

Resilient and Adaptive Communities

Making Luton and Dunstable resilient to climate change

লুটন এবং ডানস্টেবলকে জলবায়ু পরিবর্তনের জন্য স্থিতিস্থাপক করা

ਲੁਟਨ ਅਤੇ ਡਨਸਟੇਬਲ ਨੂੰ ਜਲਵਾਯੂ ਤਬਦੀਲੀ ਲਈ ਲਚਕੀਲਾ ਬਣਾਉਣਾ

Przystosowanie Luton i Dunstable do zmian klimatu

Luton și Dunstable - împreună să luptăm împotriva

لیوٹن اور ڈنسٹیل کو ماحولیاتی تبدیلیوں کے لیے لچکدار بنانا



Luton 2040
A place to thrive



Central Bedfordshire Council
Working in partnership

August 2022

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“ Making Luton and Dunstable resilient to climate change. ”



Flooding at Wardown Park, Luton

Foreword

We are pleased to have been able to work closely with Central Bedfordshire and Luton Borough Councils to reduce the risk of flooding to Luton and Dunstable for many years. Climate change and development needs are however putting increasing pressure on the places we live and work in, which means we need to invest more in sustainable and adaptable approaches to flood risk management.

Extreme weather events are predicted to increase over the coming years. As well as the potential for loss of life and damage to property, these events can affect people's health and well-being, disrupt essential infrastructure and services, cause loss of business and income, and damage the environment. Now more than ever, we need to plan and act if we are going to adapt to these changes and create resilient communities across Luton and Dunstable.

This Vision lays the foundation for an innovative approach to flood risk management: developing and evaluating multiple combinations of green, local, adaptable solutions; working collaboratively with a myriad of public bodies, local businesses, charities and communities; and embedding wider integrated social, economic and environmental benefits into schemes. By doing this together, we can help communities protect against, manage, and build back better from, the impacts of climate change.

Darsha Gill

Environment Agency, Area Flood and Coastal Risk Manager

“We welcome the development of the Luton and Dunstable Resilient and Adaptive Communities project. The impact of this work will contribute greatly to our vision for Luton 2020-2040; to create a healthy, fair and sustainable town, where everyone can thrive and no-one has to live in poverty.”

Robin Porter | CEO of Luton Borough Council

“The Council's 2050 Vision focuses on investing in infrastructure to create sustainable places for the future and being able to better understand, prepare and plan for areas at risk of flooding is important to manage communities' risk and be more climate change resilient. Reducing damage and long-lasting impacts from flooding will enable faster recovery for local communities.”

Cllr Ian Dalgarno | Executive Member for Community Services, Central Bedfordshire Council

“The Luton and Dunstable Resilient and Adaptive Communities project is a collaborative effort demonstrating how local and national partners can work together towards a common goal. We support this project which embraces ambitions and priorities of Luton Borough Council and its partners in an integrated way. We look forward to working together to seek opportunities that will enhance environmental, social and economic benefits for local communities.”

Hazel Simmons | Leader of Luton Borough Council

Introduction: Resilient and Adaptive Communities (RAC)

The towns of Luton and Dunstable are at a high risk of flooding from rivers, surface water, groundwater and sewers. Whilst much has been done to tackle flood risk over the years, the climate emergency, population growth and development pressures combine to make this a continuing and increasing threat.

Luton and Dunstable has been designated as a Flood Risk Area (FRA) within the Thames Flood Risk Management Plan 2022-27 (FRMP). FRAs are locations identified in England where there is significant flood risk. FRMPs set out how organisations, stakeholders and communities will work together to manage flood risk.

The Resilient and Adaptive Communities (RAC) project aims to address this risk of flooding to reduce the devastation and disruption that it can cause. When identifying measures to reduce flood risk we will strive to implement solutions that can also deliver associated social, environmental and economic improvements that will benefit local communities and businesses as well as reduce their risk of flooding.

Flooding affects everyone. In order to improve our resilience to it, we therefore need to involve everyone: communities, businesses and organisations both in the development of the project but also the delivery of flood mitigation measures. It is vital that we all work together to share local knowledge and resources that will allow us to tackle flood risk effectively.

Working collaboratively will also identify opportunities to efficiently achieve other shared goals. The RAC project will focus on natural and sustainable solutions to flood risk, which will help to 'green' these heavily urbanised towns. This 'greening' will also deliver positive social, environmental and economic impacts such as improvements in water and air quality, health, wellbeing, and reduce the financial losses due to flooding.

This document sets out the vision and objectives that will guide future phases of the RAC project looking ahead to 2100. It describes the current flood risk, environmental and socio-economic context and challenges facing the area. It also outlines the project's next steps towards defining an adaptive (flexible) approach to flood risk management: one that will be able to mitigate the impacts of climate change, population and development growth and wider environmental changes but also adapt and respond as these evolve in the future.



Dunstable Road



Bury Park, Luton

Our Vision

Working together to make our communities resilient to flood risk and adaptable to climate change. Aiming for solutions that will also provide wider environmental, social and economic benefits.

Our Objectives

Places that are adaptable and resilient to a changing climate

Implement an adaptive approach to flood risk planning that promotes the use of nature based solutions to tackle all sources of flooding and makes efficient use of water resources.

Communities that are engaged, listened to, and participate in healthy place-making

Landowners, businesses and local people support this approach, and are involved in discussions about climate change, the value of nature, well-being and their role in shaping their community.

Natural Environment that is enhanced and robust

Create, protect and enhance blue-green infrastructure, habitat networks and biodiversity, maximising natural capital, environmental net gain, and carbon reduction.

Partnerships that explore opportunities and support delivery

Promote a catchment-scale, collaborative approach to place-making, working together to deliver integrated benefits, realise local policy and stakeholder aspirations, reap efficiencies and unlock funding opportunities.

Project Partners

The RAC project will require new ways of working and creative thinking at all levels across multiple organisations, including active participation by local communities. Numerous organisations have already contributed to the development of this vision, and we will seek their ongoing support as we develop the project.

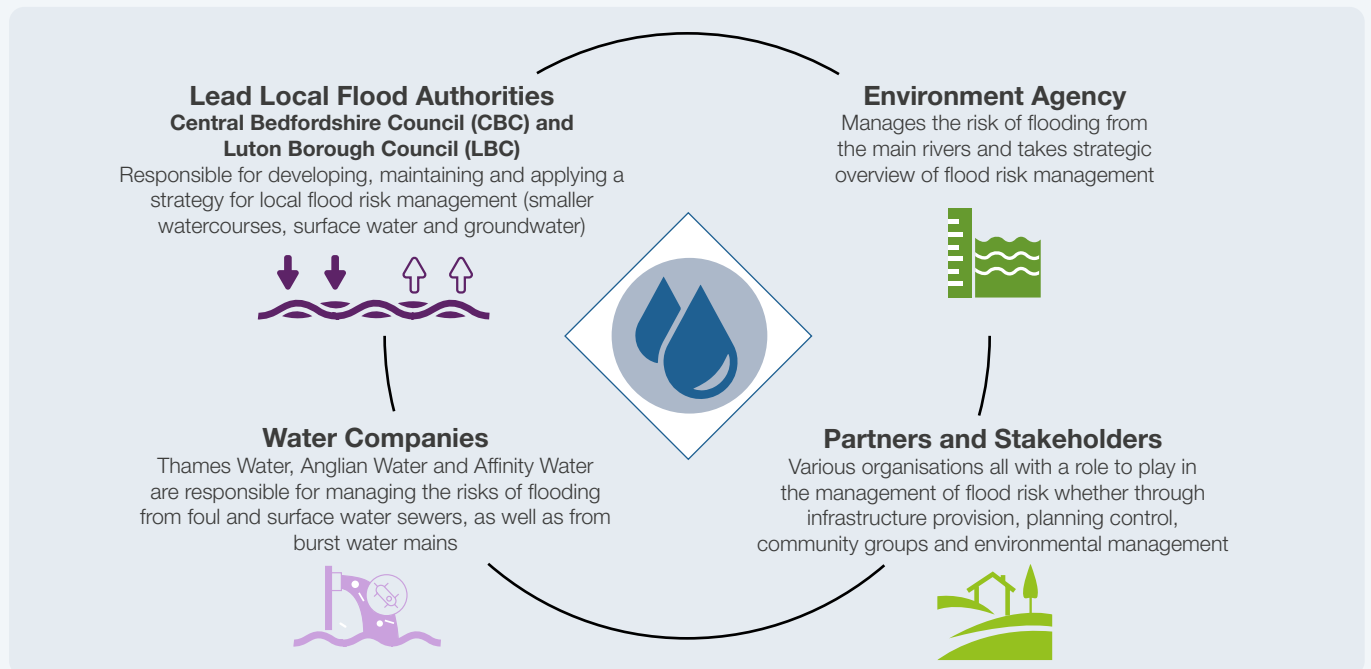
These organisations are experts in their respective fields, and have already developed a number of plans and strategies to address challenges in the local area. These have informed the development of this Vision and are listed in the references section on page 16.

Some of these partners already collaborate through the Luton Lea Catchment Partnership which covers the majority of the project area. This group works together to share local knowledge and expertise to bring about improvements to the river. The RAC project will work closely with this existing group to identify and support local action.

No single organisation can solve the current or future water and environmental challenges in the Luton and Dunstable community. Therefore it is an imperative that we all work together to address these. The diagram to the right identifies the key water management organisations within Luton and Dunstable and their roles. Working together through the RAC project will maximise efficiencies saving time and money, broaden the knowledge pool and open up sources of funding to maximise benefits to the community.

Contributing Organisations

- Affinity Water
- Anglian Water
- Bedfordshire, Cambridgeshire, Northamptonshire Wildlife Trust
- Bedfordshire Local Nature Partnership
- Central Bedfordshire Council (CBC)
- Chilterns Conservation Board
- Environment Agency (EA)
- Groundwork East
- Hertfordshire and Middlesex Wildlife Trust
- London Luton Airport Operations Limited
- Luton Borough Council (LBC)
- Luton Lea Catchment Partnership
- National Flood Forum
- National Highways
- South East Midlands Local Enterprise Partnership
- Thames Water



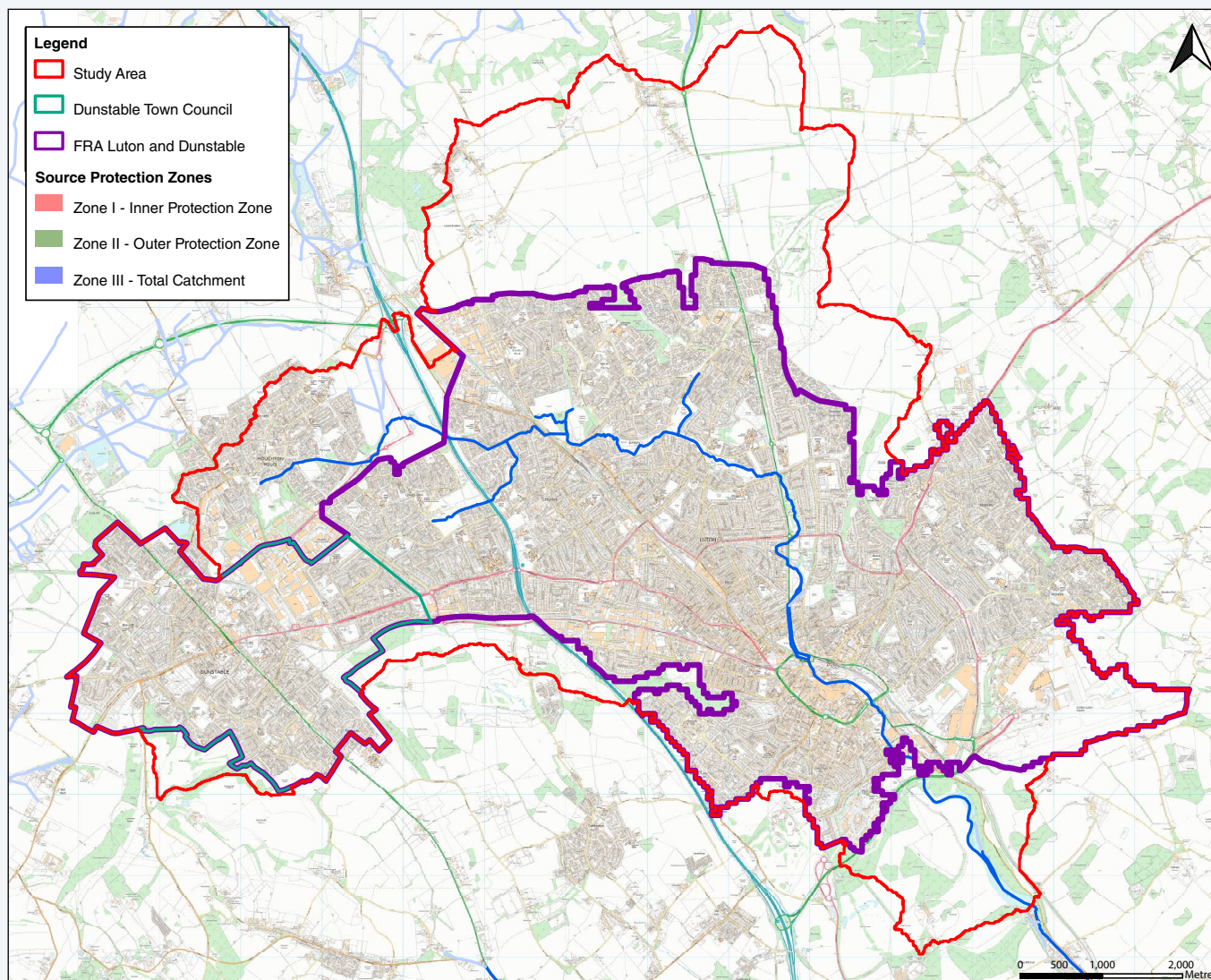
Study Area

The study area incorporates all of the Luton Borough Council area and the town of Dunstable. The area has been expanded from the Luton and Dunstable Flood Risk Area (LDFRA) identified by the Flood Risk Management Plan (see Page 2) to encompass the topographic River Lea catchment downstream as far as Luton Hoo lakes in order to incorporate potential constraints and opportunities (e.g. new development) that could directly influence the LDFRA from beyond its extent.

Click below to see the predicted areas of flood risk and key environmental considerations.

- **Map A:**
Administrative Boundaries
- **Map B:**
Fluvial Flood Risk
- **Map C:**
Surface Water Flood Risk based on Risk of Flooding from Surface Water (RoFSW) mapping
- **Map D:**
Groundwater Flood Risk
- **Map E:**
Flood History
- **Map F:**
Overall Flood Risk
- **Map G:**
Environmental Designations

Click on the map to return to base map.



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Setting the Scene

The key objective of the RAC project is to address current and future flood risk. However it will also deliver environmental, social and economic benefits as part of any flood risk management measures. With this in mind this section provides an overview of the current state of the environment in Luton and Dunstable.

Flood Risk

Flooding can have a devastating effect upon families, communities and the local economy. It poses a risk to life, damages property and infrastructure, disrupts services, can destroy habitats and causes health impacts such as stress. The national economic losses from the winter 2019 to 2020 flooding is estimated to be about £333 million.

The principal watercourse in the study area is the River Lea that runs through the centre of Luton. The Lea is approximately 68km long from its source in the Chilterns to its confluence with the Thames at the Royal Docks.

Luton

The River Lea is extensively culverted (underground) in Luton. Culverts can increase the risk of fluvial (river) flooding through blockages and structural failure. They also prevent access, fish passage and reduce biodiversity. The poor condition of the culvert through the centre of Luton is currently being investigated by LBC and remedial actions are being reviewed. The areas of Wardown Park, the Telford Way roundabout and the confluence of Houghton Brook with the Upper Lea are known to experience flooding problems.

Extensive risk of surface water (intense rainfall) flooding stems from: the rapid expansion of Luton in the 1950s to the 1980s without a related upgrade of the sewerage system; the steep local Chiltern's topography routing and funnelling surface water towards the centre of Luton; loss of greenspace to development that could hold back the water; and reliance on pumped drainage which can become overwhelmed during heavy rain. LBC identified 14 Critical Drainage Areas across the borough in 2020 (see Map C on Page 5).

Groundwater flooding is also a significant risk in Luton. Many of the watercourses are spring fed, indicating groundwater levels are close to the surface throughout the borough. The north-east and south-west sides of Luton consist of a chalk geology and therefore are part of extensive aquifers, many of which are used for water supply. Groundwater flooding has been recorded in Verulam Gardens and Stratton Gardens.

Dunstable

Surface water flooding in Dunstable is caused by exceedance of the capacity of the sewerage network due to intense rainfall (there are no watercourses in the town). A number of overland flow paths converge on the town centre following the topography causing flooding as occurred in June 2016 which affected approximately 30 properties and businesses (although this is considered to be an underestimate). From the town centre rainfall drains eastwards towards the Houghton Brook and Lewsey Brook, both of which drain to the River Lea and then flow through Luton. CBC has identified 8 Critical Drainage Areas (see Map C on page 5).

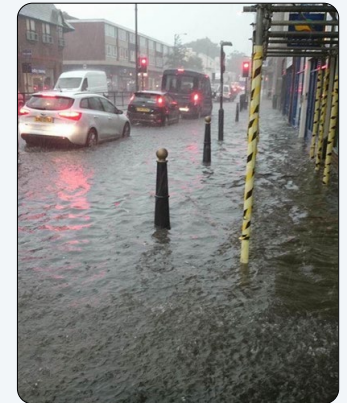
Flood Risk Summary

There are 290 properties estimated to be at risk of fluvial flooding in Luton from a 1 in 100 annual chance event (equivalent to Flood Zone 3 – see Map B on page 5) and 1,250 have a 1 in 1000 chance every year (equivalent to Flood Zone 2).

Up to 9,360 properties are at risk of surface water flooding within Luton from the 1 in 100 annual chance event. CBC has identified 1,693 properties are predicted to be at risk of surface water flooding from a 1 in 50 annual chance event in Dunstable.



Butterfield Green Road, Luton



Dunstable High Street

Water Quality and Resources

The River Lea is a chalk stream with its base (non-flood) flows coming from the chalk aquifers (permeable rock) below. The river has historically been affected by drought, over-abstraction, agriculture and urbanisation. Each of these has played a part in affecting the water quality and resources of the Lea catchment.

The Lea (from Luton to Luton Hoo Lakes) catchment (area drained by the river) covers the vast majority of the study area and is the focal river catchment for the RAC project. It is designated a heavily modified water body and classified currently at 'Bad' status under the Water Framework Directive, with an overall objective of reaching 'Good' status by 2027. The primary reasons for its current failure are:

- changes to the natural flow and levels of water
- pollution from wastewater
- physical modifications
- pollution from towns, cities and transport

Sources of pollution in the Lea are nitrate polluted agricultural runoff in rural areas, and diffuse pollution from highways runoff, combined sewer overflows, and misconnections in urban areas.

Thames Water, Anglian Water and Affinity Water manage water and its quality (as the principal service providers) through abstraction for water supply and discharges from wastewater treatment works. The Luton Lea Catchment Partnership is also working closely with other partners and stakeholders to better manage the aquatic environment.

Due to the local chalk geology most of the RAC area is within a Source Protection Zone meaning that the groundwater is used for drinking water supplies. There are three Zone 1 areas which are the most vulnerable to pollution (see Map G): one to the south of Dunstable town centre, one to the south east of M1 Junction 11 and another in Luton town centre.

Water Stress

South East England is an area of serious water stress (when the water resources in a region are insufficient for its needs). Water resources will require increasingly careful management to meet increased demand in the future due to population growth, development and environmental needs. This will require a combination of both the physical installation/retrofitting of water efficiency measures and behavioural change to reduce demand.

Both CBC and LBC have undertaken Water Cycle studies in recent years to understand the current position in relation to water stress and the impact of future development on water resources and specifically, efficiency, treatment, quality, supply and drainage. The studies recognise that more needs to be done to promote water efficiency, to improve the quality of the water entering our rivers, and to renaturalise them wherever possible.

The Importance of Chalk Streams

Chalk streams are a rare and valuable habitat. Often referred to as the equivalent of England's rainforests they are spring-fed from underground aquifers. They support a rich ecology and biodiversity of fish, plants and insects because of their alkalinity, minerality and their cool, stable and gentle flows. However they face significant challenges in the 21st century due to pollution arising from road run-off, agriculture and sewage. Additionally they experience low flows due to abstraction for public water supply and physical damage to the watercourses, both of which are likely to worsen due to climate change and population growth.

85%
of the world's chalk streams
are found in England



Variability of the condition of the River Lea from an urbanised, constrained channel (Guildford Street Junction) to a rural floodplain (Moor Park)

Natural Environment

The intention is that this project will seek opportunities to deliver wider social, economic and environmental benefits beyond the water environment. Therefore, a summary of the wider environmental baseline has been undertaken,

together with a socio-economic baseline a summary of which is on page 9. Click on each topic to read more. (please note that some of these topics include links to external websites).

Socio-Economic

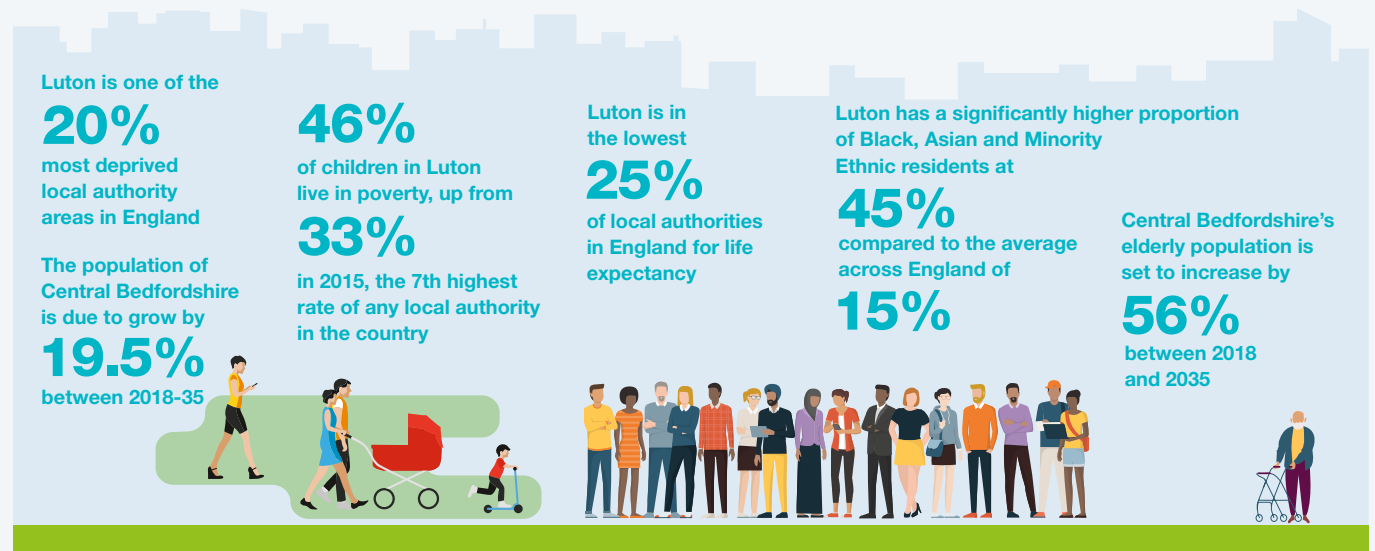
Flood events inevitably have significant consequences for the population who are impacted. However, the precise nature of impacts is dependent on the characteristics of local communities, and particularly the demographics of its population. The socio-economic impacts of flood events tend to be particularly severe for the most vulnerable members of society.

A range of social factors can affect the ability of households to prepare for, respond to and recover from flooding including: poverty, ethnicity, physical and mental health and age (see icons to the right).

Increasing flood risk due to climate change is likely to have wider socio-economic impacts on communities. It may reduce the extent of land available for community growth and housing due to the reluctance of families to relocate to areas with high risk, or difficulties acquiring planning permission to build future homes.

Luton's population is considered to be young, highly ethnically diverse, very deprived and has widespread health challenges. While Central Bedfordshire's is older, more affluent, less ethnically diverse, mostly healthy and has small pockets of deprivation, this is not necessarily reflected in Dunstable, as the town includes the most deprived wards in Central Bedfordshire. The prevailing demographic characteristics across Luton and Dunstable (see infographic to the right) are such that the area is predisposed to acute socio-economic impacts following flooding.

Click on each topic to read more.



Future Challenges

Climate Change

The Met Office's latest assessment of how the climate will change (UKCP18) confirms that winters in the future will be warmer and wetter, summers will be hotter and drier and sea level will continue to rise. How rapidly, and to what extent these changes occur, depend on the success of global efforts to reduce greenhouse gas emissions (e.g. carbon dioxide and methane).

The key expected impacts of climate change to Luton and Dunstable are:

- Air temperatures in both winter and summer will continue to increase for our lifetimes
- The total amount of rain falling in any year is expected to decrease slightly in the next 100 years
- Seasonal patterns of rainfall will become more pronounced, with total rainfall substantially increasing in winter and decreasing in summer

17,800

new homes are needed in Luton between 2011 and 2031



- More intense rainfall in summer
- The predicted changes to rainfall mean that total flows in the River Lea could increase in winter but decrease in summer with potential impacts for flooding, water quality and biodiversity.

Development

Luton and Dunstable will experience significant population growth and associated development over the coming decades. This will place pressure on the environment through the creation of impermeable surfaces that absorb and retain heat and reduce the ground's ability to absorb rainfall, increasing the risk of surface water flooding. There will also be strategic development such as the Oxford to Cambridge Corridor and development aspirations for Luton Airport that will affect both towns. However if harnessed correctly such developments could become catalysts for wider environmental and social improvements.

Central Bedfordshire's population will increase by

54,000 (20%)

6,500

new homes have been committed in Dunstable



Expected changes to rainfall

Winters in 20 years time are expected to have

7-12%

more rainfall and in 50 years time up to

20%

more, and in 100 years time up to

33%

more.

Note: Changes compared to 1981-2000

Expected average temperature rises



Summer temperatures in 20 years time will likely be

1.0-1.5°C

higher, in 50 years time they will be

2.0-3.9°C

higher and in 100 years time, average temperatures could be

2.3 - 9.0°C

higher.

Note: Than was typical in winters between 1981 and 2000.

Flood Risk

Without intervention the implications for Luton and Dunstable could be significant. It is expected to rain less often but when it does it will be more intense which could lead to more flooding in urban areas, for example from more intense summer thunderstorms as occurred in Dunstable in June 2016. Maps B and C on page 5 provide an estimation of the increased flood extents from the River Lea and surface water due to climate change.

Wetter winters would increase river flows and consequently flood risk. Current UK climate projections indicate peak flows on the Upper River Lea would increase by up to 59% by the 2080's. The increased rainfall could also increase the risk of groundwater flooding due to increased infiltration to the aquifers.

Water Quality and Resources

The potential impacts are wide-ranging, including concerns over availability of water for people and business, and the quality of water in the River Lea and groundwater due to lower flows in the summer. Increased storminess in summer could increase pollution loads entering the River Lea with consequences for water quality and biodiversity. With more rain falling in winter than summer, and in more intense events, we need to provide flexibility to ensure availability throughout the year, including reducing demand or storing water for later reuse.

Natural Environment

Climate change could have a profound effect upon native flora and fauna reducing biodiversity because species would be less able to adapt to the changing climate than humans. Changes to the flow of the River Lea, particularly lower flows in the summer, could affect fish and other aquatic animals and insects.

Socio-Economic

A serious impact of increased flooding is the heightened risk of injury and threat to life. Additional flood events and associated recovery costs will further stretch low income households. Increased flooding could reduce the accessibility of green spaces, transport, employment, services or social networks, disproportionately affecting those already disadvantaged. Many buildings are not designed for hot weather and this increase in temperature may require some adaptation to provide greater cooling in the future.



Making it Happen

Project Stages

Vision: This document completes this stage, setting out a collaborative vision for Luton and Dunstable, including core objectives and delivery principles to guide delivery of the RAC project.

Strategy and Implementation Plan: This stage will set out the practical steps to achieve the RAC project for Luton and Dunstable. Given the future challenges and uncertainties looking ahead to 2100, the Strategy will identify multiple delivery pathways (options) to achieve the RAC objectives, in order to maintain an adaptive (flexible) approach (see An Adaptive Plan below).

Working in collaboration with stakeholders and partners, the Implementation Plan will detail the short, medium and long-term actions required on each pathway. These actions will vary in scale and location, from natural flood management in the upper catchment, to sustainable drainage and property level resilience in the lower catchment. Timescales for implementation will vary to achieve optimal impact, and/or they may depend upon the availability of land, resources and funding.

Project Delivery: This stage will be to deliver the projects included in the Implementation Plan in partnership with relevant groups and organisations. The Implementation Plan will be reviewed every few years to consider any relevant changes and to adjust the action path accordingly. This long-term adaptive approach to flood risk planning will allow us to flex to future changes, better manage future risk, and deliver wider integrated benefits.

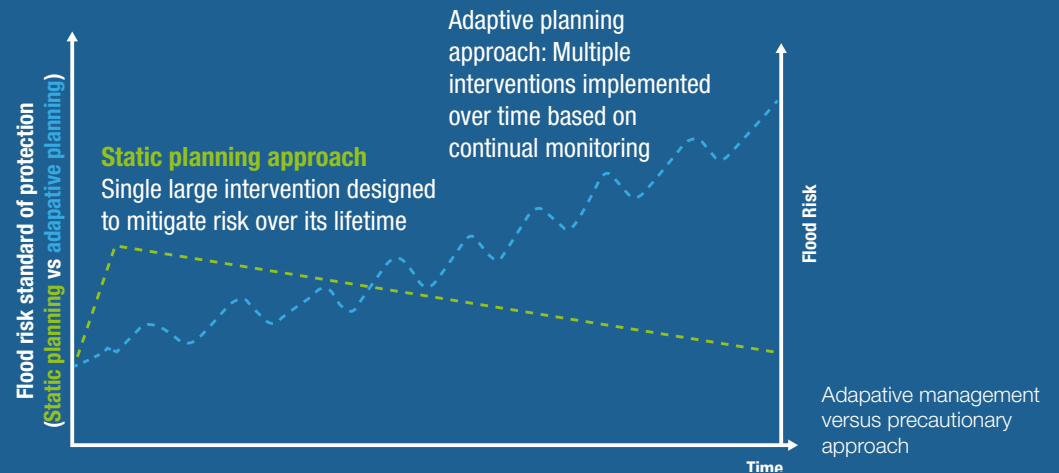
Engagement

Communities: The involvement of local communities is key to the RAC project's success, and it will evolve in time. Initially we will seek the views of local people on what they see as the key issues and also what do they want the future to look like. They will be involved in the development of the Implementation Plan to ensure it addresses the issues they had previously identified. Local communities will continue to be involved through the delivery process as the works will directly affect them.

Partners: Partner organisations have been involved in the development of this Vision through two workshops in 2021 and we would like them to have an integral part in the creation and development of the Strategy and Implementation Plan. There will be regular communication to keep them informed, seek their input to the development of the plan, and to identify project delivery opportunities. Other organisations will be sought and welcomed as additional partners to this project.

An Adaptive Plan

The intention of an adaptive plan is to retain flexibility to accommodate future changes. Given the timescale that the RAC project is working to these could include for example: climate change, future development, and legislative changes. The adaptability would ensure that the current vision and plan would remain relevant into the future through regular review cycles.



Delivery Principles

The over-arching principles for success that will be adopted by the RAC partners are:



Inclusive: The local community's input and support is integral to the RAC's success in order to deliver solutions that will truly make a difference - it needs to involve as many people as possible.



Adaptive: The RAC project needs to be able to respond to future climate and development challenges or become irrelevant.



Sustainable: The plan will have to include approaches that deliver improvements efficiently while not compromising but enhancing the future environment.



Collaborative: No single community, body or organisation can address inter-related challenges alone - meaningful change will come through joint-working to a common goal and the subsequent successful delivery of multi-benefit schemes.



Nature-based solutions: Working with nature by installing natural, green infrastructure schemes is cheaper and more effective than engineered solutions that try to control nature, and can deliver an array of wider interrelated benefits.



Low Carbon Solutions: The RAC project is committed to limiting its carbon footprint at every stage, and will explore and trial innovative low-carbon approaches to delivery wherever possible.



Local solutions: Small changes can have a large cumulative impact. Luton and Dunstable are dense urban environments with competing pressures on limited space. The RAC project will look at solutions of all sizes, and encourage local people to identify opportunities on every lamp post / building / street / park that they frequent. Local materials, suppliers and volunteers will be recruited wherever possible to support the local economy.

How will this be funded?

Climate change affects us all and we are all part of the solution. The scale of the challenge required to make our communities resilient is such that government on their own cannot fund all of this work. However, by being adaptive and linking our work to the developments and opportunities that spring up around us, not only can we spread the load around many organisations, but we can also make this more affordable.

Pilot Projects

Several pilot projects have been identified for delivery during these early project development stages in order to test the sustainable, collaborative approach required by the RAC project. These include tree pits and rain gardens along Dunstable High Street, and a Junior River Wardens programme to engage children in their local water environment.

The pilot projects should demonstrate how it is possible to efficiently deliver multiple benefit schemes that are valued by the local community. Lessons learnt from the pilot projects will also ensure that the Implementation Plan reflects the practicalities of project delivery such as collaborative working, community involvement and funding.

Opportunities to deliver more pilot projects will be explored during development of the Strategy to continue this learning. Plans to implement sustainable drainage systems are already underway with two Luton schools, and the installation of some flood resilience measures in homes is being investigated. Other avenues for consideration at this time include water efficiency assessments and recommendations for businesses, as well as collaboration opportunities arising from the planned deculverting and restoration of the River Lea through Luton town centre.

Case Study: Dunstable High Street SuDS

Development can be an opportunity to introduce water and environmental benefits even if they are not the core driver of the project as was the case in Dunstable High Street.

CBC received funding from Highways England as part of the de-trunking of Dunstable High Street to improve the shopping experience. As part of this Sustainable Drainage Systems (SuDS) were introduced including rain gardens and soft landscaping areas to store surface runoff which are cheaper and more effective than traditional drains. These features both address pre-existing flood risk issues, and also enhance the environment and the associated wider benefits this brings. Anglian Water contributed funding to release pressure on the drainage network and the EA contributed funding as part of the RAC pilot projects, meaning more measures could be installed.



Case Study: Junior River Wardens

Community engagement is vital to ensure interventions are delivered that local people truly value. The RAC project funded a pilot Junior River Wardens Programme to introduce school children to the River Lea, and to find out what they would like from their local river.

The programme ran March-September 2022, and took 17 groups of children from 8 different schools and uniformed groups to their nearest accessible section of the River Lea. The children went on a guided riverside walk, made field sketches, carried out water quality sampling and wildlife identification activities, and participated in creative writing and drawing sessions.

The programme was successful in raising awareness of the river and climate change, sharing knowledge and opinions, encouraging local action, and discovering how the children would like to use their river in the future.



How can you get involved?

There are several things you can start doing now to help make your community more resilient:

- understand your own flood risk and sign up for [EA flood warnings here](#)
- support the work of the Luton Lea Catchment Partnership and look out for opportunities to volunteer in projects to improve the local water environment <http://www.riverleacatchment.org.uk/index.php/luton-lea-about-us/the-luton-lea-partnership>
- let us know if you have any comments on this Vision document, have any ideas for pilot project collaborations, and/or would like to be more involved in the RAC project at ps0-hnl@environment-agency.gov.uk
- please attend future consultation events



'Our River' community photo mosaic, The Mall, Luton (Aleksandra Warchol Photography, www.awarchol.com)

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