Kent Minerals and Waste Local Plan

Planning for the future of minerals and waste in Kent

Evidence Base for the Draft Minerals and Waste Plan

MWTR3: Climate Change and the Kent MWLP

September 2013

Kent County Council

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i Abbreviations

AQMA	Air Quality Management Area
BAP	Biodiversity Action Plan
CO_2	Carbon Dioxide
DECC	Department of Energy and Climate Change
EfW	Energy from Waste
GHG	Greenhouse Gas
HAP	Habitat Action Plan
HWRC	Household Waste Recycling Centre
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
KCC	Kent County Council
MPA	Mineral Planning Authority
MPS	Minerals Planning Statement
MWLP	Minerals and Waste Local Plan
NPPF	National Planning Policy Framework
PPG	Planning Policy Guidance Note
PPS	Planning Policy Statement
SFRA	Strategic Flood Risk Assessment
UKCP09	UK Climate Projections
WPA	Waste Planning Authority

1 Introduction

1.0.1 This topic paper outlines how climate change is likely to impact on the county of Kent and more specifically, how Kent County Council (KCC) will reduce and mitigate its effects with regard to minerals and waste development and take into account the impacts of severe weather and climate change, in particular flood risk.

1.0.2 This document forms part of the evidence base for the Kent Minerals and Waste Local Plan (MWLP)[1] and draws upon relevant data, national and regional guidance and also the policies contained with the draft Minerals and Waste Core Strategy.

2 Climate change

2.1 What is climate change?

2.1.1 The Department of Energy and Climate Change (DECC) define climate change as "an identifiable change in the climate[2] that persists for an extended period, typically decades or longer, and is often taken to mean man-made changes that have occurred since the onset of the industrial revolution".

2.1.2 The Earth's climate has experienced cyclical fluctuations throughout its history in response to a variety of natural causes however, today, climate change is generally regarded as the change in the Earth's climate which cannot be explained by natural variations alone.

2.1.3 Anthropogenic (human-caused) climate change poses serious environmental, economic and social consequences for Kent's residents and thus it is imperative that measures are implemented to help reduce and mitigate such impacts through sustainable development[3].

2.2 The greenhouse effect and global warming

2.2.1 Although the Earth's climate has varied naturally in the past, it is widely accepted by the scientific community that the observed increase in global average temperatures since the mid-20th century is due to the increase in man-made greenhouse gas (GHG) concentrations[4].

2.2.2 Greenhouse gases, or GHGs, are naturally occurring gases in the atmosphere such as as carbon dioxide (CO_2), methane and water vapour which contribute towards the greenhouse effect; a process which traps heat from the sun and warms the Earth (Figure 1).

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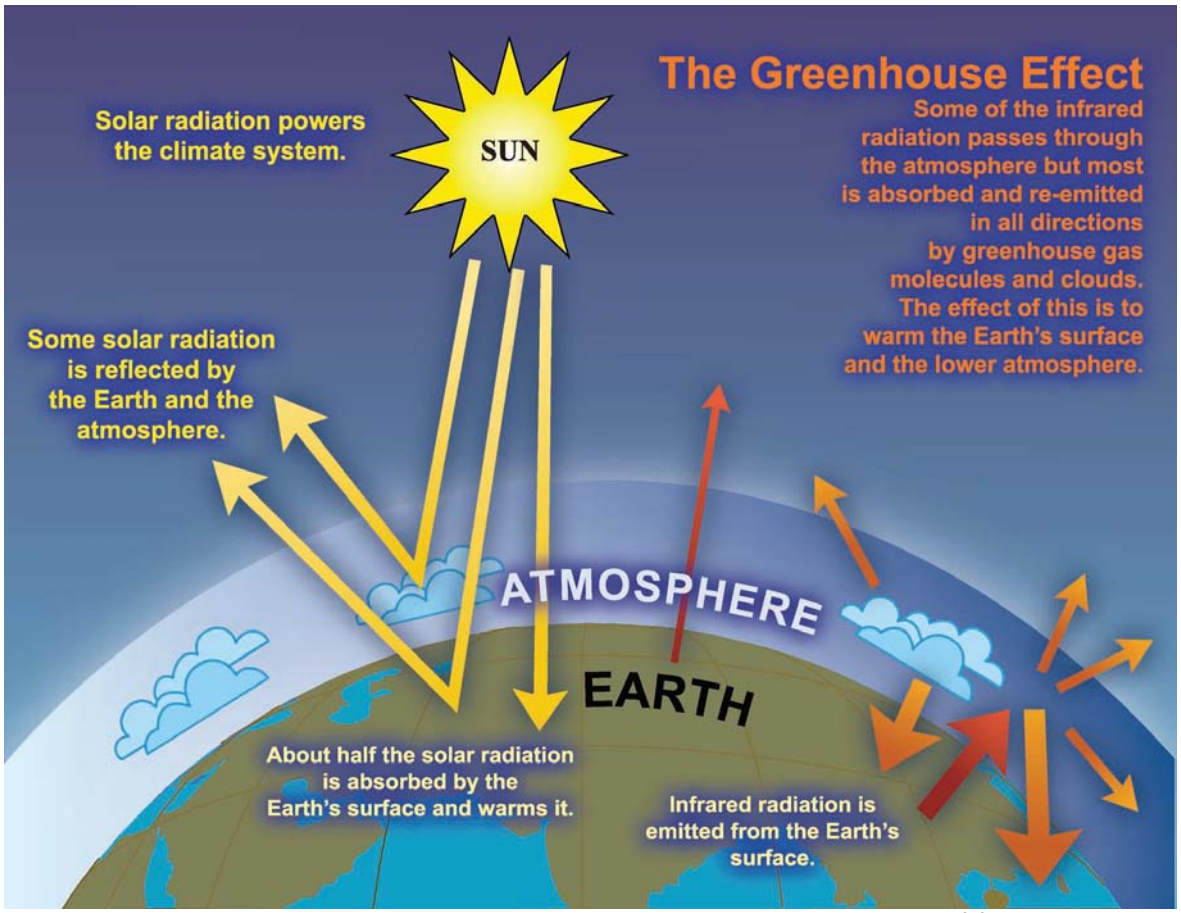
1 Previously referred to as the Minerals and Waste Development Framework (MWDF).
2 Climate is the average period of weather experienced over a long period of time, which includes temperature, wind and precipitation (rainfall, hail, sleet and snow) (DECC, 2012).
3 Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. See http://sd.defra.gov.uk/
4 See http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch9s9-7.html

Figure 1 - An idealised model of the greenhouse effect



Source: Intergovernmental Panel on Climate Change (IPCC), 2007[5].

2.2.3 Whilst the greenhouse effect is a natural phenomenon and one which is necessary to sustain life on Earth, industrialisation by humans has greatly increased the concentration of GHGs in the atmosphere; thus trapping more heat and causing a rise in global average surface temperatures beyond natural levels. This intensification of the greenhouse effect is known as global warming.

2.2.4 Global warming is largely attributable to an increase in anthropogenic CO_2 emissions caused by burning fossil fuels such as coal, oil and gas. Deforestation has also reduced the amount of CO_2 that is absorbed from the atmosphere, further accentuating the process.

2.2.5 A recent analysis by the World Meteorological Organisation (WMO) found that between 1990 and 2011 there was a 30% increase in radiative forcing (the warming effect on our climate), with the amount of GHGs in the atmosphere reaching a new record high in 2011 (Table 1)[6].

5 Frequently Asked Questions - IPCC FAQ 1.3, Figure 1.
6 See https://www.wmo.int/pages/mediacentre/press_releases/pr_965_en.html

Table 1 - Increase in GHG concentrations since the pre-industrial era

GHG	2011 level	Increase from pre-industrial level (before 1750)
Carbon dioxide	390.9 ppm	140%
Methane	1813 ppb	259%
Nitrous oxide	324.2 ppb	120%

ppm - parts per million
ppb - parts per billion

2.2.6 It is therefore important to tackle climate change by reducing the amount of CO_2 emitted by Kent's minerals and waste developments through a commitment to renewable (i.e. non-fossil fuel) energy and sustainability.

3 Climate change in Kent

3.1 Evidence of climate change in Kent

3.1.1 There has already been a noticeable change in Kent's climate since the beginning of the 20th century and climatic alterations have continued to occur in the region due to sustained global warming.

- Mean daily temperature has risen 0.9°C between 1914 and 2006 in the South East – the equivalent of moving from southern England to mid France today.
- Autumn temperatures have risen 1.3°C since the beginning of the 20th century.
- Since the mid-20th century, average sea levels have risen around the South East coastline by about 1mm per year, a rate which has increased in the 1990s and 2000s. At Sheerness, measurements show a rise of around 25cm since the mid 1800s.
- Over the past 45 years, the South East has experienced an increase in the amount of winter rain that falls in heavy downpours.
- In summer, the region has already shown decreases in rainfall.
- Earlier emergence dates for butterfly species (up to 20 days earlier in the case of the Adonis Blue, symbol of the Kent Wildlife Trust[7]).
- Earlier arrival and breeding success of bird species like the Hobby, which require a warmer climate.

3.1.2 Extreme weather events around the UK have also become more frequent in the past few decades and Kent has experienced its fair share.

- The Great Storm of October 1987 recorded gusts of 103mph in parts of Kent, driving a ferry ashore at Folkestone and capsizing a ship at Dover.
- Extensive and repeated winter flooding in 2000.
- The heatwave in 2003 recorded temperatures of 38.5ºC at Brogdale, near Faversham – the highest UK temperature since records began.
- The heatwave in July 2006 broke records for the highest average temperature for the month of July.

7 See http://www.kentwildlifetrust.org.uk/

3.1.3 In 2011 KCC undertook a Local Climate Impacts Profile (LCLIP) which highlighted that over a 12 year period severe weather events cost Kent £440m. Furthermore, we have now implemented a severe weather impacts monitoring system (SWIMS) which in 2012 recorded over £750,000 in costs from severe weather over its first year of implementation.

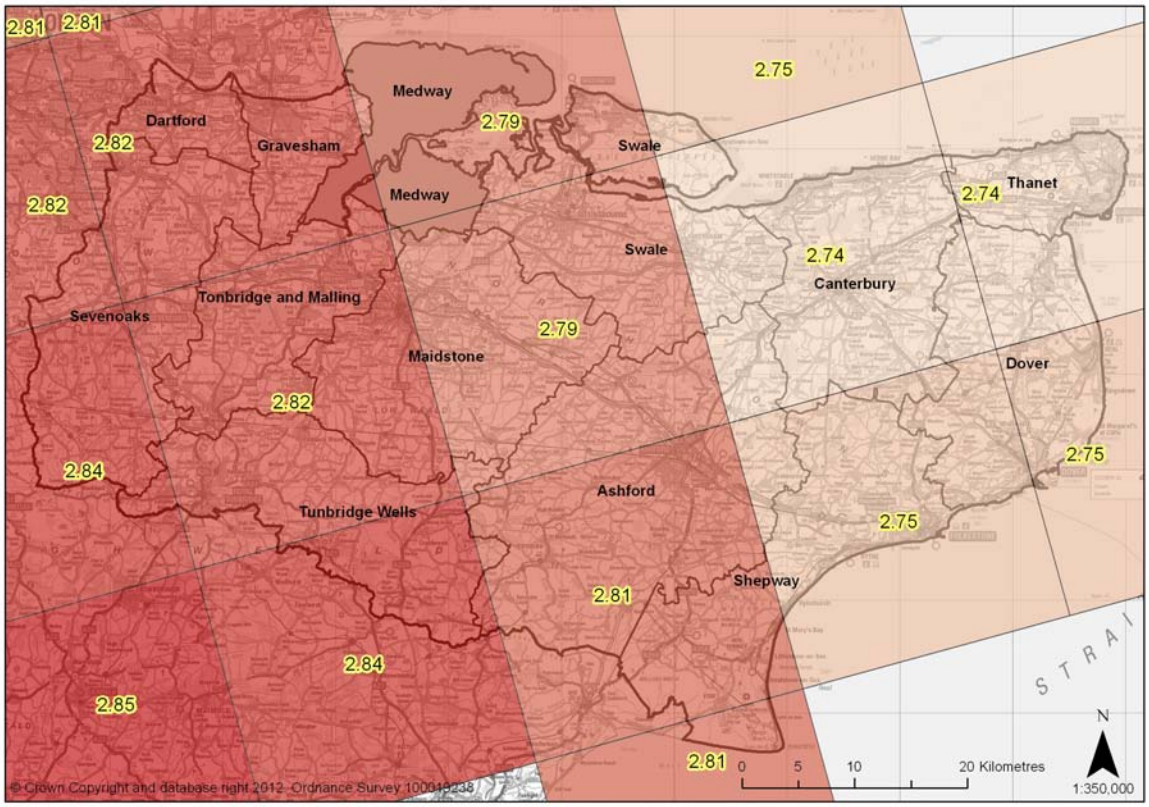
3.2 Future projections

3.2.1 Projections indicate that climate change will have a number of impacts on Kent, with the severity of these dependent on how well the county can mitigate and adapt to such changes.

3.2.2 In June 2009, The UK Climate Projections (UKCP09) were released which provide the best science to date on climate change in the UK. UKCP09 offers projections of the future climate based on our current understanding of the climate system. However, there may be scientific unknowns that would affect the information provided and hence UKCP09 should be seen as providing possible projections rather than absolute predictions or forecasts. Further information on the projections themselves and how they are derived is available on the UK Climate Impacts Programme website[8].

3.2.3 KCC has mapped the UKCP09 projections on to its current mapping system, KentView, which depicts how Kent's climate is likely to change in the future. It is wise to plan for climatic changes based on a high emissions scenario, as the ability of the UK to reduce global warming is limited and influenced by the actions of other industrialised nations. Figures 2 to 6 below show central estimations of climate change in Kent for 2050, based on the UKCP09 high emissions scenario[9].

Figure 2 - Change in Annual Mean Temperature (°C)



8 See http://www.ukcip.org.uk/
9 See http://ukclimateprojections.defra.gov.uk/23154

Figure 3 - Change in Warmest Days of Summer (°C)

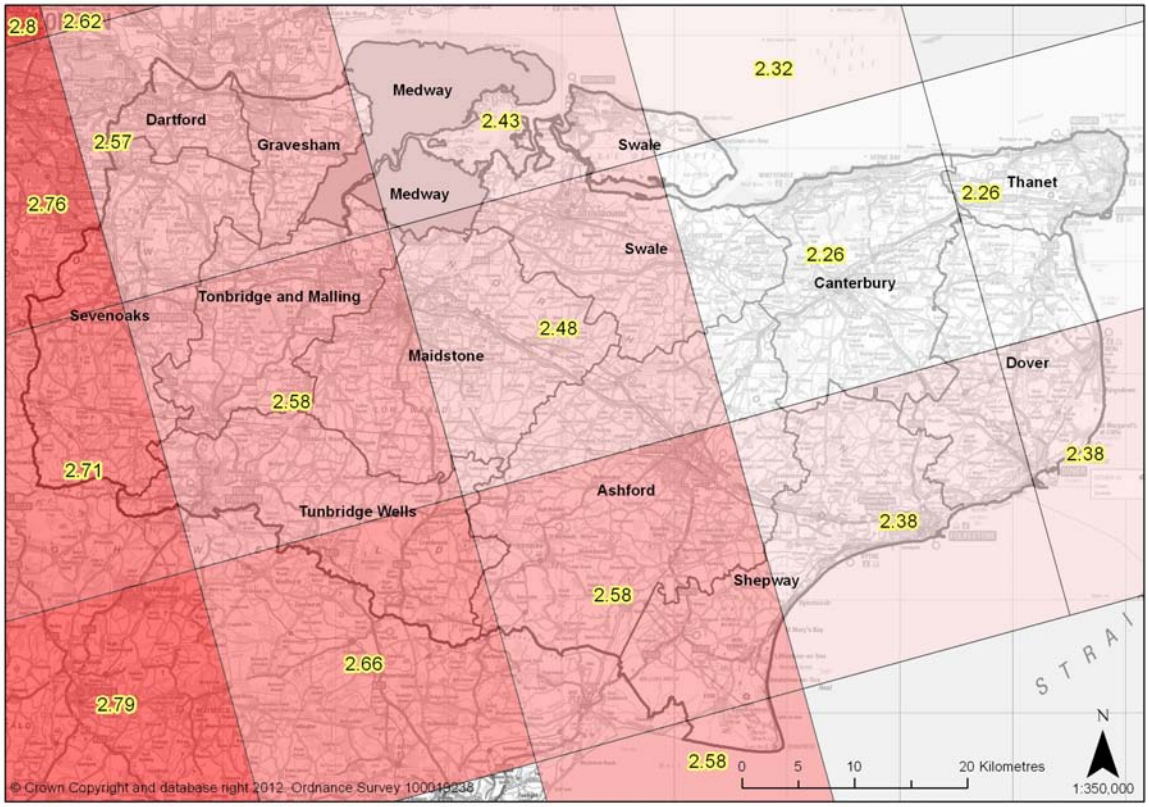


Figure 4 - Change in Summer Precipitation (%)

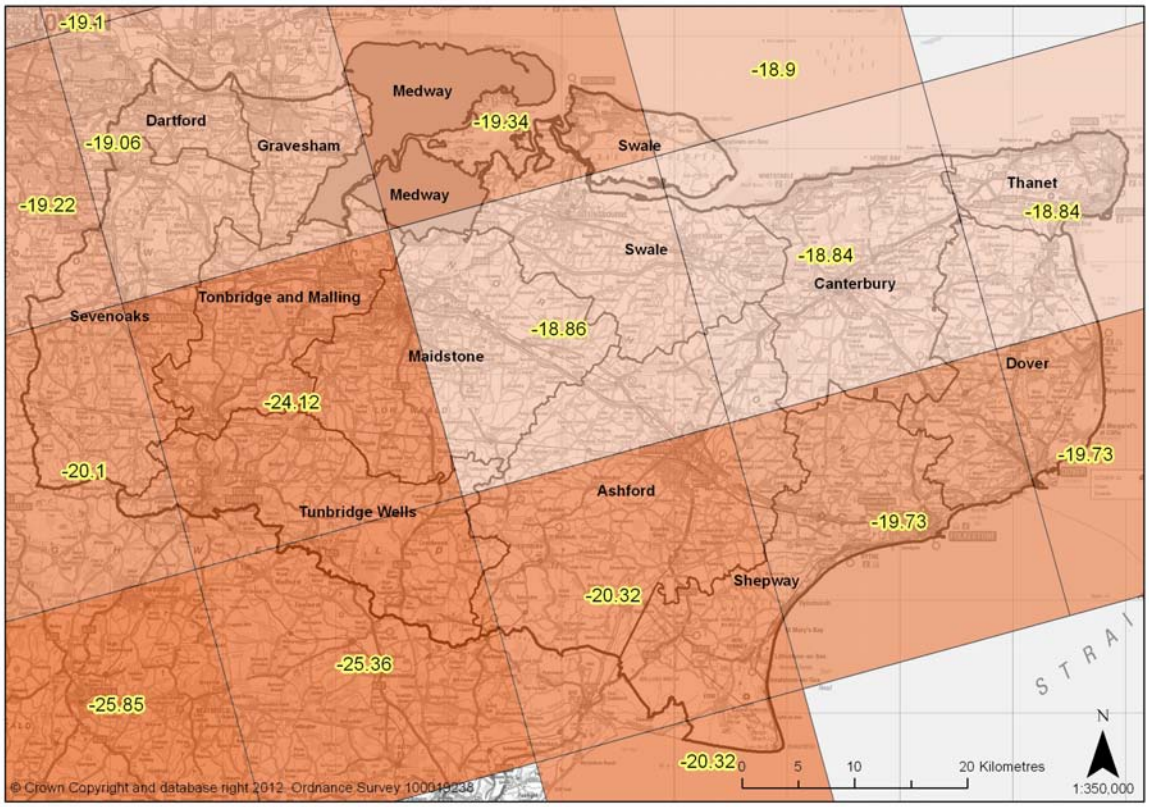


Figure 5 - Change in Winter Precipitation (%)

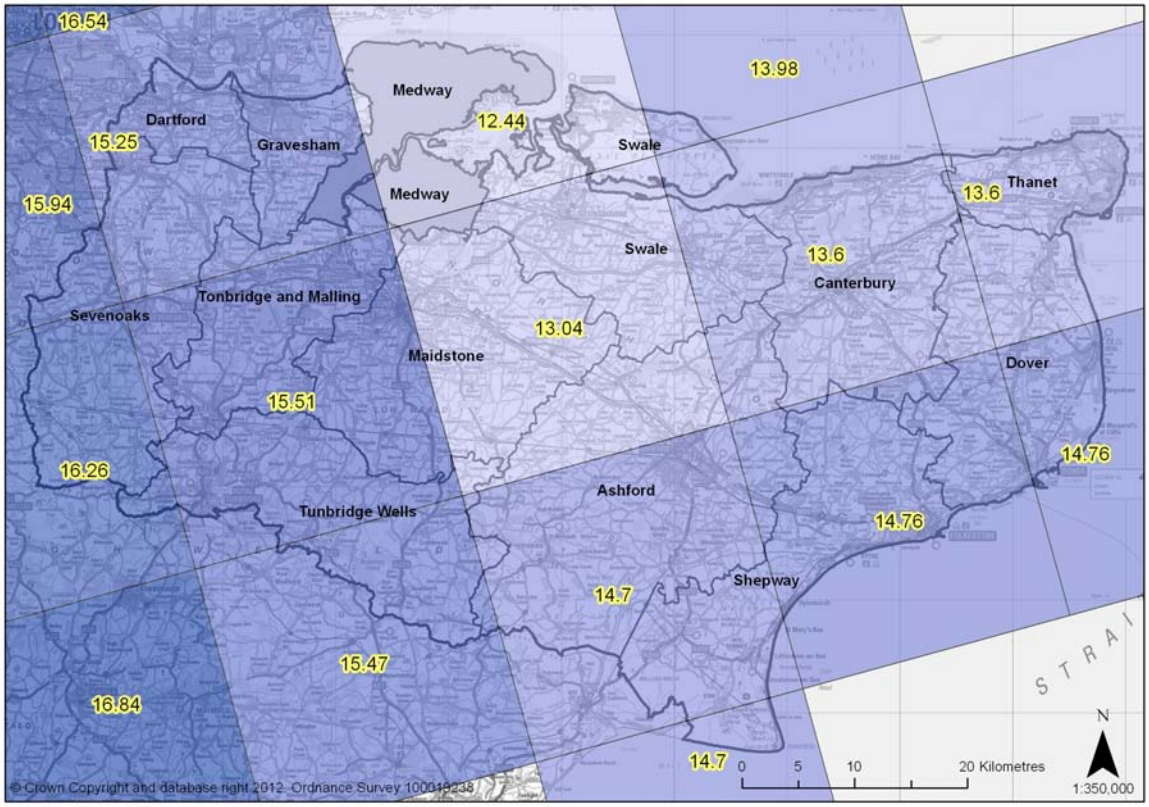
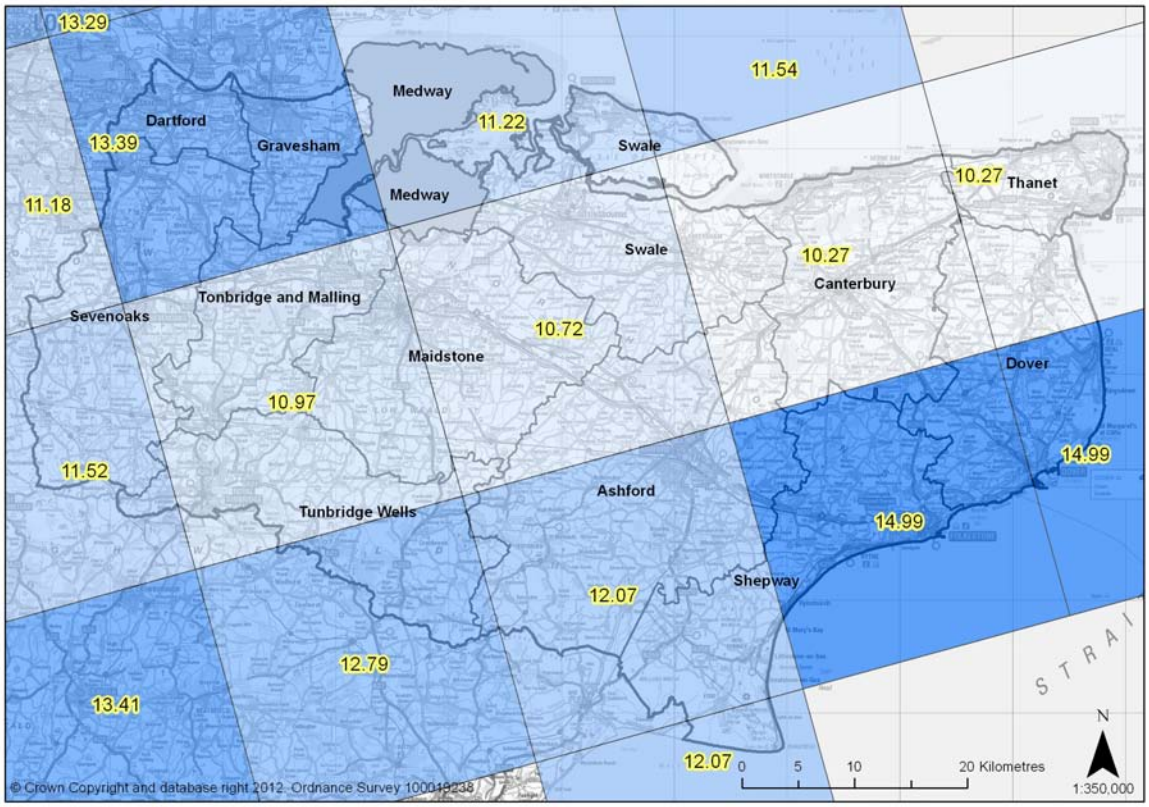


Figure 6 - Change in Wettest Days of Winter (%)



3.2.4 To summarise, current projections suggest that Kent will experience some of the greatest climatic changes in the UK. The projected impacts of climate change in Kent are outlined in Table 2 below.

Table 2 - Future climate change trends in Kent

Hotter, drier summers
• Summers are likely to be hotter by around 2.8°C • The hottest summer days could increase by up to 3.7°C • Summer night time temperatures are likely to increase by 3°C • Summer rainfall is likely to decrease by up to 25% • More 'very hot' days (the 2003 heatwave will be considered an average temperature by the 2040s)
Milder, wetter winters
• Winters are likely to be warmer by around 2.2°C • Winter rainfall is likely to increase by up to 16% • More intense downpours of rain (flash flooding) • Increased flood events (at least 8.5% of Kent's population are already at risk)
Sea level rise and increased risk of coastal flooding
Changes in storminess and high winds

4 Policy context and recommendations

4.1 National Planning Policy Framework

4.1.1 In March 2012 the Government published the National Planing Policy Framework (NPPF). This document replaced the vast majority of pre-existing Planning Policy Guidance Notes (PPGs) and Planning Policy Statements (PPSs), consolidating national planning policy down to around fifty pages of text[(10)].

4.1.2 Paragraph 2 of the Framework states that the NPPF "must be taken into account in the preparation of local and neighbourhood plans, and is a material consideration in planning decisions". It is therefore important to ensure that the MWLP is compliant with the policy contained in the NPPF, including references to climate change mitigation and adaptation.

4.2 ISO 14001

4.2.1 KCC achieved the ISO (International Organization for Standardization) 14001 standard for environmental management in 2009 (except schools). This recognises that all over the council we are embracing environmental best practice and sustainability, in order to reduce the effect on the environment for all the services we provide and our development projects.

4.2.2 ISO 14001 provides a structured process for making environmental improvements, the rate and extent of which will be determined by the organisation in light of business needs and circumstances[(11)]. The key outcomes will be:

- Minimising our environmental impacts.
- Achievement of our environmental targets.
- Reduction in carbon emissions contributing to Kent and UK carbon reduction targets.
- Improved use of resources minimising our costs.
- Compliance with relevant legislation.

4.2.3 For the MWLP, existing Household Waste Recycling Centres (HWRCs) are already included in KCC's ISO 14001 scope, thus any new HWRCs within the plan period will need to be included too. The county does not have any mineral extraction sites within ISO 14001 scope as KCC does not operate any sites and there are no current or proposed sites situated on land owned by the council.

10 Additional guidance was also published in Technical Guidance to the National Planing Policy Framework

11 See http://www.kent.gov.uk/environment_and_planning/environment_and_climate_change/environment_policy_and_targets/iso_14001.aspx

4.2.4 It is important however, to encourage operators of mineral and waste sites to achieve ISO 14001 accreditation as this will help to reduce the environmental impacts of extraction and the amount of waste that is transported and processed in Kent[12]. It is known that several mineral and waste operators in Kent already have ISO 14001 accreditation for their Kent sites.

4.2.5 The following sections address the most pertinent issues regarding climate change for minerals and waste development in Kent. Whilst the NPPF and Planning Policy Statement 10 (which which was not rescinded but will be eventually replaced by the National Waste Plan) are now the main source of national planning policy for minerals and waste, regional and local policy is also referred to where appropriate, including useful guidance which is no longer extant.

12 See http://www.kent.gov.uk/sustainablebusiness for information on how KCC can help businesses to cut costs, reduce their environmental impacts and ensure resilience to climate change.

4.3 Climate change policy

4.3.1 The benefits of tackling climate change are obvious, not just in terms of reducing impacts on the natural environment, but also for Kent's economy and its residents. In 2006 the **Stern Review on the Economics of Climate Change**[13] highlighted the potential effects of climate change on the world economy, concluding that "the benefits of strong and early action far outweigh the economic costs of not acting".

4.3.2 It is therefore necessary to reduce the contribution that mineral and waste sites make towards climate change as this is beneficial for Kent's economy and communities. Integrating planning for severe weather and climate change now will save money in the long term and as such will enable KCC to deliver a more effective service.

4.3.3 The **NPPF** contains twelve core planning principles, a number of which refer to climate change mitigation and resilience. The document states that plans should[14]:

- Be kept up-to-date, and be based on joint working and co-operation to address larger than local issues.
- Contribute to conserving and enhancing the natural environment and reducing pollution.
- Support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change.
- Encourage multiple benefits from the use of land in urban and rural areas, recognising that some open land can perform many functions (e.g. flood risk mitigation, carbon storage).

4.3.4 More specifically, paragraphs 93 and 94 of the NPPF state that:

- Planning plays a key role in helping shape places to secure radical reductions in greenhouse gas emissions, minimising vulnerability and providing resilience to the impacts of climate change, and supporting the delivery of renewable and low carbon energy and associated infrastructure. This is central to the economic, social and environmental dimensions of sustainable development.
- Local planning authorities should adopt proactive strategies to mitigate and adapt to climate change, taking full account of flood risk, coastal change and water supply and demand considerations.

13 See http://www.hm-treasury.gov.uk/stern_review_report.htm
14 NPPF paragraph 17.

4.3.5 The **South East Plan**[15] highlights the importance of incorporating climate change resilience in local authority plans in Policies CC1 and CC2:

- Sustainable development should reduce greenhouse gas emissions associated with the region and ensure that the South East is prepared for the inevitable impacts of climate change.

- Local authorities, agencies and others will include policies and proposals in their plans, strategies and investment programmes to help reduce the region's carbon dioxide emissions by at least 20% below 1990 levels by 2010, by at least 25% below 1990 levels by 2015 and by 80% by 2050 *(i.e. in accordance with the targets set by the **Climate Change Act 2008**).*

4.3.6 **The Planning Act 2008** introduced a statutory duty to adapt to climate change, stating that in preparing Development Plan Documents (DPDs), local authorities "must (taken as a whole) include policies designed to secure that the development and use of land in the local planning authority's area contribute to the mitigation of, and adaptation to, climate change".

4.3.7 **Planning and Climate Change: Supplement to Planning Policy Statement (PPS) 1** was introduced as a supplement to PPS 1: Delivering Sustainable Development. Although it has now been replaced by the NPPF, it contains useful guidance on how planning authorities should (a) mitigate climate change by reducing emissions; and (b) adapt to the impacts of a changing climate, considering the environmental, economic and social costs of climate change. **The MWLP should address climate change by:**

15 See South East Plan

- Continuing to drive waste up the waste hierarchy.
- Reducing energy and water consumption and greenhouse gas emissions, and incorporating measures for renewable energy technology and design[(16)].
- Considering all forms of flood risk and accounting for projected increases in the frequency of flood events.
- Implementing sustainable restoration initiatives to preserve and enhance biodiversity and alleviate flood risk[(17)].
- Reducing road miles and pollution caused by the transportation of minerals and waste materials through appropriate siting and encouragement of sustainable transport methods (i.e. rail, sea and inland waterways).
- Safeguarding railheads and wharves for future use.

4.3.8 The *Minerals and Waste Core Strategy: Strategy and Policy Directions Consultation* document also contains policies CSM1 and CSW1 which state that all new minerals and waste development "must assist in mitigating the effects of climate change". The contribution of new sites toward mitigation and adaptation to the effects of climate change is also included as a strategic objective for the plan.

4.3.9 Despite being replaced by the NPPF, **PPS 22: Renewable Energy** provides guidance on how the planning system can help implement the government's aims for the generation of energy from renewable sources. Waste development in particular can contribute to this aim. The accompanying good practice guidance to PPS22 recognises the following types of waste related sources of renewable energy:

- Energy from waste (biological processes) – including anaerobic digestion, landfill & sewage gas.
- Energy from waste (thermal processes) – including pyrolysis and gasification.

4.3.10 Through embracing renewable energy systems in minerals and waste development, the MWLP will make a positive contribution towards reducing the production of GHGs and therefore the effects of anthropogenic climate change.

16 See Policy DM1 of the Minerals and Waste Core Strategy: Strategy and Policy Directions Consultation

17 See Policy DM15 of the Minerals and Waste Core Strategy: Strategy and Policy Directions Consultation

4.4 Duty to co-operate

4.4.1 The duty to co-operate was brought into effect on the 15 November 2011, when the **Localism Act** received Royal Assent. The "duty to co-operate in relation to planning of sustainable development" relates to sustainable development or use of land that would have a significant impact on at least two local planning areas or on a planning matter that falls within the remit of a county council.

4.4.2 In order to encourage joint working and assist in the development of sound Local Plans, Section 110 of the Act requires local authorities to "engage constructively, actively and on an ongoing basis" with neighbouring councils and prescribed bodies (i.e. the Environment Agency, Natural England, the Homes and Communities Agency, highways authorities etc[18]) on strategic issues of common concern.

4.4.3 Paragraph 156 of the NPPF outlines the key strategic priorities that should be considered under the duty to co-operate which includes:

- The provision of infrastructure for transport, telecommunications, waste management, water supply, wastewater, flood risk and coastal change management, and the provision of minerals and energy (including heat).

- Climate change mitigation and adaptation, conservation and enhancement of the natural and historic environment, including landscape.

4.4.4 The duty to co-operate can therefore help facilitate climate change mitigation and adaptation within the county and will require KCC to engage and consult with neighbouring authorities and prescribed bodies during the plan making process and throughout the lifetime of the MWLP.

18 Full list available at http://www.legislation.gov.uk/uksi/2012/767/regulation/4/made

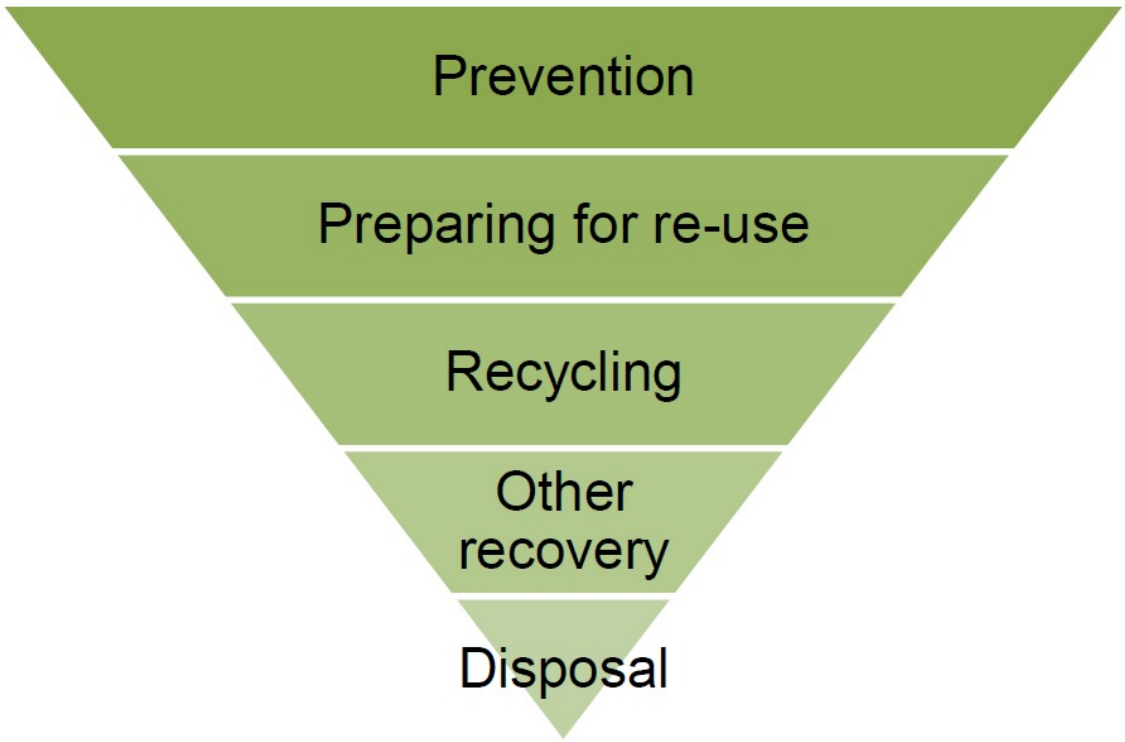
4.5 The waste hierarchy

4.5.1 Direct emissions from waste management contribute towards increased concentrations of GHGs, and when emissions from the whole life of materials and products are included, the contribution of waste management, including prevention, becomes significant. Waste management is closely linked to climate change because if minerals and other natural resources are not reused or recycled, then new primary resources have to be extracted and new products manufactured resulting, in the use of additional energy and increased GHG emissions.

4.5.2 The revised **Waste Framework Directive (Directive 2008/98/EC)** introduces a changed hierarchy of options for managing wastes (Figure 7). It gives top priority to preventing waste in the first place. When waste is created, it gives priority to preparing it for re-use, then recycling, then other recovery such as energy recovery, and last of all disposal (e.g. landfill). **The Waste (England and Wales) Regulations 2011** apply the requirements of the waste hierarchy.

4.5.3 **PPS 10: Planning for Sustainable Waste Management** (which remains extant) also provides guidance on how Waste Planning Authorities (WPAs) should drive waste up the waste hierarchy. In a similar approach, the NPPF promotes the use of secondary and recycled materials and minerals waste before extraction of primary materials.

Figure 7 - The waste hierarchy



4.5.4 Application of the waste hierarchy can help to mitigate climate change in a number of ways:

- Prevention – the most effective environmental solution is often to reduce the generation of waste, including the re-use of products.

- Preparing for re-use – products that have become waste can be checked, cleaned or repaired so that they can be re-used.

- Recycling – waste materials can be reprocessed into products, materials, or substances. This includes composting if it meets quality protocols.

- Other recovery – waste can serve a useful purpose by replacing other materials that would otherwise have been used. Recovery includes: anaerobic digestion, incineration with energy recovery (energy from waste), gasification and pyrolysis which produce energy (fuels, heat and power) and materials from waste, and backfilling (e.g. the restoration of quarries with inert material that is not recyclable).

  The intention of allocating four EfW (energy from waste) facilities in the MWLP will help to (a) reduce the county's dependency on fossil fuels for energy creation; and (b) minimise the amount of biodegradable waste that is sent to landfill, thus reducing climate-altering methane and CO_2 emissions.

  The 2012 report *Renewable Energy in Kent*[19] also outlines the need for the MWLP to maintain an-going supply of green waste streams in order to facilitate bioenergy recovery. Energy derived from green waste is renewable (i.e. naturally replenished) and if correctly managed, can deliver a significant reduction in net carbon emissions when compared with fossil fuels.

- Disposal (e.g. reduction in waste that is sent to landfill) – the least desirable solution where none of the above options is appropriate. The landfilling of biodegradable waste is particularly detrimental, as this produces methane (in addition to CO_2) during decomposition. Methane is 23 times more potent a GHG than CO_2 and accounts for 7% of the UK's total GHG emissions, with landfilled waste accounting for 35.6% of the UK's methane emissions in 2010[20]. Reducing the amount of biodegradable waste that is land-filled is one of the key objectives of the **Landfill Directive**.

19 See Renewable Energy for Kent report.
20 See http://www.decc.gov.uk/assets/decc/11/stats/climate-change/5556-methane-factsheet.pdf

4.5.5 Strict adherence to the principles of the waste hierarchy can help to maximise the contribution that minerals and waste sites make towards reducing climate change. **The Minerals and Waste Core Strategy and Site Allocations Documents will need to address climate change by:**

- Continuing to drive waste up the waste hierarchy – both in terms of diverting biodegradable waste from landfill and associated methane emissions, and also in terms of maximising the potential for reuse, recycling and recovery of resources – in order to minimise the demand for new resources and the greenhouse gases generated in their production.
- Including policies which:

  (a) support the generation of energy from renewable resources for minerals and waste sites; and

  (b) promote the use of site design and layout principles which minimise energy consumption and greenhouse gas emissions.

4.6 Flood risk

4.6.1 Whilst minerals and waste sites are already assessed against flood risk, climate change is likely to increase the occurrence and severity of flood events in the plan area due to:

- Higher precipitation levels and increased extreme rainfall events, particularly during the winter months.
- Sea level rise caused by global warming.

4.6.2 The NPPF has replaced the previous planning policy document on flooding (PPS 25: Development and Flood Risk) however, many of its key elements have been retained in the NPPF **Technical Guidance to the National Planning Policy Framework.** Whilst PPS 25 itself is no longer extant, the **Practice Guide** to the statement has remained and states that "waste and mineral planing authorities (including county councils) need to take account of flood risk when allocating land for development"[(21)].

4.6.3 The Technical Guidance to the NPPF categorises flood risk areas into four zones – Zone 1, Zone 2, Zone 3a and Zone 3b – based on differing annual probabilities of river or sea flooding. Flood Zones 1, 2 and 3a are described as areas of low, medium and high probability of river or sea flooding respectively; Zone 3b is defined as the functional floodplain (i.e. comprising of land where water *has* to flow or be stored in times of flood). Table 3 below defines the four different flood zones and outlines the types of minerals and waste development that are considered appropriate for each zone (see underlined text).

Table 3 - Flood zones

Zone 1
• This zone comprises land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%). • The overall aim is to steer new development to land within Flood Zone 1 and developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development and appropriate use of sustainable drainage systems. • The Sequential Test[(22)] identifies any land use as appropriate in this zone. This includes all minerals and waste development.

21 PPS 25: Development and Flood Risk - Practice Guide paragraph 2.25.

22 The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. NPPF paragraph 101 states that "development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding". The SFRA will provide the basis for applying this test.

Zone 2
• This zone comprises land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year. • Development within Flood Zone 2 should seek opportunities to reduce the overall level of flood risk in the area through layout and form of the development and the appropriate application of sustainable drainage systems. • The Sequential Test identifies sand and gravel workings, wharves, minerals working and processing, waste treatment sites and landfill sites for waste management facilities and hazardous wastes as appropriate for land within this zone.
Zone 3a
• This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year. • Development within Flood Zone 3a should seek opportunities to reduce the overall level of flood risk in the area through layout and form of the development and appropriate use of sustainable drainage systems, relocating existing development to land in zones with a lower probability of flooding and create space for flooding to occur by restoring functional floodplain and flood flow pathways and by identifying, allocating and safeguarding open space for flood storage. • Sand and gravel workings are considered suitable for land within this zone and also wharves, minerals working and processing and waste treatment (except landfill and hazardous waste facilities).
Zone 3b
• This zone comprises land where water has to flow or be stored in times of flood. • Development within Flood Zone 3b should seek opportunities to reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage systems, and relocate existing development to land with a lower probability of flooding. • Sand and gravel workings and wharves are considered appropriate land uses within this zone.

4.6.4 The NPPF requires Local Plans to be supported by a Strategic Flood Risk Assessment (SFRA) to collate information on all known sources of flooding that may affect existing or future development within the plan area and to develop policies which will manage flood risk from all sources. In producing a SFRA, local authorities are required to consult with the Environment Agency and other relevant flood risk management bodies, such as the lead local flood authorities and internal drainage boards[23].

4.6.5 Two SFRAs[24] have already been produced as part of the evidence base for the Minerals and Waste Sites Preferred Options Documents which summarise the flood risk associated with each preferred option minerals and waste site. The SFRAs also consider the effects of climate change, using the "Recommended national precautionary sensitivity ranges for peak rainfall intensities, peak river flows, offshore wind speeds and wave heights"[25] contained in the Technical Guidance to the NPPF.

4.6.6 The effects of climate change on flood risk are outlined as a key consideration in paragraph 100 of the NPPF which states that Local Plans should apply a sequential, risk-based approach to the location of development to avoid, where possible, flood risk to people and property and manage any residual risk, taking account of the impacts of climate change, by:

- Applying the Sequential Test and if necessary, the Exception Test[26].
- Safeguarding land from development that is required for current and future flood management.
- Using opportunities offered by new development to reduce the causes and impacts of flooding, both for the site and the wider area.

4.6.7 Findings from this paper show that minerals and waste development can be located in flood zones, subject to meeting the requirements of the Sequential Test and where appropriate, the Exception Test. It is important that the MWLP does not increase flood risk in areas prone to flooding and elsewhere, and where possible, helps to alleviate the risk of future flood events[27].

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23 NPPF paragraph 100.
24 See Minerals and Waste Sites SFRAs
25 Technical Guidance to the National Planning Policy Framework Table 5.
26 NPPF paragraph 102 states that if, following application of the Sequential Test, it is not possible, consistent with wider sustainability objectives, for the development to be located in zones with a lower probability of flooding, the Exception Test can be applied if appropriate. In order pass the Exception Test it must be demonstrated that the development will both (a) provide wider sustainability benefits to the community that outweigh flood risk; and (b) be safe for its lifetime through the submission of a site-specific flood risk assessment.
27 See Policy DM7 of the Minerals and Waste Core Strategy: Strategy and Policy Directions Consultation

4.6.8 Although minerals and waste development can exacerbate flooding, it can also play an important role in alleviating the risk of future flood events. For example:

- Quarries can help to attenuate the severity and frequency of flood events by:

  (a) holding large volumes of water during flood events to increase flood storage and slow surface runoff; and

  (b) providing an important source of green infrastructure through well-designed restoration and landscaping (i.e. creation of ponds, lagoons, lakes, swales etc).

- Waste sites can help to attenuate flood risk through effective site design and layout, and appropriate landscaping.

4.6.9 The Minerals and Waste Core Strategy and Site Allocations Documents will need to plan for the projected increase in flood events as a result of climate change by:

- Including policies to support the minimisation and mitigation of flood risk.
- Ensuring applications for minerals and waste development have considered flood risk, including the effects of climate change on all sources of flooding[(28)].
- Ensuring mitigation measures are fit for purpose.
- Promoting, where possible, the use of site design and layout principles which reduce flood risk.

28 Paragraph 2 of Technical Guidance to the National Planning Policy Framework defines "flood risk" as risk from all sources of flooding – including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources.

4.7 Biodiversity

4.7.1 Biodiversity and ecosystem services are sensitive to gradual changes in climate (e.g. increasing temperatures) and to more abrupt changes caused by extreme weather events (e.g. droughts, floods and storm surges)[29]. It is therefore likely that climate change will pose a number of implications for biodiversity in Kent and thus the MWLP should ensure that minerals and waste development can make a positive contribution towards alleviating such impacts.

4.7.2 Alongside reducing CO_2 emissions, the restoration of former minerals and waste sites is a key measure that can be implemented to help mitigate the effects of climate change on biodiversity. By restoring former sites to provide green (vegetation cover) and blue (water) space, this creates habitats for flora and fauna to become established and thrive.

4.7.3 The **Kent Biodiversity Action Plan (BAP)**[30]. The Kent BAP is formed of 28 Habitat Action Plans (HAPs). Each Plan sets out the projects and initiatives that will be taken forward in partnership to conserve, enhance and restore the priority habitats in Kent as identified by the **UK BAP**[31].

4.7.4 Proposals for minerals and waste development will need to demonstrate that consideration has been given to the 28 HAPs located in Kent and where possible provide a meaningful contribution towards the preservation and enhancement of UK BAP priority habitats. Due regard should also be given to the location of any internationally, nationally or locally designated sites (e.g. Natura 2000 sites, Regionally Important Geological Sites, Local Wildlife Sites etc).

4.7.5 In order to mitigate the effects of climate change on biodiversity in Kent, the Minerals and Waste Core Strategy and Site Allocations Documents will need to:

- Include policies which enhance biodiversity and contribute significantly to the aims of the Kent BAP, through:

  (a) appropriate site management; and

  (b) effective restoration and after use schemes[32].

29 See UK Climate Change Risk Assessment.
30 See http://www.kentbap.org.uk/
31 See http://jncc.defra.gov.uk/page-5155
32 See Policies DM15 and DM16 of the Minerals and Waste Core Strategy: Strategy and Policy Directions Consultation

4.8 Transportation of minerals and waste

4.8.1 Due to their bulky nature and relatively low value, minerals and waste materials are predominantly transported using heavy goods vehicles (HGVs) along both local and strategic road networks.

4.8.2 The transportation of minerals and waste by road contributes towards climate change due to the GHGs produced by vehicles moving products around the county. In 2010, emissions from road transport accounted for 31% of Kent's total CO_2 emissions[33].

4.8.3 Traffic relating to minerals and waste development can also cause air pollution, especially in areas where multiple sites are located in close proximity to one another (i.e. cluster sites) and for sites which are located in or close to an existing Air Quality Management Area (AQMA)[34]. The location of existing AQMAs and the minerals and waste proposals at Preferred Options stage are shown in Appendix A.

4.8.4 It is important to reduce the adverse effects associated with the transportation of minerals and waste and also the cumulative contribution that the MWLP and other growth agendas for Kent[35] will make towards climate change, not just in terms of GHG emissions but also impacts on biodiversity in internationally, nationally and locally designated wildlife sites.

4.8.5 **Minerals Policy Statement (MPS) 1: Planning and Minerals** (replaced by the NPPF) includes climate change considerations relating to the transportation of minerals, highlighting the importance of locally sourced products and thus reduced road miles. Paragraph 15 states that Mineral Planning Authorities (MPAs) should:

- Take account of the benefit, including the reduction in carbon emissions, which local supplies of minerals would make in reducing the impact of transporting them over long distances by road.

MPS 1 also states that MPAs should[36]:

- Seek to promote and enable the bulk movement of minerals by rail, sea or inland waterways to reduce the environmental impact of their transportation.

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33 Total CO_2 emissions for Kent in 2010 were 11,040.36 kilotonnes (kt); road transport accounted for 3,437.68 kt. See Local Local and regional CO2 emissions estimates for 2005-2010 – Full dataset (DECC).

34 An AQMA is an area declared by local authorities where air quality needs to be improved. This area is monitored for various pollutants while improvements are put in place (e.g. traffic management schemes).

35 Such as Growth without Gridlock (Transport Delivery Plan for Kent), Kent's Third Local Transport Plan (LTP3) and the Freight Action Plan

36 MPS 1: Planning and Minerals paragraph 16.

- Promote facilities at ports and rail links that have good communications inland, so that bulk minerals can be landed by sea and distributed from ports, as far as is practicable, by rail or water.

- Safeguard and promote rail links to quarries where there is potential to move minerals by rail.

4.8.6 The safeguarding of railheads and wharves is a key aim of the MWLP as this can help to reduce the need for the transportation of minerals and waste by road, thus minimising GHG emissions. Policy CSM10 of the KCC **Minerals and Waste Core Strategy: Strategy and Policy Directions Consultation** safeguards 16 wharves and railheads collectively, stating that[37]:

- Applications for development adjacent to or opposite a safeguarded importation facility will need to demonstrate that acceptable levels of noise, dust, light and air emissions derived from the current importation site would be experienced at the development. Vehicle access to and from the wharf or railhead must not be jeopardised by the development.

Policy CSM9 also supports the need to reduce road miles, stating that planning permission will be granted for new wharf and railhead importation operations which include the transport of the minerals by sustainable means (i.e. rail, sea or inland waterways) providing[38]:

- They are well located in relation to the Key Arterial Routes across Kent.

- Environmental impacts can be controlled so that there is no significant effect upon sensitive receptors.

4.8.7 The **Practice Guide** to MPS 1 (which remains extant) recognises however, that whilst there are economic and environmental advantages in transporting large amounts of heavy materials by rail or water, this can only be utilised if there is the network capacity and adequate loading and reception facilities. Hence the importance of identifying potential loading and unloading depots and wharves, and to safeguard these from potentially competing resources.

4.8.8 The Practice Guide also recognises that low priced minerals, such as sand and gravel, tend to be secured locally whereas higher priced commodities, such as high specification igneous rocks, can bear longer distances. Consequently, the lower priced materials, such as aggregates, are often transported for short distances from the quarry by road[39].

37 See Policy CSM10 of the Minerals and Waste Core Strategy: Strategy and Policy Directions Consultation

38 See Policy CSM9 of the Minerals and Waste Core Strategy: Strategy and Policy Directions Consultation

39 MPS 1: Planning and Minerals - Practice Guide paragraph 58.

4.8.9 Whilst **MPS 2: Controlling and Mitigating the Environmental Effects of Minerals Extraction in England** (replaced by the NPPF) does not specifically refer to integrating climate change considerations, it does set out how MPAs should incorporate the objectives of sustainable development. Paragraph 4 states that MPAs should aim to:

- Conserve minerals as far as possible, whilst ensuring an adequate supply to meet the needs of society.
- Ensure that the environmental impacts caused by mineral operations and the transport of minerals are kept to an acceptable minimum.

4.8.10 **Designing Waste Facilities: A Guide to Modern Design in Waste**[40] was published in 2008 by the Department for Environment, Food and Rural Affairs (Defra) and the Commission for Architecture and the Built Environment (CABE) to provide a sustainable design guide for waste development and to take into account the need to mitigate and adapt to climate change. The minimisation of road transportation is included as a key theme throughout the report which also endorses the movement of waste by more sustainable methods such as rail, sea and canal in order to secure significant reductions in GHG emissions.

4.8.11 The NPPF and **PPS 10: Planning for Sustainable Waste Management** (which remains extant) states that "waste management should be considered alongside other spatial planning concerns, such as transport, housing, economic growth, natural resources and regeneration". PPS 10 also includes a list of criteria that waste sites should be assessed when considering their suitability for development. Paragraph 21(i) states that WPAs should assess a waste site's suitability for development based on:

- the capacity of existing and potential transport infrastructure to support the sustainable movement of waste, and products arising from resource recovery, seeking when practicable and beneficial to use modes other than road transport.

4.8.12 Findings from this paper show that the transportation of minerals and waste can contribute significantly towards climate change and air quality degradation, thus posing serious implications for residents' health and biodiversity. It is therefore beneficial for minerals and waste development to be located where it:

- is well related to the strategic route network;
- has potential for the sustainable movement of materials (i.e. rail, sea or inland waterways); and/or
- can minimise operational road miles.

40 See http://archive.defra.gov.uk/environment/waste/localauth/documents/designing-waste-facilities-guide.pdf

4.8.13 In order to mitigate the negative impacts of transporting minerals and waste, the Minerals and Waste Core Strategy and Site Allocations Documents will need to:

- Integrate consideration of carbon emissions and air pollution associated with the transportation of minerals and waste alongside the cumulative impacts of other key strategies for Kent, taking into account:

  (a) increased volumes of traffic; and

  (b) increased pollution, particularly for multiple sites located in close proximity to one another (cluster sites) and sites located in or close to an existing Air Quality Management Area.

- Include policies which[41]:

  (a) support the transport of minerals and waste by rail, sea or inland waterways; and

  (b) support the minimisation of road miles, except where:

  i. there is no practicable alternative to road transport which would be environmentally preferable;

  i. the proposed access arrangements would be safe and appropriate to the proposed development and the impact of the traffic generated would not be detrimental to road safety to an unacceptable degree; and

  ii. the highway network is able to accommodate the traffic that would be generated and the impact of the traffic generated would not have an unacceptable impact on the environment or local community.

41 See Policy DM10 of the Minerals and Waste Core Strategy: Strategy and Policy Directions Consultation

Appendix A: Location of AQMAs and proposed sites

Figure 8 - Location of AQMAs and proposed minerals and waste sites (at Preferred Options stage)