

LOCAL CLIMATE IMPACTS PROFILE (LCLIP) UPDATE

1 Purpose

- 1.1 To update Environment and Living Scrutiny members on the production of the Council's second Local Climate Impacts Profile (LCLIP) addressing climate change adaptation issues.

2 Recommendations

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| 2.1 That Committee members note the production of the updated LCLIP and agree to its publication on the Council's website. |
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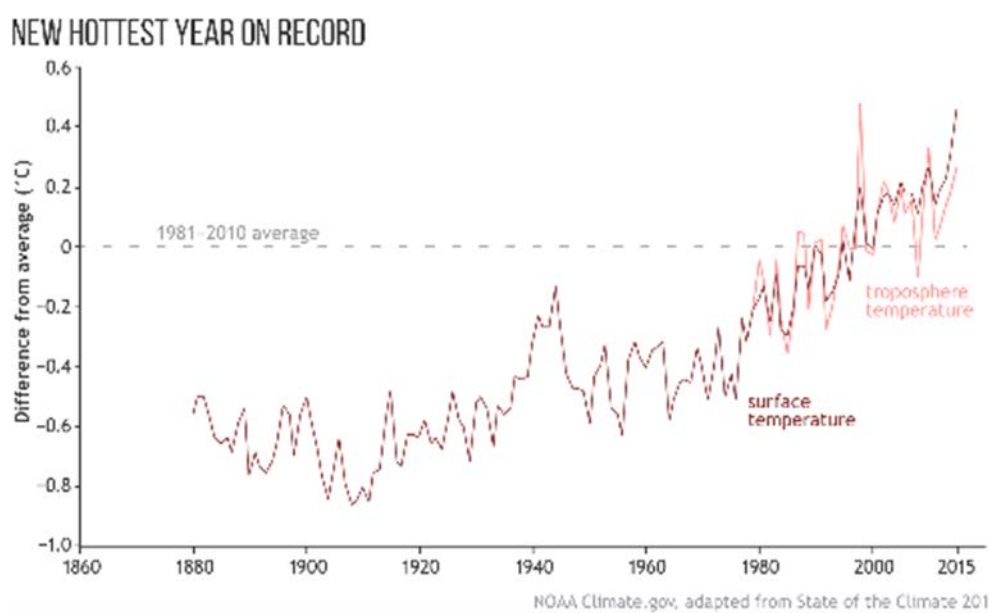
3 Executive summary

- 3.1 This report is to update the Committee on the Council's Climate Change Adaptation measures. Adaptation involves adjusting systems, processes or methods of working so as to increase the resilience to changes and risks posed by climate change.
- 3.2 The LCLIP (see appendix 2) is a document first produced in 2008. As the first district council LCLIP in the country at the time, it set out to assess the period 2000 to 2008 using archived news and local weather data for the Vale and North Bucks region.
- 3.3 Extreme weather occurrences in the news were matched to extremes of weather (rain, drought, flood, snow, ice, storms etc.) events in the locality. These were then discussed with stakeholders from public sector departments to provide information about the effects that these occurrences had caused to services and the disruption and costs of these.
- 3.4 It is an accepted fact that extreme weather events will become more frequent over the coming years. Adapting to what will become normal business will become necessary and will save organisations, including the Council, significant costs. The cross party endorsed review paper http://webarchive.nationalarchives.gov.uk/+http://www.hm-treasury.gov.uk/sternreview_index.htm written by the economist Sir Nicholas Stern in 2006 stated:
- 3.5 Unabated climate change could cost the world at least 5% of GDP each year. If more dramatic predictions come to pass, the cost could be more than 20% of GDP.
- 3.6 In contrast, the cost of action – reducing greenhouse gas emissions to avoid the worst impacts of climate change can be limited to around 1% of global GDP, if actions are taken early.
- 3.7 The attached LCLIP is an update on this first LCLIP and sets out the continuing period 2008 to 2016.

4 Supporting Information

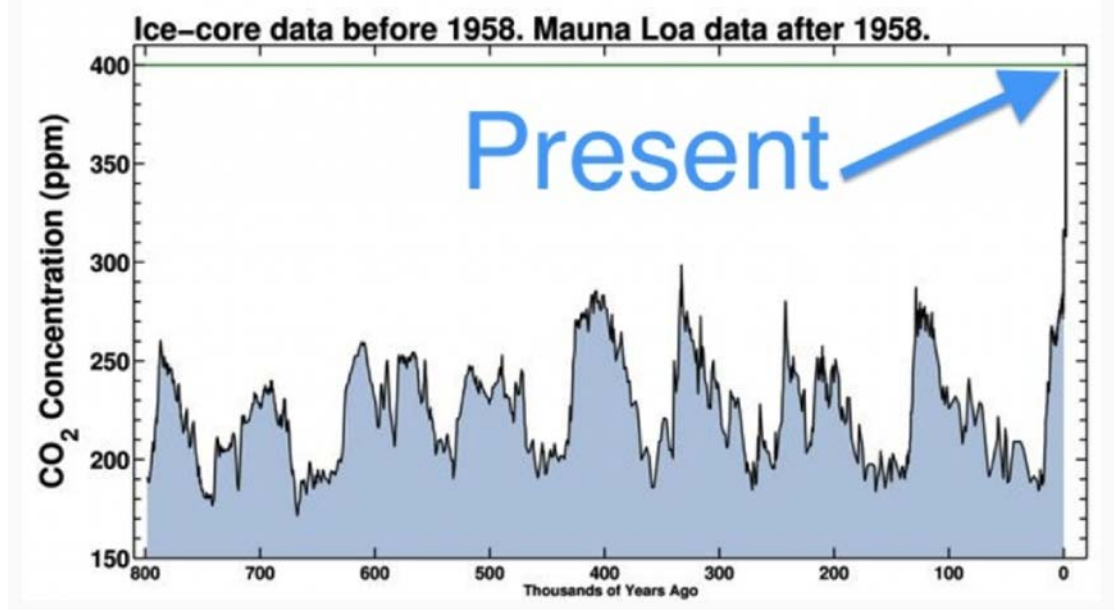
- 4.1 The case for a changing climate is set out in the graphs below: The 2015 Paris accord requires the world's average global temperatures to plateau at 1.5C above pre (1750AD) industrial levels.
- 4.2 In 2015 it was announced that global average temperatures had already reached 1C above pre industrial levels (see graph at 4.8 below provided

by <https://www.carbonbrief.org/scientists-confirm-multiple-climate-records-broken-in-2015>):



- 4.3 The first 9 months of data for 2016 show that global temperatures surpassed those of 2015.
- 4.4 Clearly whilst national governments argue over the achievement of an aspirational target of 2°C with a real aim of 1.5°C maximum temperature increase from pre industrial levels, the world has already made a 1°C temperature increase.
- 4.5 Mitigation (carbon reduction measures) alone will be insufficient to address this issue. Building in resilience to a changing climate with consequent increased severity and frequency of extreme weather events is crucial to the maintenance of workable operations and services.
- 4.6 This trend is more concerning when measured into geological time periods using ice core data. In 2015, CO₂ levels in the atmosphere hit 400.8 parts per million, most recently 401.57 (Oct 2016). From ice core data (see graph at 4.11 below), this is the highest figure in over 800,000 years (see graph below), a time before humans existed.
<http://www.climatecentral.org/news/the-last-time-co2-was-this-high-humans->

[didnt-exist-15938](#) See below:



- 4.7 UK Councils have expended a great deal of effort on Climate Change mitigation (reducing CO₂ emissions). Indeed Aylesbury Vale Council has been at the forefront of this, overachieving on both of its ambitious targets. However, activities that involve adapting to a changing climate (wetter summers, flash floods, more frequent and violent storms etc) have been comparatively ignored.
- 4.8 Aylesbury Vale District Council led the way in 2008 with the publication of the first UK District authority LCLIP in partnership with Bucks County Council and working with partner agencies. This new LCLIP, picks up where the last one ended and brings the Council's adaptation endeavours up to date.
- 4.9 The findings of the new LCLIP which was commissioned by a second year student from the University of Manchester, demonstrate that the need to adapt and become more resilient to the weather effects of a changing climate are just as pressing as ever.
- 4.10 Examples highlighted for the Council include a £45,000 cost to overhaul Council personal protective equipment (PPE) due to extreme weather conditions, an insurance claim of £30,000 for a single skid and crash accident caused by wet roads and, by contrast, a £10,000 saving made by the omitting of one grass cut due to drought conditions.
- 4.11 **Recommendations**
- 4.12 In 2008, a partnership approach was recommended to tackle the impacts of extreme weather and adapt to the effects of climate change. This still stands now, as the impacts that extreme weather has affects both district and county services.
- 4.13 The coordination of resource deployment between services and delivery partners; joint support and a better use of available resources.
- 4.14 The use of GIS was also previously mentioned as a method with which to map historical weather events thus providing valuable insights into where these events are most likely to occur and the potential impact they have. This as well as providing the ability to map the impacts of management strategies against these weather events.

- 4.15 Extreme weather costs should be recorded more meticulously to ensure all potential costs savings can be identified.
- 4.16 Again, as discussed in 2008, mini climate profiles could be conducted on specific areas within AVDC and BCC.
- 4.17 Continue to advise, enable and encourage residents to apply for the Repair and Renewal grant money provided by Central Government, in response to (for example) the 2013/2014 Willows floods.
- 4.18 To ensure that culvert/watercourse/drainage infrastructure owners are aware of their responsibilities.
- 4.19 Continue to ensure that recycling remains containerised within wheeled bins so as to ensure it is not blown over the roads and pavements in times of high winds such as those experienced during 'Doris' on 22/23 February 2017.
- 4.20 Renew the locations where strategic flood defences and sandbag barriers could have a positive effect in decreasing flood risk.
- 4.21 Development of an information campaign in relation to flood-risk and property level protection by individuals.
- 4.22 The above is a long list of recommendations. On completion of the Council restructure, a view will need to be taken as to which actions can be progressed within the reduced resources available.

5 Reasons for Recommendation

The report serves as an update to members on the LCLIP report published in April 2008 and asks members to note the position. It requests that the officers be asked to continue to work towards addressing solutions to improve the Council's resilience to Climate Change, whilst recognising that the Sustainability resource has been reduced.

6 Resource implications

There are no direct additional resource implications relating to this report other than those already funded. The report was carried out by the University student at no cost to the Council.

A Local Climate Impacts Profile of Aylesbury Vale

February 2017

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Edited by: Alan Asbury – for Aylesbury Vale DC

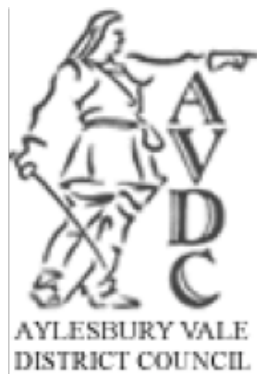


Image of 2014 Willows Flood: Courtesy of The Bucks Herald (2015)

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1. Executive Summary

<p>Cllr Neil Blake</p>	<p>Cllr Sir Beville Stanier</p>	<p>Mr Andrew Grant</p>	<p>Ms Hannah Pool</p>	<p>Mr Alan Asbury</p>
				
<p>Leader of the Council</p>	<p>Portfolio Holder</p>	<p>Chief Executive Officer (CEO)</p>	<p>Author</p>	<p>Initiator and Editor</p>

1.1. Background

The weather has the potential to impact public services and local authorities in many different areas of service. Some in a positive way, yet more commonly in a negative fashion. With the acceptance of a changing climate, the influence that weather has on local authorities in the 21st century will continue to become more prevalent.

Back in 2008, Aylesbury Vale District Council in partnership with Bucks County Council produced the first UK District Local Climate Impacts Profile (LCLIP). This highlighted the importance of preparation by local authorities for the present and future effects of climate change. (Refer to LCLIP 2008 document for more background). Adapting to a changing climate must be embedded to prepare for the potentially damaging consequences that the weather can have on local authority service delivery, finances, staff resources, and reputation.

Under the Government's 'Sustainable Communities Plan', over 30,000 homes are to be built in Aylesbury Vale by 2033, with a forecast requirement for industry of 22 ha of land for provision of local jobs, businesses and transport infrastructure. The scale of this development potentially presents an opportunity to develop and implement solutions to begin to tackle some of the challenges presented by climate change, as well as minimising the impact of this development on the environment.

The climate we will experience in the next 30 years will be driven largely by historical anthropogenic (man made) emissions which will continue to accumulate, and thus it will be necessary for local authorities to begin to adapt to the threats faced and become more resilient to the effects of extreme weather, over and above any mitigation measures put in place.

Organisations cannot attempt to adapt to climate change unless the true impact of the weather on its staff and services is measured and assessed. The goal of this climate profile is to identify and quantify the impact that the weather has on local authorities, extending on from the 2008 profile.

1.2. Summary of Results

The local climate impact profile has provided clear evidence that extreme weather has a number of impacts to both district and county services. However, it is impossible to quantify the extent of the impacts under current reporting mechanisms as most financial costs are not quantified and staff time dealing with the weather impacts is rarely recorded with any accuracy.

A summary of the extreme weather events from January 2008 through to July 2016 is included in section 4 and Appendix 2, explaining the type of weather event and the resulting impacts on the local community and authority. In sections 4 and 5, impacts of the weather events specific to AVDC's and BCC's service areas are detailed.

However it should be noted that the impacts of changing weather and a changing climate are not completely negative. Hotter summers have been seen to have a positive effect on some leisure activities and tourism, whilst potential milder winters may reduce healthcare and allow for less interruptions to transport infrastructure and waste management issues.

1.3. Identified Costs

Due to the limited data available regarding costs, the financial and operational costs identified from this project are detailed below as annual costs and potential savings.

AVDC

- **Insurance Claims**
 - £30,000 for a single skid and crash incident due to wet roads
 - £7,500 for a whiplash incident due to wet roads
 - £16,000 from staff accidents
- **Design Services**
 - £3,000 nitrogen gas injection in Vale Park flood storage area
 - £45,000 PPE equipment overhaul due to extreme conditions
- **Leisure – Green Spaces**
 - Saving of £10,000 in dropping of one grass cut due to droughts

BCC

- **Maintenance**
 - £540 for single ambulance wheel and tire replacement due to potholes
 - £1,000 - £2,000 clearing highway of trees due to wind

Broader Region

- **Insurance Costs**
 - £2,000,000 per year in Hertfordshire, Bedfordshire and Buckinghamshire due heavily to extreme weather events
- **Staff time**
 - Water rescue capability cost of overtime at £40,000 - £50,000

Despite the financial costs identified seeming insignificant compared to the overall operating capital of the authorities, many go unreported and thus the overall impact is largely unknown and therefore an unidentified risk. Better reporting practices could uncover more of these additional costs and the frequency with which they occur.

The largest cost of extreme weather to local authorities seems to be the potential for it to disable the delivery of services such as waste collection, and the subsequent and significant impact on finances. This in itself is sufficient to place the increasing prevalence of extreme weather and a changing climate as a corporate high risk that seriously requires urgent monitoring and addressing.

1.4. Specific Recommendations

- In 2008, a partnership approach was recommended to tackle the impacts of extreme weather and adapt to the effects of climate change. This still stands now, as the impacts that extreme weather has affects both district and county services.
- The coordination of resource deployment between services and delivery partners; joint support and a better use of available resources.
- The use of GIS was also previously mentioned as a method with which to map historical weather events thus providing valuable insights into where these events are most likely to occur and the potential impact they have. This as well as providing the ability to map the impacts of management strategies against these weather events.
- Extreme weather costs should be recorded more meticulously to ensure all potential costs savings can be identified.
- Again, as discussed in 2008, mini climate profiles could be conducted on specific areas within AVDC and BCC.
- Continue to advise, enable and encourage residents to apply for the Repair and Renewal grant money provided by Central Government, in response to (for example) the 2013/2014 Willows floods.
- To ensure that culvert/watercourse/drainage infrastructure owners are aware of their responsibilities.
- Investigate the use of recycling being containerised within wheeled bins so as to ensure it is not blown over the roads and pavements in times of high winds such as those experienced during 'Doris' on 22/23 February 2017..
- Renew the locations where strategic flood defences and sandbag barriers could have a positive effect in decreasing flood risk.
- Development of an information campaign in relation to flood-risk and property level protection by individuals.

2. Background

2.1. Introduction to the Local Climate Impacts Profile (LCLIP)

An LCLIP is a methodology to help organisations to better understand the impact that weather can have on their performance and operations. It uses local media archives and weather station data to develop a picture of how an area, such as a local authority and community is impacted by weather events.

Weather and Climate Defined

The difference between weather and climate is a measure of time. Weather is the conditions of the atmosphere over a short period of time. Climate is how the atmosphere “behaves” over relatively long periods of time. Climate is typically defined as the average weather conditions over a 30 year (or greater) period.

The LCLIP was developed by the UK Climate Impacts Programme (UKCIP), funded by DEFRA, and was originally trialled by Oxford County Council, where identification of extreme weather events were found to costing the authority in excess of £16 million over a 10 year period.

The Aylesbury Vale LCLIP has been conducted in partnership with Aylesbury Vale District Council, Buckingham County Council and Buckingham Strategic Partnership.

An overview of extreme weather has been conducted from January 2008 through to July 2016, making use of historical newspaper archives of the Bucks Herald.

2.2. Extreme Weather Impacts

Extreme weather events fall into 4 different categories:

- Sun – Heat
- Rain – Flooding, flash flooding
- Storms – Wind, Lightning
- Snow, Ice and Hail

The impacts from extreme weather events on local authorities commonly fall into four main categories:

- Service delivery
- Capital and operational cost
- Employee time
- Reputation

3. The Local Climate and Weather

3.1. *The Local Climate*

Historical climate averages can be obtained through the UK Met Office and relate to the local weather events in the period of study from 2008-2016. The Met Office compiles historical climate averages specific to local areas. These are over a period of 30 years, as this is the length of time for which average weather has to change in order to be deemed as climate change. Climate periods are 30 years plus.

3.2. *The Local Weather*

The local historical weather data has been compiled with data provided by a weather station based in Iver¹. This station is located in the South of the county, outside of the Aylesbury Vale District. However it was the nearest station able to provide the weather data from 2008 to 2016. Average weather conditions from 2008-2016, This station was also used in the 2000-2008 LCLIP for comparability. Maximum and minimum temperatures as well as maximum precipitation (mm) have been compiled into line graphs (see section 3.5).

3.3. *Weather vs. Climate*

Local authority decisions are typically assisted with data from historical weather scenarios, for example planning and development, where implications such as (for example) a 1 in 100 year flooding event are used to inform the decision making process.

It is becoming more apparent that the weather is becoming more unpredictable as the climate is changing, whether by anthropogenic means or not. Past years' weather are not necessarily representative of future weather events. As such, using historical scenarios to inform the decision making process may not be the best, most informed way to base future scenarios and decision making processes on. However, it does provide trends that can be logged, graphed and modelled.

3.4. *Future Climate*

The consequences of extreme weather events within Aylesbury Vale provide a good indication of what we may face in the next few decades as a result of a changing climate. It is suggested we may encounter²:

- Higher average temperatures in summer and winter
- Changes in seasonal rainfall patterns
- Rising sea levels (of less direct impact to Aylesbury)
- More very hot days/heatwaves
- More intense downpours of rain
- Higher intensity storms

The diagrams below detail the predicted climate scenarios for southeast UK, showing precipitation and temperature changes in response to low and high carbon dioxide emissions scenarios³.

¹ Data kindly obtained from Iver Weather Station at www.iverweather.co.uk

² Information obtained from www.ukcip.org.uk

South East England

Source: UKCIP02 Climate Change Scenarios (funded by Defra, produced by Tyndall and Hadley Centres for UKCIP)

Percentage change in summer precipitation

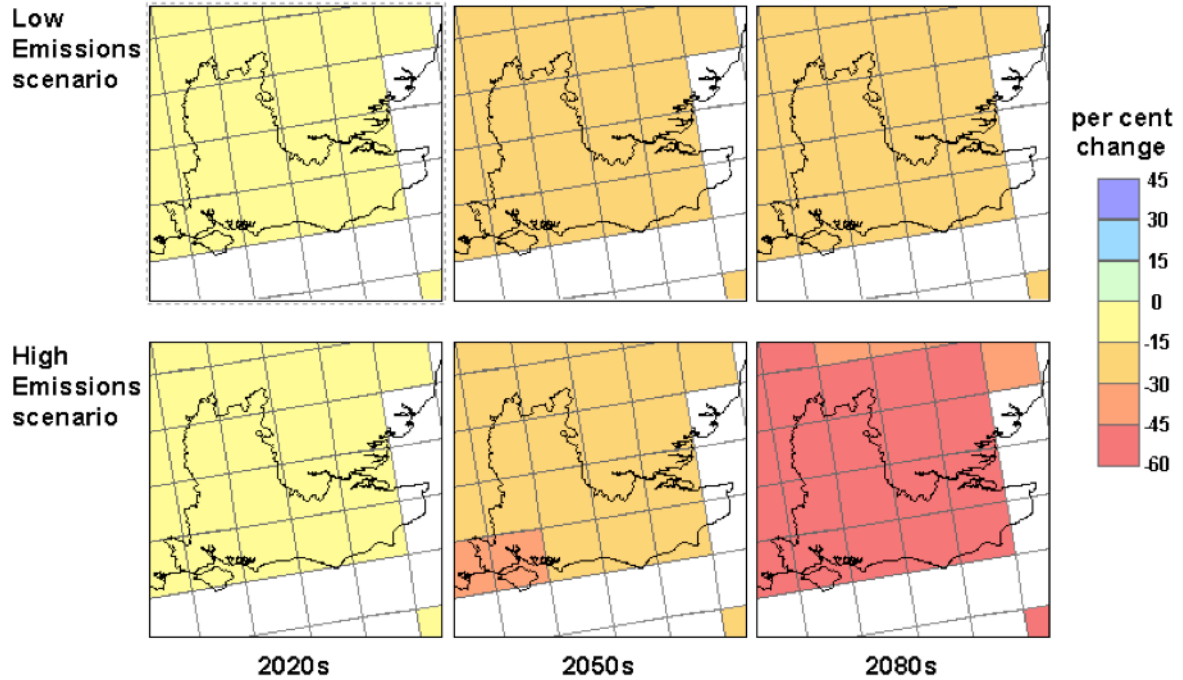


Figure 1: Future summer precipitation changes

³ Information obtained from www.ukcip.org.uk

South East England Percentage change in winter precipitation

Source: UKCIP02 Climate Change Scenarios (funded by Defra, produced by Tyndall and Hadley Centres for UKCIP)

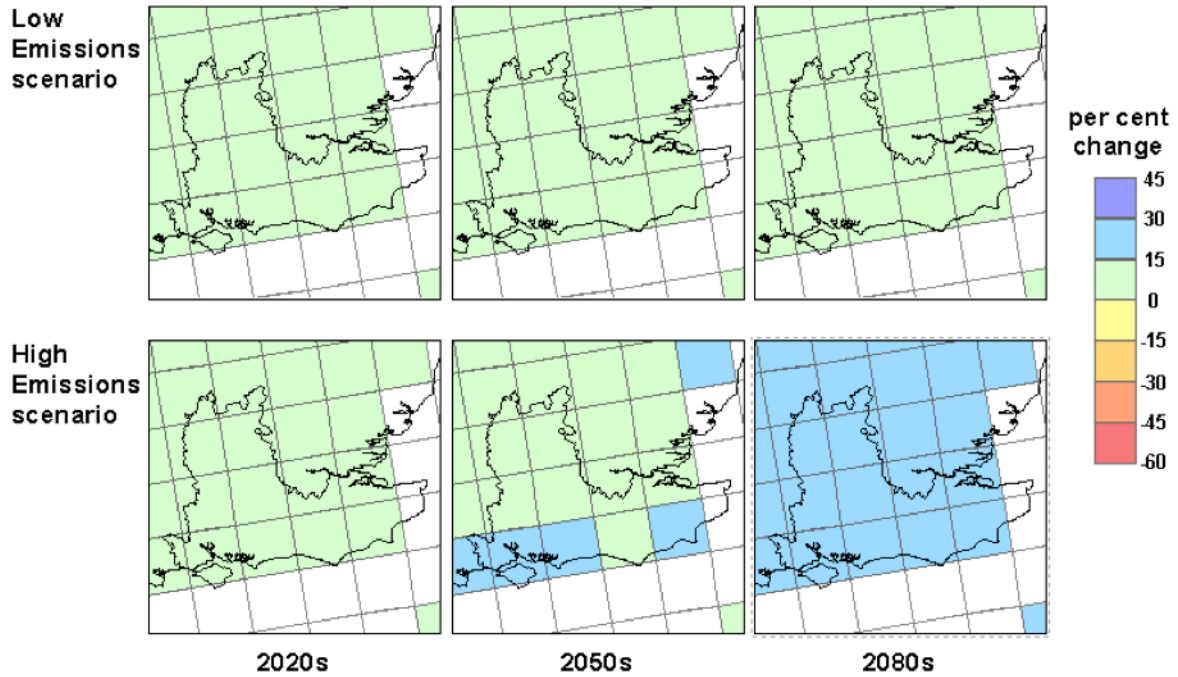


Figure 2: Future winter precipitation changes

South East Change in annual average daily temperature

Source: UKCIP02 Climate Change Scenarios (funded by Defra, produced by Tyndall and Hadley Centres for UKCIP)

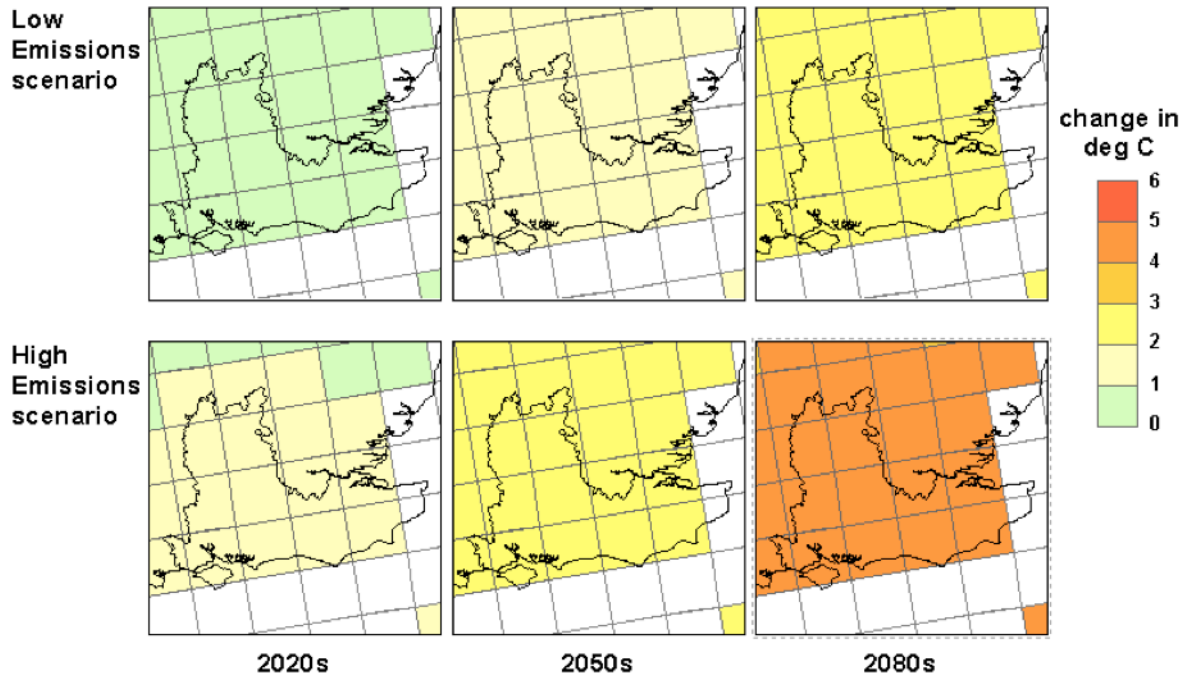


Figure 3: Future temperature changes

3.5. Results

Maximum and minimum temperatures, as well as maximum precipitation (mm) from 2008-2016 have been collected from www.weatheronline.co.uk and the data compiled into line graphs. This visually describes the changing weather across the past 8 years, and can be married up to the affects on services on the ground subsequently described in sections 4 and 5 (see Appendix 2 also).

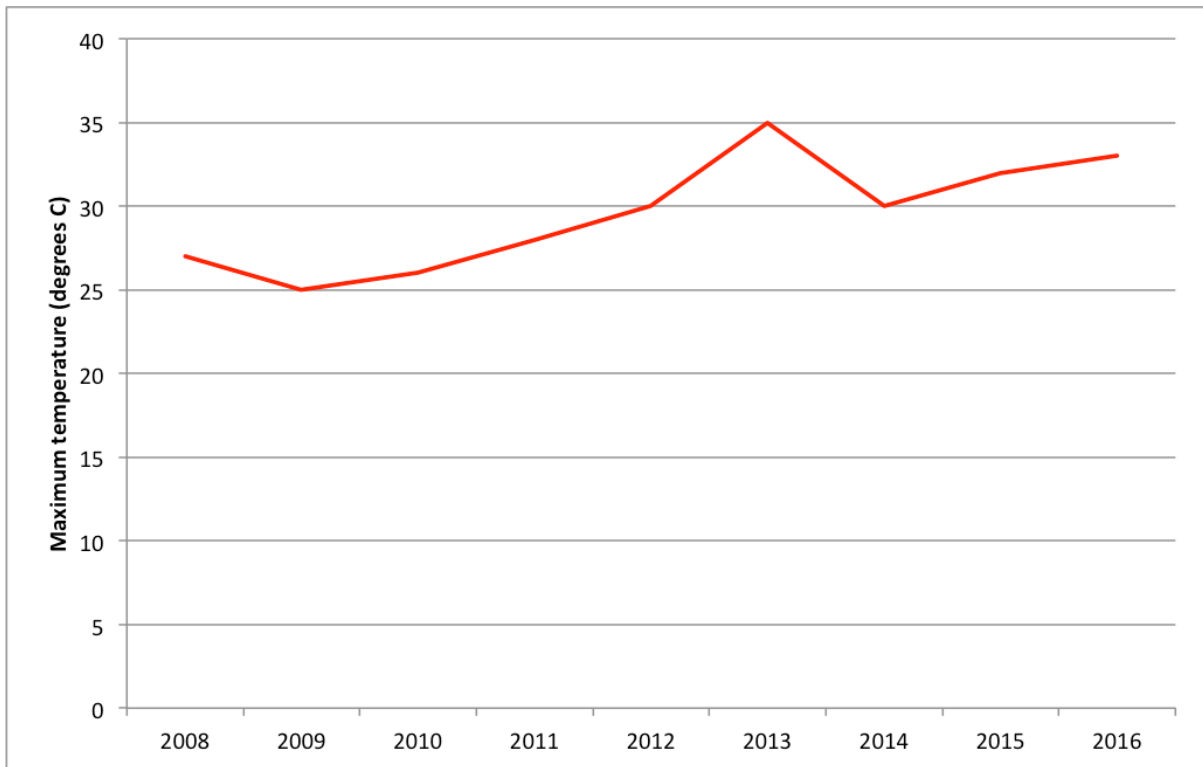


Figure 4: Maximum temperature 2008-2016

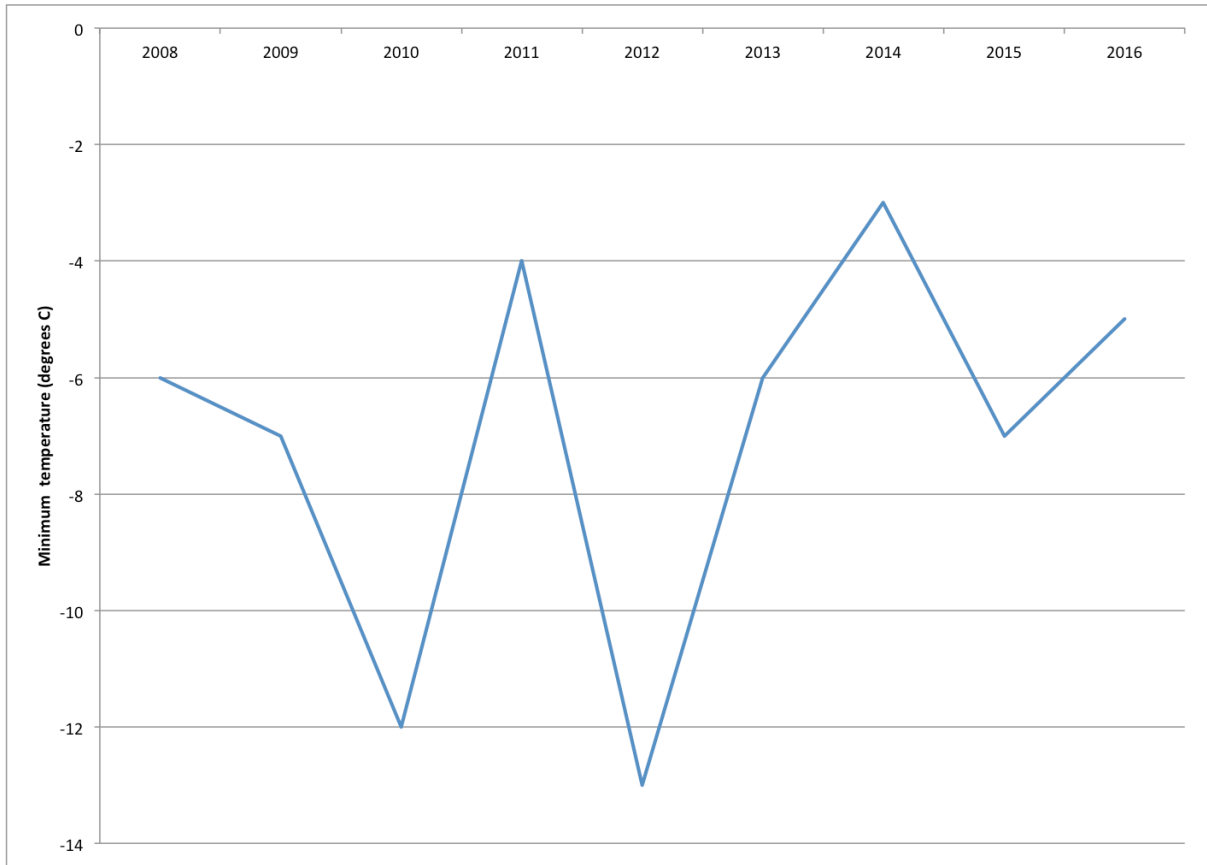


Figure 5: Minimum temperature 2008-2016

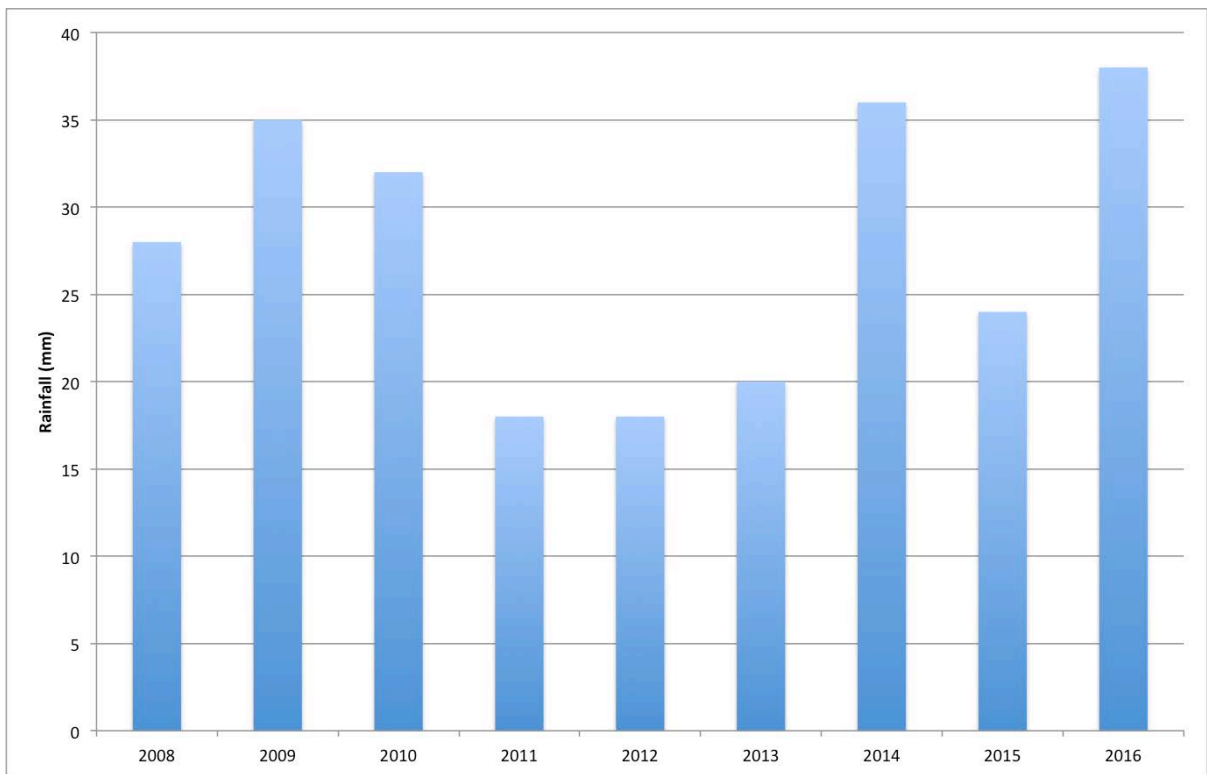


Figure 6: Maximum precipitation 2008-2016

4. AVDC Service Impacts

4.1. Storms

- **Damage to Infrastructure**
 - **Property Services** – No data available.
 - **Insurance Claims** – No data available.
 - **Fallen trees** – some leading to power line damage
 - **Embankment slippage near Banbury** – Disruption to the whole of the Chiltern Railways network

- **Loss of Power – Property Services**

No data available.

In terms of responding to the effects of Doris, below is what UK Power Networks stated on 24 February 2017 at 09:22:

- We have extra engineers working to clear the damage and restore the power as quickly as possible.
- We have arranged a greater number of call advisors to take your phone calls, and have opened up extra call centres, staffed by volunteers from different departments across the company, to answer your calls.
- We've been calling back as many vulnerable customers as we can to keep them updated and to ensure there is no threat to their safety and wellbeing.

In terms of adaptation, below is a summary of the UK Power network planned approach: What did we do to prepare for this weather?

- We worked very closely with the Met Office before the storm and put in robust plans to minimise the disruption you may experience from a storm of this scale.
- We arranged additional staff to cover all key roles, and increased the volume of engineers, call centre staff and additional resources to be available at short notice.
- Our emergency teams reviewed existing plans and our customer champions were made available.
- We invest in a partnership arrangement with the British Red Cross and requested that they were ready to activate their volunteers to support vulnerable customers in areas where power supplies are affected.
- We provided improved information updates for local authorities and parish councils so they can join the effort to help inform local areas too.

- **Fallen Trees – Leisure**

The main concern with regards to wind is falling trees, as they can be inspected as thoroughly as possible but heavy wind can still cause them to fall. Storms paralyse normal services, for example the closure of public parks until the recovery process is well underway.

Very high winds may also cause trees to fall into and block roads. However this is usually dealt with in a short response period (typically one to two hours). In the unlikely event of a major blockage, an extra day of work would have to be paid to clear the road; This may cost £1,000 to £2,000 for the extra day. This impacts upon the ability of public transport such as buses to resume normal service. Similar problems occur if trees fall on railway lines.

- **Outside Events – Leisure**

No data available.

- **Leaf Sweeping – Contract Services (Waste)**

Wind can cause issues with litter picking and leaf sweeping. However it can also aid the process by directing the debris into a corner, allowing for easier clearance.

Alternatively, heavy winds cause dust to be blown around in roads and thus sweeper crews are sent out on a reactionary basis after storms. The streets must be kept clear all year round to prevent dust build up in case there is an unexpected high wind.

- **Recycling Collection Bins – Environment Services/Contract Services**

Access to tipping stations is reduced in times of high wind, as landfill sites are closed down. This has a knock-on effect meaning that vehicles cannot be emptied and thus collection the next day cannot commence on time. This can potentially lead to crew working overtime and consequently incurring additional costs. However, It has not been possible to identify these costs for this report.

Another issue relates to the blowing over of recycling bins; This is an issue due to recyclables not being placed within internal bin bags,. When bins are toppled, refuse and recycling can be spread around the streets leading to complaints to be made. This causes additional work for the crew and may have an indirect impact on council reputation and service delivery.

- **Health and Safety for Staff Travelling – Contract Services (Waste)**

Staff unable to get into work in times of high winds due to safety, which subsequently delays services such as waste collection. This may lead to overtime payments having to be made and can be damaging to the service reputation.

- **Emergency Services**

High winds may cause emergency vehicle responses to patients to be extended, especially if trees are blocking the road as a result of winds. However this impact is dependent to a large extent on whether the area is rural or urban.

Wind causes disruption to houses however there is little evidence to say whether this has an impact on people medically. The main issue regarding wind is the logistics of getting around.

- **Public Transportation – Transport Services**

Wind has an impact on longer bus routes, such as those that involve travelling on a dual carriageway. If this is the case in heavy wind, a single decker rather than a double will be used on the service for safety. However, if this is a busy route this may result in numerous people being left without a bus service due to lack of space on the buses. The bus companies consulted were unable to put a quantifiable figure on this.

Tree fall due to wind may cause a breakage to the bus windscreens, which then have to be replaced at a costs of over £1,000 (specialist curved panelled windscreens). Similarly and anecdotally an event that occurred where glass smashed over a passenger due to an impact caused by the wind, resulted in a £3,000 insurance claim and additional costs for damage to the bus and the knock-on effect of the bus being out of service, bringing the total cost of damage for this single incident to over £5,000. Trees may also block watercourses but sometimes clear by themselves; if not, this is an issue that is supposed to be dealt with by the riparian owners.

Trains have to travel slower in heavy wind. For example, in February 2016 a 50mph speed limit was put in place by National Rail for services from Haddenham to Birmingham. This halved the capacity of the Chiltern rail trains that operate on this route resulting in stranded passengers. This may have an indirect affect on the reputation of Chiltern Railways and National Rail and in compensation claims. However, no quantified cost was available. Lightning storms can hit the signal equipment on the railway tracks and cause short circuiting. As a direct consequence, trains cannot the operate until the equipment is replaced.

4.2. Rain/Flooding

- **Leisure Services**

The flooding of Vale Park would result in customers unable to use Aqua Vale swimming pool. As this is built on Vale Park, this results in a loss of revenues. However this largely is where the impacts would end. Vale Park is a water retention area and so is designed to flood. Aqua Vale is built with reinforced concrete and as such is designed to withstand floods. If Swan Pool in Buckingham were to flood, there would be more serious problems due to it being located on the side of a hill. When Hayden Hill park flooded (even though this is designed to happen as a flood storage area), a number of customer complaints were received.

If football pitches become too wet they cannot be played on. This leads to cancelled games and causes administrative issues in the need to reschedule. This can lead to concerns raised at the end of the football season. This must be factored against the risk of injury to players of playing on wet grass.

If there is a prolonged period of heavy rain and children's' playgrounds become flooded, there is a potential for the loss of the shock absorbing impact of the ground material. This can lead to high labour costs of relaying. However this cost was not able to be provided.

- **Vegetation Growth**

- **Customer Services**

- Heavy rain can impact grass cutting as the wet ground can result in wheel spin. As a result, the grass isn't cut and a day of work is lost. This can also lead to complaints from the public, damaging reputations.

- **Green Spaces**

- Overgrown grass in green spaces if grass is unable to be cut due to long periods of heavy rain. This may lead to obstructed views which can be detrimental to traffic movements.

- **Delays in Construction – Design Services and Property Services**

Extreme weather may exacerbate any potential weaknesses in existing infrastructure, however no specific data is available.

- **Land Drainage Issues – Design Services**

Previously a small shower could flood Vale Park due to its raised water table as a result of hard layers of soil beneath. The instigation of measures to introduce £3,000 worth of nitrogen gas, injected into the ground to relieve the compression in the soil has led to the resolution of this issue now.

- **Refuse Collection Delays – Contract Services**

Delays in services due to rainfall. If the roads flood, staff and contractors may be unable to get in to work. Also, because of the way that landfill sites are constructed, they become similar to a quagmire and thus landfill trucks can sink into them and become stuck. This results in huge amounts of maintenance damage and can result in major costs, through repairs and replacements along with delays to services. Heavy rain may make access to rural areas challenging, and can cause these areas to be missed out and refuse collection delayed.



Image Courtesy of Buckingham and Winslow Advertiser 10th May 2012

Heavy rain has also result in flooding at the Council's waste and recycling depot due to being surrounded by the Grand Union Canal on one side and a tributary of the Ouse on the other. This has the potential to damage valuable material in the recycling sheds. The 2014 Willows floods almost had this impact. However sandbags were deployed just in time to ensure no material was damaged.

- **Environmental Health**

An issue with flooding at the waste depot is that because of the diesel use and vehicle wash along with other chemicals are used on site, water running through the site can carry this into the main brooks. In the most recent flood event, water ran off so quickly that there was very little that could be done to prevent water contamination.

- **Emergency Response**

- **Housing Needs**

One of the main issues in terms of heavy rain and subsequent flood events is the housing of people somewhere safe if their home were to flood. The Willows flood event in February 2014 was due to a large amount of rain falling on saturated ground. This estate was on a known floodplain clearly identified on Environment Agency flood maps. 79 properties in the estate were flooded. However, only two households were evacuated to an overnight rest centre arranged for the night by AVDC. The cost of this centre is £100 per person per night due to overtime costs for staff. Concerns were raised that AVDC's response to this event were too slow and that agencies appeared unprepared for surface water flooding in an area with no known history of this; at the time, this incident was not flagged as being "major".

- **Design Services**

Sandbags are only provided in exceptional circumstances by AVDC, such as properties in imminent risk of flooding, or in the protecting of vital infrastructure. AVDC were criticised in this flood event for not deploying sandbags. However the 2007 Government sanctioned Pitt Review identified the weakness of relying on sandbags; instead community or property level protection should be used.

- **Biodiversity**

Bat populations struggle in wet years as they struggle to fly and catch their prey. This sort of increasing weather event can negatively impact biodiversity.

4.3. Sun/Heat

- **Anti-Social Behaviour and Crime – Environment Services**

An increase in anti-social behaviour is observable in the warmer months of the year, predominantly as more people, especially younger people, are out in the streets and parks. Tree climbing can be a problem as, although it does not seem an issue, tree branches could fall and pose a safety threat to climbers or passers by.

- **Internal Cooling – All Services**

An ongoing issue in offices in warmer months is internal cooling, with complaints significantly increasing as specific summer day temperatures reach up to 32°C. As with the heat events encountered 1-3 July 2015).

Large trees can assist with internal cooling due to shading. This can save costs on internal cooling through mechanical air-conditioning and reduce urban heat island effects. However, a large tree can cost hundreds of pounds to plant, and may fail or die during this process. Also, trees can limit what further developments may be put in place, often leading to a reluctance to plant them.

When internal temperatures are a localised issue, an increasing number of portable air conditioning units and fans may be purchased. Whilst providing a cooling effect, these have a negative impact on carbon dioxide emissions and energy consumption as well as having significant cost implications. Moreover, the extract from these units leads to increased temperatures around them which in turn has negative effects on the local environment.

- **Green Spaces Trees and Water Use – Leisure**

Irrigation is often used in the warmer months to water the plants and grasses in the surrounding areas. Some areas are left to go dry as they are not a high priority. However others where it is a more decorative area such as in the town centre, need to be frequently watered in order to look aesthetically pleasing. The planting around the Council's Gateway office and conference centre have been sourced as drought resistant, not least because of the 15 month dry spell that preceded the completion of then building in April 2012.

Grass cuts are stopped in periods of hot, dry weather, as the grass does not grow as much. Dropping one grass cut saves around £10,000 for the open spaces team.

However this reduction in cuts can only be achieved up to twice per year or else the contractors would be unable to pay for staff and machinery. As such, in times of intense droughts the contractors are deployed elsewhere. Only one such non-cut has been enacted since 2012.

Previously, annual bedding schemes were in place with attractive plants and flowers planted every summer. This carried significant cost, not least because of the need for regular watering. Instead the Council are now proactive rather than reactive with regards to hot weather and droughts. Perennials and drought-resistant plants are planted instead, thus saving money. This is a clear example of a resilience strategy that has been put in place to prepare for the effects of a more extreme climate.

- **Access to Green Spaces – Leisure**

High temperatures in the summer lead to football pitches being unable to be played on, as dry grass patches appear due to a lack of water and high temperatures. This can take a long time to repair, as the grass seed needs to grow and be watered and monitored regularly.

Sudden limb drop on trees is a problem that although is not fully understood, is thought to be linked to hot weather due to the timber getting dry. This may happen even if a tree is inspected and well maintained. If someone is hit by a falling branch, depending on the severity of the injuries there may be inquests and claims.

- **Reduced Garden Waste – Contract Services/Recycling**

Fly tipping decreases slightly in summer periods. Also, when there have been prolonged periods of hot weather there is no water and so nothing is growing in the gardens. Therefore less garden waste is collected; there is a link with garden waste and weather. The more that is collected, the more it impacts upon the rounds, with an extra tip costing £200. Therefore in this sense the hot weather can be beneficial.

Services may also be slightly worse in the hot months, as the crew members carrying out the services such as waste collection or street cleansing, will struggle in the heat. This may lead to complaints. Their hours are often annualised, with longer hours in the summer and shorter hours in the winter due to reduced daylight.

- **Increased Visitor Numbers – Leisure**

Extreme hot summers increase the footfall of people coming to swim. Also, solar gain in the swimming pool heats the leisure centre and can lead to a cost saving. This may be countered in some areas (outside of the pool areas) where additional air conditioning is required to meet comfort levels

- **Crew Health and Safety – Waste Collection**

2013 was a very hot summer; As a result, re-usable bottles, sunscreen and caps were provided to the crew as a safety precaution. This cost in total around £1,000-£2,000. Hot weather in August 2015 had four crewmembers taken down with heatstroke, with two having to take a long time off work to recover. This is a direct cost to the service.

4.4. *Snow, Ice and Hail*

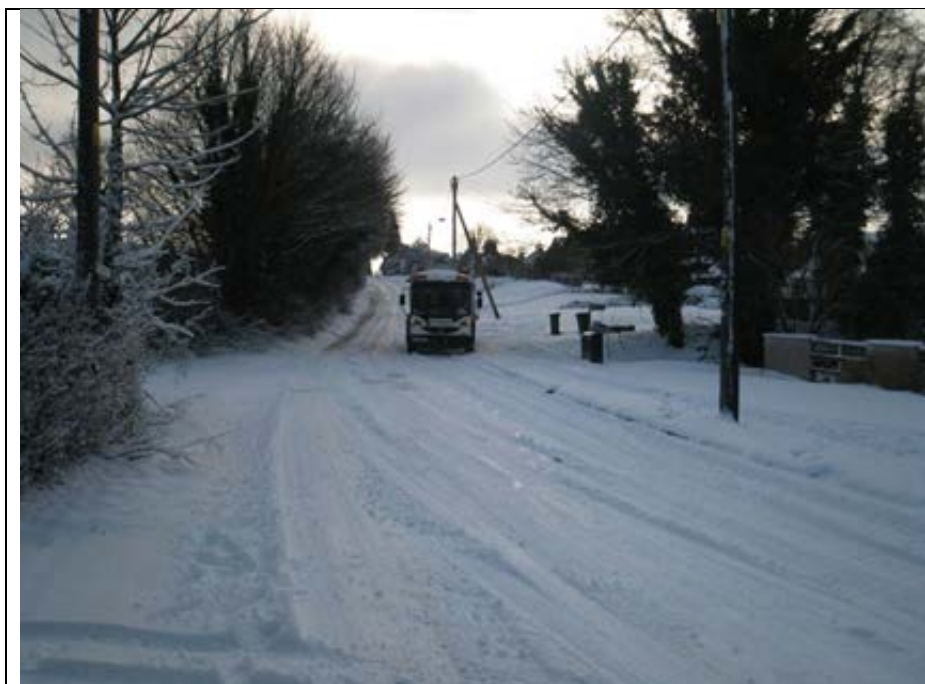
- **Staff Absence – All Services**

Staff may become unable to get into work due to the unsafe roads. However, due to improved IT systems at the Council, most staff can still work from home as they can access their IT systems using Citrix and similar systems. This is of course less the case with services such as waste and recycling collection; If the crew are unable to get into the buildings then the services cannot go ahead. 2010 was one of the worst years for cancelled services as a result of this.

If staff are unable to get into the leisure centre then no one else can, thus the doors are kept shut, as it is not an essential service. In this case the contractors would lose the revenue.

- **Refuse Collection Delays – Contract Services (Waste)**

Snow causes collection problems. For example at the end of 2009/2010 there were major issues with snow and low temperatures leading to six major staff accidents costing £16,000 based on hours lost due to people unable to get to work. There is a lack of understanding amongst the public that assume that if a vehicle can go out, then surely it is safe to collect; the snow and ice can often make it unsafe for the crew to do the collections.



Aylesbury Vale District Council refuse crews collecting in the snow. Image Courtesy of Pintertest.

If crew cannot be sent out during the week due to snow and/or ice, the service may have to move to a Saturday thus there is a cost in paying overtime. It is also an inconvenience for the public. External suppliers affect the service so even if there is no snow in the

district, if there is snow in Wales that can directly impact contractors coming in. This occurred in Christmas 2013 and as a consequence, waste had to be diverted elsewhere; 180 tonnes were diverted to landfill. This caused resident complaints and affected the Council's reputation due to a lack of understanding, as they could not appreciate the link to snowfall in Wales.

- **Salting Car Parks – Parking Services**

Car parks and footpaths have to be de-iced, especially if they are a through-route such as the Vale Park route through to the leisure centre. Tarmac can be de-iced using salt and grit. However natural stone (often used on pavements) requires the use of urea, which is very expensive. A weather watch programme in partnership with the county council sends out alerts if the temperature will drop below -2°C, thus gritters are sent out and paid per operation. During most winters there are 15 operations. However there were only 12 in 2015 which had the result of significant savings on costs. Car parks are expensive to salt because they are such large spaces. Salt cannot be put down near tree roots as it kills them, building up in the soil as a contaminant. This is an issue that needs to be resolved.

- **Safety – Contracted Services**

Personal protective equipment for the waste collection crew had to be reviewed due to the very cold weather, snow and ice in 2010. Snowshoe fittings were provided for all the crew. Unfortunately, due to the long distance that crews walk every day, these fittings would break daily. Each snowshoe costs £5 per pair, for 100 crew members and had to be replaced daily. This was a huge cost. Overall, the overhaul of the PPE equipment cost £45,000. Due to these changes, roughly £20,000 worth of PPE equipment was lost as it is now not used.

There are more slips trips and falls with crewmembers, as well as a couple of vehicle accidents in the snow and ice. This can impact upon service delivery as it may slow them down; the crew will collect more slowly in order to be careful on the slippery roads.

5. BCC Services Impacts

5.1. Storms

- **Damage to Infrastructure – Rail Services**

Leaf fall due to high winds can become mulched on railway lines, leaving behind a greasy trail. Train wheels do not have grooves or 'tread' in them and when they are running at high speeds, they have a small surface area of the wheel touching the rail. Consequently, it is easy for them to get into a skid. Trains braking heavily due to leaf fall leaves flat spots on the wheels which are not good for the wheels, axles or tracks. There are only so many times this can be fixed before new wheels are required. Replacing wheels is a large and expensive job. Trees may also fall onto the tracks due to high winds; one or two times yearly a train carriage or unit is lost due to tree damage from high winds.

- **Service Impacts – Waste Management**

The main issue related to high winds and storms is the blowing over of recycling bins. This is an issue as due to recyclables being lightweight and not being placed in bin bags, they are spread around the streets thus causing complaints to be made. This causes additional work for the crews and may have an indirect impact on council reputation and service delivery.

- **School Closures – Children and Young People**

No data available.

- **Operational Problems – Rights of Way and Access**

No data available.

- **Staff Health and Safety – All Services**

No data available.

- **Fallen Trees – Transport Services**

Similarly to the aforementioned impacts of storms upon AVDC services.

5.2. Rain/Flooding

- **Health and Safety – Transport Services**

A period of heavy rainfall in January 2016 saw a trainee driver driving at night going into a skid and colliding into the back of another vehicle. The insurance claim to date for that incident is £30,000.

- **Emergency Response - Floods**

The Willows 2014 flood was a combination of pluvial and fluvial flooding and a blocked culvert. As a result of these floods, AVDC officers determined that a flood alleviation feasibility study should be commissioned. The estimated cost of this study was to be £24,000; AVDC offered to finance 1/3 of the costs, with BCC and the EA also funding 1/3. The costs of this study could also be claimed back from the flood-affected households that agreed to contribute a proportion of their Repair and Renewal Grant.

The Repair and Renewal Grant gave £5,000 per property but this wasn't enough for a property level protection scheme. As a result, four properties signed up to pool their £5,000, giving enough money to buy property level protection equipment for those properties.

- **Operational Problems – Contracted Services (Waste)**

- **Waste Management**

Floods lead to high volumes of water-damaged goods needing to be collected by waste services. This is often bulky waste and needs to be disposed of in landfill, at a cost of £34 per item. However this was a subsidised service after the 2014 Willows floods.

Contaminated sandbags need to be disposed of carefully, requiring deep burial in landfill. This has an additional cost however this data was unavailable.

- **Flooded Roads – Transport Services**

- **Emergency Services**

Floods may affect ability to access, especially villages where the roads may be blocked. Heavy rain also impedes driving progression and so it may take longer for emergency vehicles to reach those in need.

- **Public Transport**

Revenue may go down as fewer buses are able to operate or fewer people are able to access the buses. Also, in periods of heavy rain, fewer people use buses as people tend to take buses to do things such as outdoor and leisure activities, which they will not do in rain.

The flood manager in the county deals with floods on the road. Preventative measures such as clearing drains, gullies and culverts of leaf blockages ahead of the rain must be done. Putting in place measures to ensure the public know what is occurring, such as through putting messages out to radio stations or in bus shelters; this is two or three days worth of time so costs a few hundred pounds per flood incident. It is hard to put these measures in place, as flood incidents are often unpredictable.

Often the flooding is localised in which case buses can usually divert around it.

- **Local Businesses/Economy**

No data available.

5.3. Sun/Heat

- **Transportation Infrastructure Damage – Transport Services**

- **Buses**

Heat may cause road melt, causing the roads to become sticky thus people cannot keep driving on them as car tyres will get damaged. This results in diversions and road closures, impacting upon transport services.

When the weather is very hot, for example 18th and 19th July 2016, buses overheat quite frequently. Consequently, someone is paid overtime to fill the bus radiators in the bus station with water and changeover those that have overheated. This gives a lost mileage of 1.5%/2% per day when typically this is as low as 0.3% per day; so on that day if every 0.1 is 10 miles the bus company will have lost 200 miles. This means that customers over a 200 mile distance wouldn't be able to get a bus that day due to overheating problems. This has negative impacts on service delivery and subsequently on the company's reputation.

The real impact of overheating engines is seen on routes that cannot afford to get new buses. These may overheat on the roads, which require an engineer to drive and swap the buses around, or tow the bus back to the maintenance garage. This involves additional costs although the total amount is not available.

- **Trains**

Rail buckling due to heat is unusual on modern tracks. However on the older lines such as Little Kimble and Monks Risborough this may happen. Most heat incidents are as a result of signal failure due to equipment overheating; it has to be cooled down before it can be replaced and this affects services. On July 19th 2016, there were three failures in the same day.

- **Reduced Garden Waste – Waste Management**

When there have been prolonged periods of hot weather, there is no water and so nothing is growing in the gardens. Therefore, less garden waste is collected; there is a link with garden waste and weather. The more that is collected, the more it impacts upon the rounds, with an extra tip costing £200. In this sense, the hot weather can be beneficial.

- **Internal Temperatures – Transport Services**

Buses under five years old have good air conditioning. As they get older, this becomes less efficient, with the very old vehicles having no air conditioning at all. This causes issues in terms of passenger comfort. An increased use of air conditioning also decreases the fuel efficiency of the buses and therefore has cost implications.

Air conditioning in trains is a challenge as there is a winter and summer setting but nothing in between. As such, it is hard to meet passenger demands for appropriate temperatures. This leads to passenger inconvenience. The 2013 summer was very hot,

and the harder working air conditioning led to engines having to work harder but trains going slower, as the air conditioning uses the engine output.

- **Emergency Services**

Additional workload is generated through dehydration and heat exhaustion. The heat may exacerbate existing respiratory problems. The main solution is to educate people to keep out of the sun and to stay hydrated. Another issue is that with prolonged heat, a downburst of water makes the road surface more slippery and thus leads to increased car accidents. The more people out and about, the more call-outs there are, for example the August 2016 bank holiday weekend.

- **Public Transport Usage**

If the weather is hot and sunny, generally more passengers will travel by bus which increases revenues. This is a positive impact of extreme weather on services. A hot bank holiday weekend will give good figures, especially on the Oxford 280 service as many people want to make the most of such good weather to take tourist related journeys.

5.4. Snow and Ice

- **Emergency Response**

Snow and ice have the worst effect on the emergency services, with a spike in admissions seen in the winter pressures period of mid/end November through to March, and especially around Christmas and bank holidays, and after Christmas parties. The main issue with snow is the inability to reach people who require an emergency vehicle. This has a huge impact on service deliverance. There are some four-wheel drive vehicles available, however it is too expensive to run just four-wheel drives.

Ambulance vehicles have a very poor grip and so the council's are relied upon heavily to do their part and grit the road surfaces to make travel easier. Having to travel at a slow speed through the snow and ice avoids more accidents being caused.

Sharing of ambulances across the borders occurs if there aren't enough in one county for example if the demand is very high. This increases the running cost due to travelling further, and the price of filling up the tank of an ambulance with fuel is roughly £120.

Every call out costs around £256, so if there is a particularly busy day due to numerous crashes and falls from snow and ice, it will be very expensive.

- **Health and Safety – All Services**

An increase in the number of slips trips and falls is seen when the conditions are particularly icy; the frail and elderly especially may not survive an injury from this type of accident. There is also an increase in admissions from hypothermia, thus potentially putting a strain on the emergency services.

Every year, £2,000,000 is paid out in insurance claims across Hertfordshire, Bedfordshire and Buckinghamshire, with 10% of that being due to passenger falls as a result of icy conditions. A claim for whiplash comes to roughly £7,500 per event.

If roads aren't gritted properly, black ice may cause bus and other vehicle crashes. This puts the bus out of service and can cause a lot of problems in service delivery.

- **Staff Absences – Contracted Services (Waste)**

Staff being unable to get into work means that fewer waste collection services may be run. Snowy roads also mean the truck may be unable to go out and collect rubbish, especially in more rural areas, thus affecting services delivery. Similarly, the truck may not be able to get into landfill due to snow and ice and so if the weather is really bad the material may not be sent off for treatment or disposal. The main impact is the public interruption of service.

- **Damaged Infrastructure – Transport and Emergency Services**

Potholes are a large issue caused as a result of icy weather conditions. These can cause damage to the suspension and wheels of an ambulance, which is very costly; Replacing new tyres and wheels of an ambulance can cost up to £540 per occurrence, plus time off road with limited numbers of vehicles available to replace them. Smeaton Close has numerous potholes, and going over the same pothole 24 times in one day can have a huge impact on both the driver and the vehicle (i.e bus or refuse vehicle). Someone may be put out of work and there could be long-term damage to the bus with massive claims on suspension. These are a very serious issue.

Enough snow will potentially lead to services not being run, and occasionally schools close partway through a day so transport has to be deployed earlier to collect the children. In 2009/2010 big snow events caused lots of services to not operate. This had a huge impact on the number of passengers travelling, especially on routes used by the elderly. Alterations to services may be made, for example missing out Naphill and Lacey Green on the 300 route and going straight down the main road instead. This of course causes certain areas to become temporarily isolated.

Equipment failures may occur on railway tracks due to snow and cold weather; a common issue is snow and ice in point work so points can't move freely, especially if they are not fitted with point heaters. Contingency timetables can be deployed in such extreme weather events. Train operating companies can plan to avoid the use of certain points and deploy resources to critical locations. There is moisture in the diaphragm of horns that can freeze in cold temperatures, causing the horn to become damaged and as a direct consequence, for safety reasons, the train cannot then operate. This impacts service delivery and causes maintenance costs. Well-placed investment makes a huge difference to resilience.

6. Conclusion

Throughout the duration of this project, it has been evident that the effects that extreme weather can have on front line services were largely understood amongst those service delivery officers that were spoken to.

Despite this, there appear to be a lack of proper mechanisms in place for recording the impacts. For example, data relating to the economic costs that frequently occur as a result of extreme weather events were unobtainable or not properly recorded by the services that were affected. This makes it difficult to accurately quantify the precise costs of extreme weather.

At the start of this process, an eight-year media search of the Bucks Herald was conducted for the period between 2008 to 2016 (inclusive) in order to identify all weather related events that resulted in impacts to the local public services and authorities. This was related to specific extreme weather events, found through www.weatheronline.co.uk and www.liverweather.co.uk (see Appendix 2).

The services most impacted by extreme weather events appear to be public transport, specifically trains and buses, and the waste collection services, predominantly due to the inability of the vehicles to travel on the roads/tracks, and the inability of staff to get into work due to the extreme weather. This is especially true in snow events, such as the 2009/2010 snow events that caused “utter chaos on Aylesbury roads”⁴ (see Sections 4.4 and 5.4: Snow/Ice). The huge cost of a PPE overhaul for the waste collection service can also be attributed to a changing climate and a rise in extreme weather events.

It is clear here that snow/ice and heavy rain/flooding events cause the most problems. An example here is the 2014 Willows flood, which caused huge problems for all services, but predominantly the emergency services and emergency response due to the issues involved with housing those whose homes had flooded. However this event cannot be attributed directly to climate change, although it does show a clear example of the potential scale and nature of the extreme weather events we may begin to experience more regularly as a result of a changing climate.

It is evident that some measures are beginning to be put in place in order to adapt to the impacts of a changing climate and more extreme weather scenarios. The injection of nitrogen gas into the ground in Vale Park has been shown to be an effective solution in reducing the likelihood of flooding in the park. Any flood events here would directly impact footfall and thus financial benefits to the Aqua Vale swimming pool and other surrounding services. As such, this measure is beneficial.

The heat waves experienced in the summer of 2014, with temperatures reaching over 25°C from 17th-27th July, and 1-2 July 2015 with temperatures reaching up to 35°C could become the norm for summers in the next few decades. Heat waves such as this have huge impacts on infrastructure, with roads melting and train signalling equipment failing, as well as a closure of leisure facilities due to the extreme heat and discomfort. This also has further implications, such as an increase in the number of hospital admissions and potentially deaths due to heatstroke, dehydration and exacerbated respiratory problems.

⁴ Bucks Herald (2010)

The previous LCLIP from 2008 outlined this as a potentially worsening issue, and this still continues to be the case. It is evident therefore that more work must be done to prepare for these effects.

Despite the vast evidence of the detrimental impacts a changing climate can have, it must be recognised that it can generate opportunities and benefits too. For example, warmer summers will bring an increase in customers to leisure services such as Aqua Vale swimming pool. It is important that both the benefits and threats are understood and quantified by simple time and cost reporting as this will provide a valuable insight into the true impact of extreme weather events.

Recommendations (see Section 1.4) describe how GIS could be used in order to map extreme weather events and their impacts, as well as mapping the effects of implementing measures to prevent against these impacts. This was mentioned in the 2008 LCLIP and remains relevant.

Further work could also lead to the establishment of trigger levels and thresholds' identifying areas that could assist in reducing the impacts of extreme weather events. Once trigger responses are established, a more proactive emergency response could occur rather than that which has previously occurred.

7. Appendices

Appendix 1: National Indicators Influenced by Severe Weather:

Nearly 12% of previous National Indicators' can be potentially influenced by the weather. These include:

NI N°	NI Title
8	Adult participation in sport
15	Serious violent crime rate
16	Serious acquisitive crime rate
17	Perceptions of anti-social behaviour
20	Assault with injury crime rate
21	Dealing with local concerns about anti-social behaviour
22	Perceptions of parents taking responsibility for the behaviour of their children
23	Perceptions that people in the area treat one another with respect and consideration
24	Satisfaction with the way police and local government dealt with anti-social behaviour
25	Satisfaction of different groups with the way police & local government dealt with anti-social behaviour
27	Understanding of local concerns about anti-social behaviour and crime by the local council and police
32	Repeat incidents of domestic violence
33	Arson incidents
34	Domestic Violence
39	Alcohol harm
41	Perceptions of drunk and rowdy behaviour as a problem
47	People killed or seriously injured in road traffic accidents
48	Children killed or seriously injured in road traffic accidents
49	Number of primary fires & related fatalities and non-fatal casualties
178	Bus services running on time
187	Tackling fuel poverty
189	Flood and coastal erosion risk management
197	Improved local biodiversity

Appendix 2: Historical Weather Events Summary:

2008

- March 21st: 40km/h winds recorded.
- April 6th 2008: Snow in Aylesbury: Minimum temperatures -3 degrees; news headline "Let it Snow".
- July: Maximum temperatures reaching 28 degrees.

2009

- Very cold April: 21st and 29th reached minimum temperatures of 1 degree.
- Very dry September: most days without rain; maximum was 1mm precipitation
- December minimum temperatures stayed below 0 all month
- December 18th -6 degrees
- December 23rd 8mm precipitation – news headlines from the 18th: "Schools closed after overnight snow"; "Heavy snowfall causes rush hour gridlock in Aylesbury"; "Severe weather warning"; "Snow possibly in excess of 40cm"

2010

- January 16th: below 0 degrees; 7mm precipitation; news headlines read "Utter chaos on Aylesbury roads"; "Weather warning: heavy snow on its way to Bucks"
- Snow continued throughout January and February due to very cold weather e.g. -13 degrees on February 13th, and precipitation e.g. 9mm on 27th Feb, 12mm on 28th
- Minimum temperatures below 0 from 24th November – 9th December
- Peaks of -8 degrees on 28th November; -12 degrees on 20th December

2011

- February 4th: 40km/h winds recorded
- Hot September: above 25 degrees from 28th-30th; "Hottest end to September since 1985" (BBC News, 2011) – average temperatures thought to be 29 degrees; good for businesses such as Travelodge

2012

- February 2012: "Schools stay open despite the snow" – minimum temperatures below 0 from 1st-13th February, reaching -7 on the 4th and -12.5 on the 11th, coupled with precipitation e.g. 6mm on 5th February
- March 11th – 13th 2012: "Drought leaves water levels running low"; "Drought leads to hosepipe ban" – 0mm precipitation from 8th-16th March and from 18th-30th
- Rain throughout April and early May e.g. 17mm on 29th April, 12mm 3rd May led to some small scale flooding: May 16th: "Chiltern Hills vintage vehicle rally at Aylesbury cancelled because of flooding"
- November 2012: "Flood alert as heavy rain soaks Aylesbury Vale" – 17mm on 20th/21st November and 13mm on 24th

2013

- January 18th until 23rd saw snow and average temperatures of -0.4 degrees – "Schools out as weather claims numerous closures with more snowfall on the way"
- Minimum temperatures below 0 from 12th-28th January
- January 23rd: "Car crash in Fairford Leys due to the snow"

- May: “Weather watch: things are hotting up after the worst of the wet, bitterly cold spring of 2013” – March minimum temperatures mainly remained between 0-5 degrees, reaching -4 on the 30th
- Warmer summer, reaching maximum 33 degrees on July 22nd
- December 2013: “severe weather warnings” (floods) – 13mm precipitation on 22nd and 15mm precipitation on December 23rd

2014

- February 7-10th: “Homes damaged by knee-deep water as floods hit Aylesbury”; “more than 180 flood call-outs as rain continues to fall” – led to 18 fallen trees, road closures etc.
- February 6th: 11.2mm precipitation; 9.1mm on the 7th; 10.2mm on the 8th
- August 6th 2014: “Weather watch: one of the hottest summers on record” due to maximum temperatures above 25 degrees from 17th-27th July
- Highs of 31.6 degrees on 17th, 32.4 degrees on 18th, 30.7 degrees on 23rd and 31.6 on the 24th.

2015

- 1st until 3rd July 3 hottest days of the year: 30 degrees plus
- August 22nd: maximum temperature above 30 degrees
- December 5th: 40km/h winds recorded

2016

- February 8th 2016: “100mph winds as Storm Imogen batters Britain” – mean wind force (km/h) recorded: 36 on February 7th, and 35 on February 9th
 - May 2016: “Britain could be hotter than Ibiza this weekend” – May 8th maximum temperature recorded was 28.6 degrees
 - 1st-7th July very dry: 0mm precipitation recorded
 - 18th July maximum temperature of 28 degrees recorded
-

Appendix 3 - Contributors:

The Council and the author wish to thank officers and staff from the following organisations for their help and assistance in producing this report:

Aylesbury Vale District Council

- Building Control
- Biodiversity and Arboriculture
- Leisure (parks, fields and centres)
- Forward Plans
- Sustainability
- Grounds Maintenance and Street Cleansing
- Emergency Planning and Health and Safety
- Environmental Health Services
- Recycling, Waste and Community Spaces

Buckinghamshire County Council

- Transport for Bucks
- Bucks Highways
- Strategic Flood Management
- Waste Disposal
- Social, elderly and residential care

Bucks and Milton Keynes Fire and Rescue
Network Rail
Chiltern Railways
Arriva Shires Buses
NHS Aylesbury Vale CCG
Age UK Buckinghamshire
South Central Ambulance Services SCAS