of the Dispersed Growth Strategy

LSOA		IMD		Health		Education		Barriers	
Code	Name	Rank	Quartile	Rank	Quartile	Rank	Quartile	Rank	Quartile
E01023345	Dacorum 013A	27734	4	27994	4	19133	3	21252	3
E01023346	Dacorum 013B	15400	2	21525	3	6624	1	24871	4
E01023353	Dacorum 018A	19481	3	22620	3	20191	3	10405	2
E01023354	Dacorum 018B	29000	4	30036	4	29637	4	9335	2
E01023355	Dacorum 006A	31374	4	31324	4	26714	4	17530	3
E01023360	Dacorum 020D	25507	4	27731	4	18450	3	29266	4
E01023378	Dacorum 021F	28583	4	30842	4	30657	4	4929	1
E01023383	Dacorum 016A	25134	4	28190	4	15976	2	31941	4
E01023384	Dacorum 016B	16978	3	20046	3	10152	2	31983	4
E01023385	Dacorum 016C	29243	4	27969	4	20126	3	28417	4
E01023389	Dacorum 019D	28412	4	28309	4	20178	3	24220	3
E01023392	Dacorum 011A	15642	2	18940	3	9149	2	24435	4
E01023393	Dacorum 007A	10953	2	9369	2	9075	2	29845	4
E01023394	Dacorum 007B	19173	3	24679	4	7935	1	26477	4
E01023395	Dacorum 007C	14429	2	19181	3	7126	1	23937	3
E01023396	Dacorum 007D	21688	3	26766	4	11280	2	30681	4
E01023397	Dacorum 007E	10904	2	15387	2	5163	1	21971	3
E01023399	Dacorum 010C	18824	3	22078	3	27526	4	23228	3
E01023401	Dacorum 008A	12760	2	15671	2	7532	1	24112	3
E01023402	Dacorum 008B	17571	3	23764	3	6367	1	31996	4
E01023403	Dacorum 008C	13376	2	12118	2	13263	2	29752	3
E01023404	Dacorum 008D	9583	2	16833	3	5245	1	19044	3
E01023405	Dacorum 008E	8788	2	12116	2	4205	1	30985	4
E01023407	Dacorum 022B	27983	4	29945	4	26168	4	13299	2
E01023409	Dacorum 017A	22288	3	22973	3	16280	3	22086	3
E01023410	Dacorum 017B	31575	4	30259	4	28954	4	32087	4
E01023414	Dacorum 020E	20985	3	23369	3	13934	2	27390	4
E01023415	Dacorum 020F	24960	4	27651	4	22457	3	25332	4
E01023427	Dacorum 011B	17681	3	17066	3	9859	2	30403	4
E01023428	Dacorum 011C	30798	4	29745	4	26798	4	17002	3
E01023431	Dacorum 001B	20990	3	30969	4	20528	3	2034	1
E01023434	Dacorum 005A	23445	3	25136	4	18026	3	27114	4
E01023435	Dacorum 005B	23388	3	27216	4	21715	3	21531	3
E01023436	Dacorum 005C	29239	4	29305	4	24399	4	22114	3
E01023437	Dacorum 005D	9856	2	13923	2	7624	1	30044	4
E01023722	St Albans 006A	18552	3	29742	4	30443	4	2168	1
E01023807	Three Rivers 001D	21552	3	28979	4	11322	2	16430	3