

Draft Resilience Element

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If you have any questions, please contact Deputy Town Administrator Mary Bohlen at the email address above, or call 410-641-4314.

Resilience Element

TOWN OF BERLIN, MARYLAND

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1 Introduction

2 Purpose of the Resilience Element

3 Comprehensive plans are the most powerful tool that local governments can use to set a course for
4 future land use and development. These plans establish community goals and priorities on specific
5 elements associated with the growth and evolution of a community and help provide a coordinating
6 platform for projects and fiscal resources.

7 The Resilience Element focuses on climate change and how the Town of Berlin will approach mitigating,
8 adapting to, and managing potential climate impacts. This new addition to the Town's Comprehensive
9 Plan seeks to define resiliency, present a general description of climate change impacts for the region,
10 list particular areas of interest where existing community plans overlap with resiliency, establish
11 resiliency strategies and actions, and identify resources that can aid in strengthening community
12 resilience.

13 Berlin has demonstrated a strong environmental ethic but has taken an ad hoc approach to their
14 sustainability and environmental initiatives. The Resilience Element provides the long-range plan needed
15 to coordinate these ongoing efforts and ensure their effectiveness in a changing climate. While the
16 ultimate goal will be to integrate climate change resilience throughout the Comprehensive Plan, as well
17 as into other municipal planning documents and practices, this dedicated Resilience Element will help
18 focus attention on the importance of climate change resilience, give prominence to the issue, and
19 provide the context for updates to the other elements of the Comprehensive Plan.

20 **What is Resilience?**

21 Resilience is the ability to anticipate, prepare for, and respond to changes and sudden disruptions in
22 order to survive and prosper. Community resilience is inextricably linked to the health, safety, and
23 financial well-being of its residents. Rather than simply a capacity, resilience should be seen as a
24 continuous process of adapting, learning, leading, and implementing interventions to ensure the success
25 of all residents. For Berlin that means long-term strategic planning to maintain the Town's small-town
26 character while accommodating a growing population, supporting community services to improve the
27 quality of life of residents, and ensuring a clean and safe environment for generations to come.

28 To achieve local resilience goals and to address the local impacts of a changing global climate, the Town
29 of Berlin will need to embrace ongoing regional coordination. For example, coordinated action would be
30 necessary to correct the large-scale flooding issues that result from a lack of existing infrastructure.
31 Furthermore, due to Berlin's unique location near major coastal communities and its strong road
32 connectivity, the Town needs to not only address the issues within their community but also to consider
33 how the Town fits into regional efforts. The Town plays an important role in emergency management
34 during acute weather events, serving as the location for shelters that are managed by the County, and it
35 will likely be the recipient of people moving from neighboring areas that lose land due to sea-level rise.

36 Improving roadways and developing large infrastructure solutions will require major assistance from,
37 and coordination with, the County and State. Some priorities identified in the Resilience Element will
38 require support from Worcester County and the State, other actions may be led entirely by community
39 volunteers, and many will require cooperative effort from the County, the local community, and other
40 regional partners. The Town of Berlin will continue to take advantage of regional planning opportunities

1 to lead and advocate for advancements in resilience efforts, such as in Worcester County’s Hazard
2 Mitigation Plan update or through participation in the Maryland Commission on Climate Change
3 Adaptation and Resiliency Working Group meetings. The Resilience Element highlights when the
4 community should be advocating for County and State intervention on larger infrastructure projects and
5 deeper legislative issues.

6 It is important to note that this Resilience Element should be revised in five years to keep up with the
7 most current scientific data, State policies, and community priorities.

8 **Weather versus Climate**

9 It has been suggested that weather is your mood, climate is your personality.¹ Weather, like your
10 mood, can change from day to day; it is how you feel in the short-term. For example, you might be
11 happy, disgruntled, and excited all in the same day or week. But if you are generally a happy person,
12 and optimistic from day-to-day, you might say that you have an agreeable personality.

17 Weather describes the morning fog, afternoon thunderstorms, or even a seasonal tornado.
18 Climate is the overall trend of weather patterns over a long period of time; it is what you can
19 generally expect from year to year. Climate change refers to the long-term rise in the Earth’s
20 global temperature, which is causing the climate, or the Earth’s personality, to change. The
21 historical patterns of precipitation, heat, and storm seasons are shifting, becoming more
22 intense and more erratic.

28 In Maryland, like much of the Mid-Atlantic and Northeast region, communities can expect to see
29 significant rises in temperatures, more droughts and more extreme precipitation events, and sea-
30 level rise. These changes in climate can have a significant local impact.²

34 It is expected that Maryland will experience twice as many days over 90°, more nights over 80°, and
35 more heat waves that last over 20 days.³ This extreme heat can impact power usage, water availability,
36 food safety, and air quality. Extreme heat and declining air quality are also likely to pose increasing
37 problems for human health, especially in urban areas. Increases in temperature contribute to heat
38 stress, allergies, vector borne diseases, cardiovascular failure, or even kidney failure due to dehydration.
39 These health impacts are especially concerning for high-risk populations such as children, the elderly,
40 and low-income and communities of color.

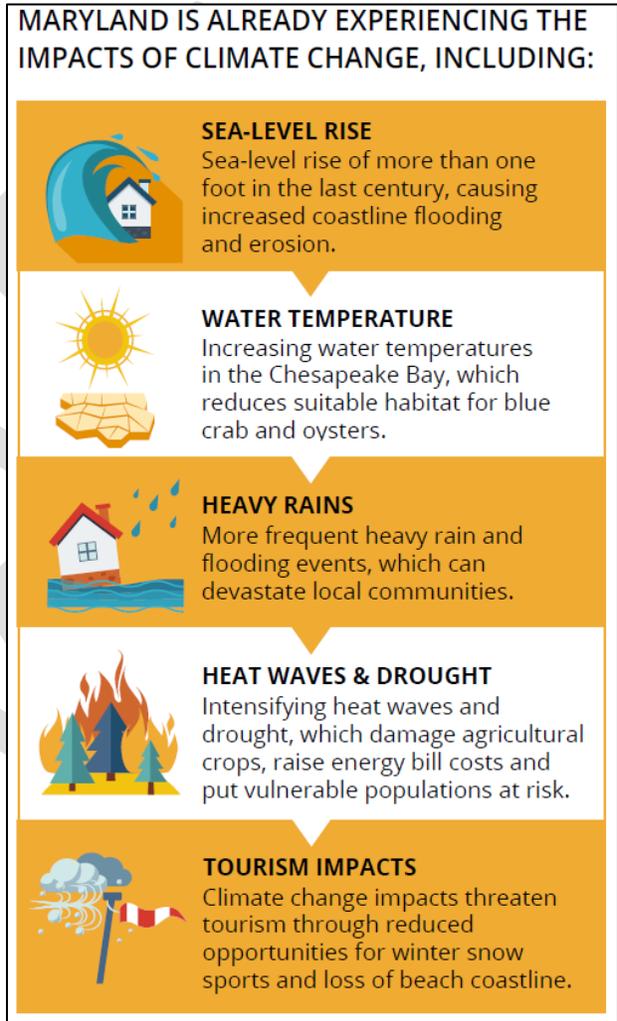


Figure 1. Addressing Climate Change in Maryland: An Overview, Maryland Commission on Climate Change Fact Sheets

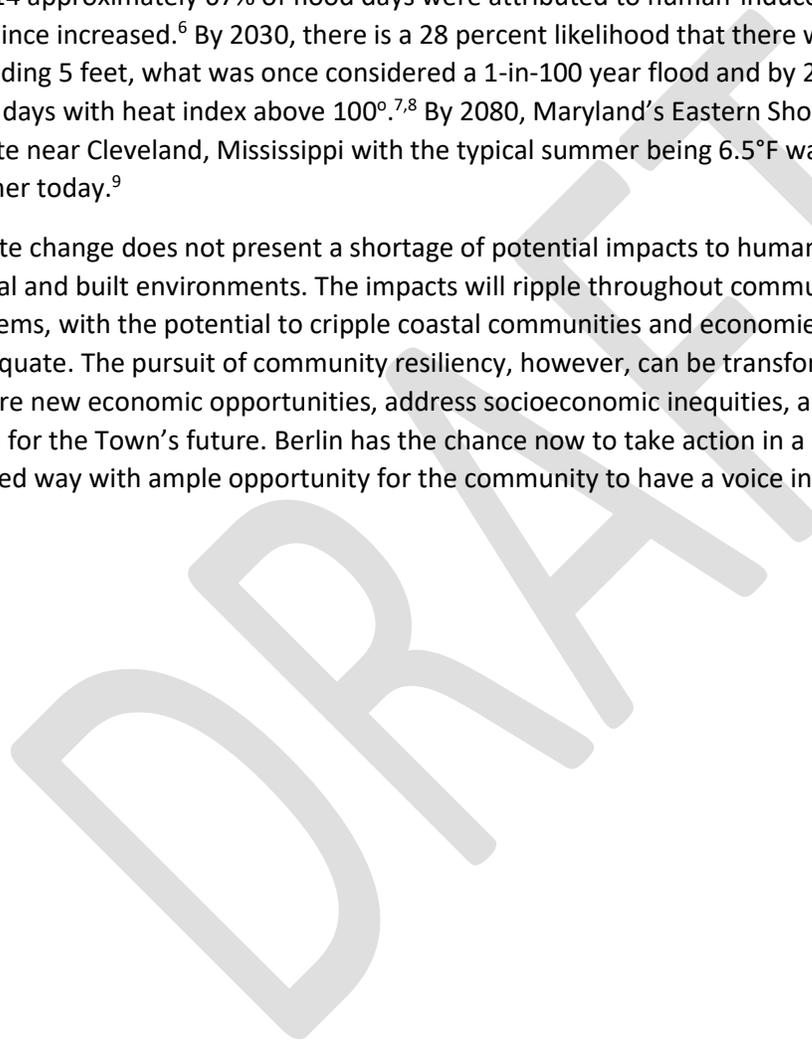
1 More frequent extreme precipitation events can cause significant property damage and are making
2 coastal waters more acidic, making it difficult for baby oysters, mussels and other creatures to build
3 their shells under these new conditions.

4 While the Town of Berlin is entirely outside of the projected inundation zones, meaning that Berlin is not
5 directly vulnerable to flooding from sea-level rise, coastal and stormwater flooding is still a significant
6 concern.⁴ Over the past 56 years Worcester County, Maryland has experienced approximately eight
7 inches of sea-level rise which makes storm surges and coastal floods more severe and frequent.⁵

8 In 2014 approximately 67% of flood days were attributed to human-induced climate change. This has
9 only since increased.⁶ By 2030, there is a 28 percent likelihood that there will be at least one flood
10 exceeding 5 feet, what was once considered a 1-in-100 year flood and by 2030 there will likely be 10
11 more days with heat index above 100°. ^{7,8} By 2080, Maryland's Eastern Shore will feel most like today's
12 climate near Cleveland, Mississippi with the typical summer being 6.5°F warmer and 11% drier than
13 summer today.⁹

14 Climate change does not present a shortage of potential impacts to human populations and both the
15 natural and built environments. The impacts will ripple throughout communities and exacerbate existing
16 problems, with the potential to cripple coastal communities and economies where preparations are
17 inadequate. The pursuit of community resiliency, however, can be transformed into a positive process to
18 capture new economic opportunities, address socioeconomic inequities, and establish an intentional
19 vision for the Town's future. Berlin has the chance now to take action in a holistic, coordinated, and
20 codified way with ample opportunity for the community to have a voice in the process.

21



1 Framework for the Resilience Element

2 **Resilience Element Development Approach**

3 The approach for developing the Berlin Resilience Element included a synthesis of extensive desktop
4 research, government staff input, stakeholder feedback, and a Berlin planning document review. The
5 ideas and comments collected during all of these efforts contribute to the resilience categories and the
6 suggested action strategies to incorporate resilience into the Town’s processes.

7 The preliminary resilience research
8 included reviewing resilience planning
9 frameworks, resilience indicators and
10 metrics, and example resilience-related
11 plans and elements. Common themes
12 identified in the desktop research
13 included good governance and
14 leadership, research and planning,
15 energy efficiency and renewable energy,
16 environmentally friendly development,
17 transportation and mobility, and health
18 and social equity.

20 These themes were further explored
21 through community stakeholder
22 meetings and outreach events where
23 over 80 participants provided feedback and input. During the community stakeholder meetings
24 residents learned about the local impacts of climate change, shared personal definitions of resilience,
25 and discussed investing in Berlin’s future. Participants discussed concerns and potential solutions for
26 issues such as growth and development, flooding, energy use, waste management, and financial
27 sustainability. These issues were further explored through a community survey administered by the
28 Town of Berlin in the spring of 2019 (see Appendix A). Through this survey, community stakeholders
29 indicated their priorities through a simple ranking exercise and open-ended questions on potential
30 projects and programs. These priorities have been woven throughout the Resilience Element.

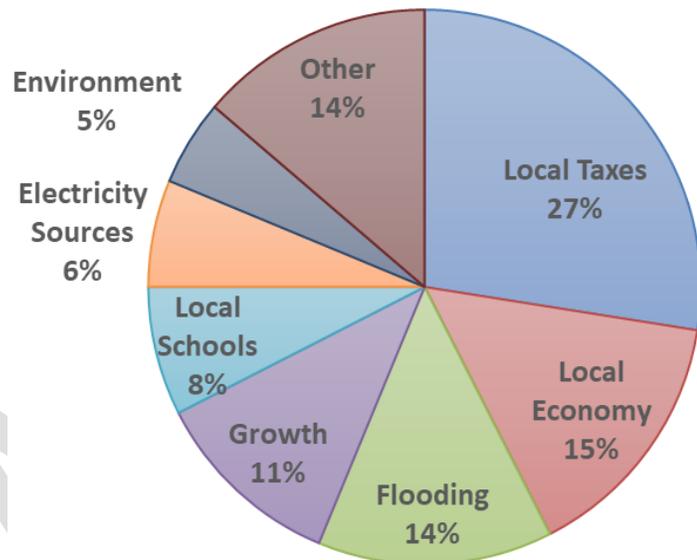


Figure 2. Berlin resilience survey results - priorities ranked in the top three

31 To recognize existing resilience efforts, augment and support established initiatives, and propose new
32 strategies to augment resilience, the Town and its partners reviewed a number of Berlin’s existing
33 documents and plans (see Appendix B). This helped identify any overlapping priorities and potential for
34 leveraging resources around resilience. The documents and information reviewed included:

- 35 • Town of Berlin, Maryland Auditors’ Communications (2018)
- 36 • Berlin Sustainable Maryland Community Certification Report (2018)
- 37 • Berlin Green Team Three Year Action Plan (2018)
- 38 • Town of Berlin Roadway Evaluation 2017/2018 Report (2018)
- 39 • Town of Berlin 2016-2018 Strategic Plan (2015)
- 40 • Our Path Forward: The Comprehensive Conservation & Management Plan for Maryland’s
- 41 • Coastal Bays (2015–2025)

- 1 • Worcester County Hazard Mitigation Plan Update (2014)
- 2 • Walkable Bikeable Berlin: A Master Plan for a Walkable, Bikeable Berlin, Maryland (2013)
- 3 • EFC Financing Feasibility Study for Stormwater Management in Berlin, Maryland (2012)
- 4 • Town of Berlin Comprehensive Plan (2010)
- 5 • Comprehensive Parks & Recreation Plan (2009)
- 6 • Technical Assistance Memo: Data Availability for Resilience and Health (2008)
- 7 • Sea Level Rise Response Strategy Worcester County, Maryland (2008)
- 8 • Stormwater System Improvement Study for the Town of Berlin, Maryland (2007)

9 Specifically, the Town of Berlin’s Comprehensive Plan (2010) was a foundational resource during this
 10 review process. The State of Maryland requires certain elements to be incorporated into the
 11 Comprehensive Plan, many of which directly relate to resilience initiatives, including¹⁰:

- | | |
|-----------------------|--------------------------------------|
| 12 • Transportation | 16 • Land Use |
| 13 • Water Resources | 17 • Community Facilities |
| 14 • Municipal Growth | 18 • Areas of Critical State Concern |
| 15 • Sensitive Areas | 19 • Development Regulations |

20 The Berlin Comprehensive Plan also included a discussion on a community vision for the future that
 21 incorporates the concept of sustainability and resilience (p. 9, 2010).

22 Future Vision: Berlin is a community with a wealth of resources that is very focused on
 23 improving the way of life in a manner that is sustainable for generations to come. The Town of
 24 Berlin is committed to preserving the community’s unique character, creating a more
 25 environmentally friendly and energy efficient community, and improving recreational green
 26 space.

27 In the Town’s more recently adopted strategic plan, the community outlines values and objectives that
 28 align with the goals of resilience, including¹¹:

29 Values: The Town of Berlin is a safe, welcoming, innovative, can-do model small Town that values its
 30 history, traditions and diversity. We embrace tolerance and inclusiveness. We are:

- 31 • Committed to working together to define and shape our future
- 32 • Economically sustainable and environmentally progressive
- 33 • Artistically alive and eternally young
- 34 • A people friendly community and a place to live in for a lifetime

35 Short-term Objectives

- 36 • Increase parks and recreation facilities
- 37 • Preserve Berlin's traditions, quality of life, and "wow" factor while prospering and changing
- 38 • Enhance and maintain public safety services
- 39 • Invest in public buildings, roads, sidewalks, and water and sewer pipes to ensure that they
- 40 function well and meet state and federal regulations
- 41 • Promote economic development and increase employment opportunities

42

1 Mid-term Goals

- 2 • Maintain an environmentally proactive community
- 3 • Broaden transportation options to improve mobility
- 4 • Increase the variety of housing to meet the needs of our population over time
- 5 • Invest in the Town's electric utility to meet environmental regulations and improve service
- 6 • Expand the Town's revenue base to meet needs, expectations, and requirements

7 As such, the Town has already identified resilience and a number of resilience issues as a priority
8 through its Comprehensive Plan (2010) and the Town of Berlin 2016-2018 Strategic Plan (2015), which
9 contain sections that directly relate to community resilience. The Berlin Resilience Element reinforces
10 those priorities and provides opportunities for actively pursuing the implementation of strategies listed
11 in the Comprehensive Plan and other community planning documents.

12 The intent, content, and implementation strategies
13 of the Comprehensive Plan have been cross-
14 mapped to this Resilience Element along with the
15 other documents listed above. The Resilience
16 Element recognizes existing initiatives, enhances
17 and supports established initiatives, and proposes
18 new initiatives for the Town of Berlin.

19 The strategies and actions identified in the
20 Resilience Element largely take a "no-regrets"
21 approach – promoting actions that make sense for
22 Berlin, regardless of whether or not a specific
23 threat actually materializes in the future.¹² By
24 aligning with the Town's existing objectives,
25 emphasizing community priorities, and embedding
26 resilience considerations into ongoing operations,
27 Berlin can build resilience to changing economic,
28 social and environmental conditions while
29 maximizing positive and minimizing negative
30 outcomes.

"NO-REGRETS" APPROACH

"No-regrets" actions are actions by households, communities, and local/national/international institutions that can be justified from economic, social, and environmental perspectives whether or not natural hazard events or climate change (or other hazards) take place. "No-regrets" actions increase resilience, which is the ability of a "system" to deal with different types of hazards in a timely, efficient, and equitable manner. Increasing resilience is the basis for sustainable growth in a world of multiple hazards (Heltberg, Siegel, Jorgensen, 2009; UNDP, 2010).

1 **Resilience Element Framework**

2 The following sections of the Berlin Resilience Element explore in detail two major categories of
3 strategies that were identified through the Resilience Element development process: *Resilient*
4 *Community Action* and *Resilient Governance*.

5 *Resilient Community Action* strategies are in response to issues identified by residents and staff during
6 community stakeholder meetings. This category establishes recommendations that show a commitment
7 to environmentally friendly, resilient, and energy efficient development. It emphasizes on-the-ground
8 implementation as well as opportunities to increase the community’s awareness of and participation in
9 the Town’s resilience initiatives.

10 *Resilient Governance* strategies are best management practices that are essential to ensuring the
11 successful and effective implementation of the *Resilient Community Actions*. While these strategies
12 were not directly identified by community stakeholders, they are foundational steps the Town of Berlin
13 will need to take to support the *Resilient Community Actions* and ensure sufficient capacity within the
14 organization for this work. These strategies embed resilience into the Town’s processes and should be
15 given serious consideration as they help the Town establish community trust, integrate resilience
16 practices throughout municipal operations, mobilize resources, and increase efficiencies, thus reducing
17 the cost of project implementation and increasing the Town’s long-term chances of success.

18 The Resilience Element provides a description of the two major categories, their overarching purpose,
19 and why that category is important. Each category also includes high-level strategies for implementation
20 and how those strategies relate to Berlin’s values and priorities.

21 Following the resilience strategies, the plan has a fairly comprehensive section on implementation
22 planning and a recommended three year action plan. This section consists of a series of tables that
23 highlight a number of actions to achieve the objectives of each action category, detailed action steps for
24 the Town and community to take, and implementation planning columns where the Town of Berlin can
25 keep track of notes for each action step. While the implementation planning section provides a
26 comprehensive suite of short, medium, and long-term actions, the action plan section provides
27 recommendations for immediate near-term next steps. These recommendations can of course be
28 expanded upon but provides a starting point for taking action.

29 Lastly, the Resilience Element includes extensive appendices with summaries of meetings and
30 stakeholder outreach (see Appendix A), tables summarizing the planning document review and desktop
31 research (see Appendix B), and a tailored resources table (see Appendix C). The Action Strategy
32 Resources provides helpful links to relevant funding opportunities, guidance documents, and tools for
33 each action category. This is not an exhaustive list of resources; rather, it is a launching point for quick
34 action.

1 Resilience Element

2 Resilient Community Action

3 Community Action is about building the capacity of the local government and its residents to develop,
4 implement, and sustain solutions to problems in a way that helps shape and exercise control over local
5 physical, social, economic, and cultural environments. It puts community members at the heart of their
6 own local services and provides opportunities for all residents and local stakeholders to get involved and
7 take action. Berlin is committed to making choices that support educational opportunities and create an
8 environment that welcomes people from all cultures and backgrounds to participate in the Town’s
9 resilience initiatives.

10 The Town’s Resilient Community Action strategies will position Berlin as a leader and catalyst for
11 resilience by inspiring and stimulating individual and institutional action. Through community outreach,
12 Berlin can provide educational opportunities and help promote the importance of resilience as a primary
13 avenue for improving quality of life. The Town can also facilitate community-led projects that will enable
14 residents to take ownership of outcomes and help build social cohesion. By identifying specific needs in
15 the community and providing targeted support, the Town can help build the capacity of residents to act
16 towards improving their environmental, social, and economic well-being.

17

RESILIENT COMMUNITY ACTION STRATEGIES

Flooding

- F-1 Adopt more aggressive flood standards.
- F-2 Identify and address nuisance and chronic flooding hotspots.
- F-3 Require the use of green infrastructure solutions for all new and redevelopment projects.
- F-4 Integrate flood mitigation objectives into open space, parks, and groundwater recharge plans.
- F-5 Promote stormwater management best practices to private property owners.
- F-6 Partner with County to seek certification in the National Flood Insurance Program Community Rating System (CRS).

Energy

- E-1 Increase energy efficiency and renewable energy capacity in all municipally owned facilities.
- E-2 Promote clean and efficient energy consumption to residents.
- E-3 Convert municipal fleet to electric vehicles and promote residential use of electric vehicles.

Heat

- H-1 Conduct an assessment of the heat impact on the electric supply reliability.
- H-2 Increase the urban tree canopy.

Community Resilience

- CR-1 Continue to facilitate community outreach and education opportunities.
- CR-2 Develop a green jobs and economic resilience strategy.
- CR-3 Enhance community connectivity between both sides of route 113.
- CR-4 Explore developing resilience hubs and cooling centers.

18

1 Flooding

2 **F-1 Adopt more aggressive flood standards.**

3 Most communities have floodplain regulations in place to guide new development away from higher risk
4 areas, as well as building codes within flood zones that aim to reduce the risk of property damage. Many
5 towns, including Berlin, base their floodplain regulations on official FEMA floodplain maps known as
6 Flood Insurance Rate Maps (FIRMs). This can be problematic, however, because regulatory floodplain
7 maps designed for federal flood insurance applications do not necessarily reflect actual flood risk.
8 Usually the area with a 1% chance of flood (100-year flood) in a given year is selected as the “base
9 flood” to establish the regulated flood zone for permitting, building code, and insurance purposes, but
10 flooding can and does occur outside of this area. Floodplain boundaries can also change faster than
11 maps are updated due to the addition of impervious surfaces in a watershed and other factors. This
12 already poses a challenge for communicating risk to the public; it also means that long-term planning
13 and development decisions may be made with incomplete or inaccurate information.

14 This situation is further complicated by climate change. Because heavy rain events are occurring more
15 frequently, the probability of experiencing a 1% flood may be higher (or conversely, the size of a 1%
16 flood is increasing). Sea-level rise also changes the probability and extent of coastal and tidal flooding
17 and storm surges. If these factors are not incorporated into the maps and regulations used to assess and
18 reduce flood risks, development may be allowed in unsuitable locations and threats to existing property
19 and infrastructure may be underestimated or overlooked.

20 In order to more proactively reduce flood risks in light of climate change, Berlin could regulate to a
21 higher standard than the 1% (100-year) floodplain required by FEMA. For example, the Town can adopt
22 the 0.2% (500-year) floodplain, designate a buffer beyond the mapped floodplain, or conduct a new
23 flood mapping study or model that incorporates future precipitation and sea-level rise projections. At
24 very least, the Town will adopt the new State flood standard once established. Currently, the state is
25 considering the 1% (100-year) flood zone plus 30 feet as the new standard, which should be considered
26 for planning purposes.

27 Updated or expanded flood maps can be used internally to make long-term infrastructure decisions or
28 adjust priority growth and open space areas in a comprehensive plan or other official documents.
29 Buffers can be required and expanded around existing natural features that provide flood protection
30 and water infiltration services.

31 It is important to note that the riverine and coastal flood zone maps for much of the Mid-Atlantic
32 seaboard underwent an update in 2015 that reduced the extent of many flood zones. Although these
33 are now the official floodplain maps for Worcester County as well as the Town of Berlin, it is likely that
34 these maps are underestimating current flood risks. It is also highly likely that they are underestimating
35 future flood risks since future precipitation projections and sea-level rise were not factored into the
36 analysis.

37

38

39

1 **F-2 Identify and address nuisance and chronic flooding hotspots.**

2 “Nuisance flooding,” or low levels of flooding that do not typically pose significant threats to public
3 safety or major property damage, can cause on-going disruptions and put additional strain on public
4 infrastructure like roadways and water systems. These floods, caused by successive rain events or
5 prolonged rainy periods, are a recurring issue in many areas of the Town and are a major concern to
6 Berlin residents and staff.

7 It is important to identify specific locations that are at higher risk of damage from floods or that present
8 access issues in emergency situations. The Worcester County Hazard Mitigation Plan specifically
9 identifies problem spots for transportation that are subject to frequent flooding already, but a study
10 that assesses the impacts of future precipitation and sea-level rise on roads and road-stream crossings
11 (bridges and culverts) can indicate future problems that can proactively be incorporated into capital
12 improvement plans and “dig once” strategies (coordinating projects with the objective that multi-use
13 benefits enhancements such as green infrastructure, can be installed while the ground is already
14 disturbed or excavated for other traditional projects, such as road or other public infrastructure
15 improvements)¹³. Road-stream crossings deserve special attention as their very nature makes them
16 particularly important but also particularly vulnerable to flooding. For example, more frequent and
17 heavier rain events will exacerbate existing problems with undersized or poorly maintained culverts. If
18 water levels are higher due to increased precipitation or sea-level rise, there will be less clearance
19 between streams and bridges, making them more vulnerable to blockage and damage from debris.

20 The Town of Berlin should identify flooding hotspots and develop a stormwater management plan to
21 address these concerns. Adding a stormwater drainage component to the Town Code, promoting low
22 impact development solutions, and pursuing acquisition and/or relocation of repetitive loss properties
23 at high risk are all potential strategies for managing impacts of increased flooding.

24 **F-3 Require the use of green infrastructure solutions for all new and redevelopment projects.**

25 Green stormwater infrastructure, often referred to more simply as green infrastructure, is a nature-
26 based approach to dealing with rainwater runoff from the built environment, such as buildings, roads,
27 and parking lots. For decades the primary way of handling stormwater runoff has involved engineered
28 solutions that aim to move water off and away from buildings and roads as quickly as possible, with little
29 regard for the impacts on receiving water bodies. Green approaches on the other hand seek to mimic
30 natural processes by using vegetation, soil, and other techniques to help filter pollutants out of water,
31 slow down flows, and recharge groundwater supplies.

32 In addition to assisting with stormwater management, many green infrastructure elements provide
33 other benefits such as community beautification, increased wildlife habitat, reduced urban heat island
34 effects, air quality improvements, increased property values, and cost savings for both developers and
35 municipalities. Because green infrastructure tends to accomplish multiple objectives compared to
36 traditional or “gray” infrastructure, it is frequently recommended as a resilience strategy. In Berlin there
37 is generally adequate depth to the water table to permit infiltration practices to be installed so long as
38 the soil allows for infiltration making green infrastructure a viable option in most cases.

39 Green infrastructure can help address multiple climate impacts at once: greater rainfall amounts, higher
40 temperatures, and groundwater supply concerns. Increasing the proportion of stormwater runoff that is

1 handled on-site, rather than sending it to wastewater treatment plants or receiving water bodies, can
2 help offset the higher amounts of precipitation predicted due to climate change. Green infrastructure
3 also imparts greater flexibility for developers by offering a wider variety of options for handling
4 stormwater runoff than traditional retention ponds and pipes.

5 The Town of Berlin should establish low impact development requirements that ensure the use of green
6 infrastructure in all new and redevelopment projects. The Town can also lobby the County to adopt
7 green infrastructure requirements and/or expedite the permitting processes for projects that go above
8 and beyond with regards to onsite stormwater management. By instituting requirements for developers
9 to go beyond minimum traditional stormwater control measures with green infrastructure, the
10 stormwater systems in those developments will be able to absorb increased flooding from climate
11 change. As a result, the private sector, which most directly benefits from the developments, will add to
12 the needed stormwater capacity rather than local taxpayers.

13 **F-4 Integrate flood mitigation objectives into open space, parks, and groundwater recharge plans.**

14 Parks and open space, especially natural areas like wetlands or forests, provide stormwater and flood
15 mitigation services for a community in addition to other benefits such as recreation, wildlife habitat, and
16 groundwater protection. Preserving or creating open space in floodplains can reduce flood impacts
17 downstream while keeping people, properties, and critical infrastructure out of flood-prone areas. The
18 location of a parcel and its potential to slow down, store, and filter rainwater or floodwaters can be
19 added to criteria for prioritizing or ranking potential acquisition and easement projects.¹⁴ These criteria
20 can be used to guide future development (if incorporated into Comprehensive/Master Plans or local
21 zoning and building codes) or to prioritize properties for buyouts. Existing parks and open space can be
22 assessed for the suitability of restoring or enhancing natural features or installing green infrastructure
23 elements to further improve their water storage and filtration functionality. Wider buffers can be added
24 around wellhead protection zones, and increasing pervious surfaces in general can help protect long-
25 term groundwater supplies. Integrating water-related resiliency objectives into Comprehensive, Open
26 Space, Parks, and Hazard Mitigation Plans also helps create more opportunities for leveraging funding
27 from multiple sources. These kinds of integrations are best done on a regional or watershed scale, but it
28 may be easier to first focus on the Town's plans.

29 Other flood- and water-related resiliency objectives that can be integrated across other plans include
30 sea-level rise, coastal flooding projections, and coastal marsh migration needs. For example, Berlin has
31 the authority in the code to expand its Critical Area, land within 1,000 feet of Maryland's tidal waters
32 and tidal wetlands that must be protected, for additional stormwater regulations if coastal migration is
33 identified as an upcoming issue for the Town.¹⁵

34 **F-5 Promote stormwater management and flooding best practices to private property owners.**

35 In the U.S. a majority of land is owned and managed privately, leaving private property owners
36 responsible for a significant portion of a community's stormwater management efforts. While
37 commercial and institutional properties usually have larger footprints and more impervious surface area
38 than residential properties, in small towns residential properties typically make up a larger proportion of
39 privately-owned land. In Berlin, approximately 84% of the properties are residential so it is important for
40 Berlin to educate homeowners on stormwater best management practices, like cleaning out household
41 gutters, and to provide incentives and rebates that can be used to encourage the installation of new

1 elements, particularly green infrastructure, on their properties. This helps expand the adoption of best
2 management practices and green infrastructure beyond publicly controlled land, further assisting with
3 improved stormwater management and flood resiliency across the Town. The Town should continue to
4 support stormwater management educational opportunities and work with the County to develop and
5 promote stormwater incentive programs.

6 It is also important to encourage residents and businesses to purchase flood insurance. Most
7 homeowner and commercial insurance policies do not cover floods. Typically, people only consider flood
8 insurance when purchasing a home in a flood zone because lenders may require it as a stipulation for
9 approving a mortgage. Many residents and businesses do not know they can opt to purchase flood
10 insurance on their own. Federal flood insurance is available in communities that participate in the
11 National Flood Insurance Program (NFIP), and some private insurers offer flood policies as well. While
12 flood insurance cannot prevent flooding from occurring, having this kind of coverage can improve a
13 family or business' ability to recover financially and emotionally after experiencing flood damage.

14 This insurance coverage gap is exacerbated by misunderstandings of actual flood risk, as residents and
15 municipalities alike rely on official floodplain maps to guide their decisions and trigger project reviews;
16 however, flood risk is not limited to areas labeled as flood zones. Up to 25% of federal flood insurance
17 claims originate from low or moderate risk areas; this statistic does not include uninsured flood losses or
18 those covered through private insurance. While increasing community members' flood insurance
19 coverage does not eliminate flood risks, it can accelerate the post-disaster recovery process and the
20 community's ability to rebound.

21 **F-6 Partner with Worcester County on applying for the National Flood Insurance Program Community**
22 **Rating System (CRS).**

23 The Community Rating System (CRS) is a program that recognizes and incentivizes improved floodplain
24 management practices by reducing flood insurance premiums in communities that participate in the
25 National Flood Insurance Program (NFIP). A community can earn points for taking actions that exceed
26 minimum NFIP floodplain management requirements, and these steps translate to reductions in
27 premiums for NFIP policyholders. The entry-level (Class 9) discount is five percent and the maximum
28 discount available is 45 percent at the highest level (Class 1). Many activities that reduce flood risks and
29 yield other benefits are included in the program, such as adopting expanded floodplain maps and
30 regulations, preserving open space in floodplains, and requiring green infrastructure and low impact
31 development practices to better manage stormwater runoff from new and redevelopment projects.
32 Some actions could be achieved through regional collaboration to distribute the burden, such as by
33 developing a regional public education program.

34 There is an administrative burden to participate in the program, so most communities that participate
35 tend to have large numbers of policyholders and/or more staff capacity. Unfortunately, FEMA does not
36 have a mechanism in place to provide assistance to small municipalities interested in CRS at this time.
37 The Town of Berlin should therefore work with and encourage Worcester County to participate in CRS
38 and establish parameters to collaborate with its local municipalities so that they can also take advantage
39 of the benefits of the program. Berlin could advocate for the County to provide municipal
40 implementation assistance, which would present a good opportunity for coordination on climate change
41 resilience efforts and shared technical assistance.

1 Energy

2 **E-1 Increase energy efficiency and renewable energy capacity in all municipally owned facilities.**

3 Clean and efficient energy consumption is the act of harnessing technology to help avoid or reduce
4 energy waste. This, combined with energy conservation measures, can save money on utilities, reduce
5 air and water pollution, and help mitigate greenhouse gas emissions associated with global climate
6 change.

7 Berlin will continue to prioritize increasing the efficiency of municipal operations, saving taxpayer
8 dollars. In November 2015, the Town of Berlin joined the Maryland Smart Energy Communities program
9 and set a goal to reduce per-square-foot electricity consumption 15 percent by 2020 relative to a 2015
10 baseline. In addition, they committed to meeting 20 percent of the municipal buildings' electricity
11 demand with distributed renewable energy by 2022.¹⁶

12 In an effort to reduce the Town's energy consumption, the Town of Berlin partnered with the Maryland
13 Energy Administration's Technical Assistance Team member Khepra Energy Group to conduct a field
14 audit of their municipal buildings.¹⁷ The assessment recommendations were given to reduce CO2
15 emissions, energy use, and costs. In response to the audit, the Town implemented several
16 recommendations including the installation of LED bulbs and the elimination of radiant-type space
17 heaters in individual offices.¹⁸ While some of the other measures in the assessment offered little cost
18 benefit, it is important to revisit this audit periodically, as new cost effective technologies may make
19 additional energy efficiency upgrades more cost effective.

20 In addition to energy efficiency, the Town of Berlin is also committed to exploring cost-effective
21 renewable energy opportunities. The Town of Berlin is only one of five municipalities with a municipally
22 owned electric utility in the State. Serving over 2,400 accounts, Berlin's publicly owned electric utility is a
23 nine megawatt system that runs on oil. Although oil produces about 25 percent less CO₂ than a
24 traditional coal plant might, oil is still a greenhouse gas emitting fossil fuel.^{19, 20} The Berlin electric utility
25 purchases 20 percent of its needs from renewable sources in order to maintain compliance with
26 Maryland's Renewable Energy Portfolio Standard, and will need to increase this to 50 percent by 2030
27 per SB 516 passed in 2019.²¹

28 Many of the Town residents would like to see the Town move to 100 percent clean renewable energy
29 much sooner; however, the cost of transitioning the publicly owned utility to 100 percent renewable is
30 cost prohibitive. The current power plant is in good working condition and still at the early stages of its
31 useful life, oil is less expensive than renewables, and there would be significant costs associated with the
32 storage needed under a fully renewable system. The Town should continue to make progress towards
33 achieving State-level renewable energy goals and evaluate the benefit-cost of transitioning the
34 municipal utility to clean energy at an accelerated rate. Specifically, as energy markets shift, the cost of
35 oil may increase, tipping the balance in favor of an earlier transition away from oil.

36 **E-2 Promote clean and efficient energy consumption to residents.**

37 Berlin should continue to encourage energy efficiency within existing residential and commercial
38 buildings in order to help residents and property owners to reduce their electric bills and decrease their
39 carbon footprint. Specifically, the Town should promote energy efficiency best management practices
40 through their media channels including on the Town's website, at local events, and in the Town's

1 newsletter and utility mailers. The Town could also seek funding from Maryland Energy Administration
2 and Department of Housing and Community Development’s energy efficiency and weatherization
3 programs in order to assist low to moderate income households who are interested in installing energy
4 efficiency measures.

5 Residents are interested in transitioning to more renewable electricity sources, and while the Berlin
6 electric utility may not be positioned to transition to 100 percent renewables at this time, the Town can
7 and should take other steps to increase the community’s renewable capacity. Berlin should support
8 onsite renewable energy and community solar opportunities for residential and commercial property
9 owners. Distributed onsite generation and storage systems such as solar (PV) panels can provide energy
10 security during storms and power outages if they are set up to function as independent microgrids;
11 importantly, the cost-effectiveness of these systems improves if the economic costs of power outages
12 are accounted for in the evaluation.²² Partnering with residents to establish a residential solar bulk
13 purchasing program or solar co-op can increase awareness of the benefits of renewable energy and
14 increase solar adoption throughout the Town. This could also have the added benefit of minimizing peak
15 load on the electric utility, which is important for avoiding brownouts in summer heat waves, and of
16 helping to increase efficiencies for the Town and reduce costs. The Town should also promote existing
17 community solar opportunities to residents who are interested in going renewable but who may not be
18 able to install onsite solar.

19 **E-3 Convert municipal fleet to electric vehicles and promote residential use of electric vehicles.**

20 Carbon emissions from transportation are a big contributor to climate change and are a major source of
21 air pollution. Electric vehicles present an opportunity to significantly reduce greenhouse gas emissions
22 from fleet operations and save taxpayer dollars. Plug-in electric vehicles can save money, with much
23 lower fuel costs on average than conventional gasoline vehicles.²³ The Town of Berlin currently has 76
24 municipally owned vehicles in its fleet, from police vehicles to department of public works trucks; these
25 vehicles are used to maintain the daily operations of the Town. Berlin should evaluate the cost
26 effectiveness of converting the municipal fleet to electric vehicles and commit to replacing retired
27 vehicles with EV alternatives and installing fast EV charging stations for municipally owned vehicles.²⁴
28 Electric vehicle technology and related products will continue to improve in areas of cost, performance,
29 and the development of emerging technologies. For these reasons, this study should be revisited
30 periodically and updated to reflect changing circumstances in the marketplace.

31 In addition, Berlin should consider adopting EV readiness policies and incentive programs to encourage
32 residents of the Town to transition their personal vehicles to electric. Low-income communities and
33 communities of color disproportionately feel the impacts of vehicle pollution and can benefit the most
34 from the clean air and cost-saving benefits of EVs. It is important that the Town of Berlin consider
35 policies that can help make EVs accessible to these underserved communities. Berlin could install public
36 charging stations and allow residents to pay for this service, with a discount being offered to low-income
37 residents. The Town could conduct an outreach campaign or work to promote rebates and incentives
38 especially to low-income residents to help make EVs more accessible for all.

39

1 Heat

2 **H-1 Conduct an assessment of the heat impact on the electric supply reliability.**

3 As average air temperature continues to rise and heat waves become more frequent and intense, the
4 reliability and efficiency of Berlin’s electric systems will be threatened. Rising temperatures will increase
5 the reliance on air-conditioning and will simultaneously decrease the efficiency of generation,
6 transmission, and distribution of power to residents.²⁵ The Town of Berlin should conduct an assessment
7 to determine the local impact that this heat-related increase in peak demand and decrease in
8 operational capacity will have on electric supply reliability. The potential impacts of outages on
9 vulnerable residents who may not have air conditioning can be factored into other action steps,
10 including **H-2** and **CR-4**.

11 The Mid-Atlantic—the region with the highest median jump in demand—will see some of the largest
12 median rises in electricity expenditures in 2040.²⁶ In order to prepare for and prevent service
13 interruptions to over 2,400 accounts, Berlin’s publicly owned electric utility will need to develop a
14 holistic plan for adaptation that comprises technological, behavioral, and institutional approaches.²⁷

15 **H-2 Increase the urban tree canopy.**

16 Urban forests play a crucial role in both climate change mitigation and adaptation. Trees are powerful
17 carbon sinks and oxygen producers; they can also help reduce heat island effects and help manage
18 stormwater runoff, thereby improving water and air quality and enhancing public health.²⁸ Research has
19 also shown that by beautifying streets and neighborhoods, trees increase property values, rental rates,
20 and economic activity in retail areas. Thriving urban forests can even boost public safety and reduce
21 energy costs for homes and businesses by shading and insulating buildings. Assessing Berlin’s urban tree
22 canopy, planning for increased capacity, and investing in trees can help provide solutions to multiple
23 issues identified by Berlin residents. Specifically, the Town will want to identify ways to invest in public
24 spaces as well as develop programs to incentivize planting trees on private property.

25 Community Resilience

26 **CR- 1 Continue to facilitate community outreach and education opportunities.**

27 Community members need to be informed about the expected impacts of climate change and the steps
28 that can be taken to improve community and household resiliency. This audience will also need to know
29 what the Town is doing to adapt to climate change and why adaptation is beneficial. Education about
30 climate impacts and Berlin’s resilience efforts can be incorporated into ongoing public outreach
31 activities, but it is also important to provide ongoing opportunities for residents and businesses to share
32 their concerns and ideas, help shape the Town’s adaptation strategies, and develop strategies of their
33 own. Making these outreach and engagement efforts transparent and inclusive is particularly important
34 for addressing equity issues. As another community’s Resilience Element notes, "for resiliency to be a
35 truly effective community planning strategy, it must also be perceived by all citizens as being applied
36 fairly and successfully."²⁹

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38
39

1 **CR- 2 Develop a green jobs and economic resilience strategy.**

2 The impacts of climate change are expected to cause economic damage, but they may also present new
3 opportunities for a community. Certain aspects of Berlin’s economy and certain segments of the
4 population may be more economically vulnerable to climate change and should receive more attention
5 in an economic resilience strategy or climate adaptation plan. Economic development and related
6 planning documents should be reviewed to better understand how climate change will impact different
7 aspects of the Town’s economy. The scale and scope of economic impacts to be considered will likely
8 depend on the sectors of interest, e.g., municipal, businesses, residents, tourism, etc.

9 Small businesses are particularly vulnerable to incidents like natural disasters because they lack “access
10 to the capital and resources of large corporations” and usually “operate out of a single physical
11 location.” They are also “more heavily impacted by technological or telecommunications failures, the
12 absence of employees, power failures, supply chain interruptions, and rising insurance costs.”³⁰
13 However, small businesses have the potential to become leaders by being prepared and taking
14 advantage of new climate-related opportunities. Small businesses should be encouraged and assisted to
15 develop their own business continuity or risk management plans that address their specific climate risks.
16 Similarly, the Town itself should incorporate economic risks into its existing planning documents and/or
17 develop a special plan to handle potential climate impacts such as sudden drops in tax revenue, disaster-
18 related emergency expenses, or rapid in-migration of people from more coastal locations. Socially
19 vulnerable populations, which are already less resilient and lack “economic mobility,” should also be the
20 focus of resiliency strategies that aim to minimize the cascading effects of problems such as income loss,
21 foreclosure, decreasing property values, lack of insurance, etc.

22 Climate change is also shifting demand for products and services to more sustainable solutions, and the
23 Town can consider economic development strategies that seek to attract or expand the green jobs
24 sector and help further diversify the local economy. This could include such areas as solar power,
25 conservation landscaping, green stormwater infrastructure construction, energy efficiency, urban tree
26 planting, etc.

27 **CR- 3 Enhance community connectivity between both sides of U.S. Route 113.**

28 Berlin stakeholders identified a perceived disconnect between the east and west side of U.S. Route 113.
29 The highway, which bisects the Town, is a safety concern for youth and residents who may have to cross
30 the highway as a pedestrian in order to access the Town Hall, the downtown shopping area, or other
31 recreational facilities. This physical barrier is said to both pose serious safety risks to economically
32 disadvantaged residents in the community but also creates a social barrier because it can deter
33 residents from participating in community events, resulting in a stratified community.

34 The Town of Berlin should continue to work with State and County agencies to evaluate solutions,
35 including longer traffic lights, a pedestrian bridge, reduced speeds, and/or additional enforcement of
36 posted speeds. In addition, the Town can endeavor to increase community integration by strategically
37 hosting events on both sides of the highway and actively advertising throughout the community. These
38 efforts to increase connectivity will build social cohesion and increase community participation.
39 Increased community cohesion and civic participation is known to have a number of co-benefits to a
40 community, including reduced crime rates, decreased litter and vandalism, increased volunteerism, and
41 better educated and prepared residents in the case of an emergency or disaster.

1 **CR-4 Explore developing resilience hubs and cooling centers.**

2 Cooling centers are already a widely used public health strategy for preventing heat-related illnesses
3 and deaths among vulnerable populations during heat waves. Resilience hubs are a concept that builds
4 on this idea but addresses other emergency needs for a neighborhood by providing a reliable off-grid
5 energy supply, such as solar panels plus energy storage and/or generators. Backup energy in the event
6 of an emergency is imperative for heating and cooling, refrigeration of temperature sensitive
7 medications and milk from nursing mothers, plug power for charging cell phone and computer batteries,
8 and emergency lighting.³¹ Resilience hubs also act as trusted locations where residents can connect,
9 access fresh water, and in some cases serve as designated locations for the distribution of emergency
10 services during extended emergencies.³² Berlin should consider piloting resilience hubs in areas with
11 vulnerable populations including elderly, low-income, and other special needs, where residents may
12 need additional assistance in the case of an emergency.

13

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DRAFT

1 **Resilient Governance**

2 Resilient governance and local leadership, from both elected officials and government staff, will be
3 instrumental in addressing the growing concerns of climate change. Decision-makers will be called upon
4 to make increasingly difficult choices in uncertain times, so it is imperative that they understand how
5 climate change could impact the quality of life for all Berliners and commit to building a more resilient
6 community. In order to accelerate and expand resilience efforts, a community must take steps towards
7 both building the capacity of local decision-makers to adopt resilient governance strategies and
8 integrating climate resilience into the planning and implementation of on-the-ground projects.

9 Committed to working together to define and shape Berlin’s future and to maintaining an economically
10 sustainable and environmentally progressive community, the Town of Berlin will need to identify and
11 provide specific opportunities to incorporate resilience practices and pathways into Berlin’s daily
12 operations. For example, Berlin has existing policies and initiatives that can be strengthened by
13 incorporating resilience and long-term decision making. Aligning government processes and decision
14 making with the Town’s resilience strategies can help minimize costs, demonstrate to residents that the
15 Town is responsive to their feedback, create transparency and accountability, and build support and
16 trust in further community engagement efforts.

17 Berlin will need to promote resilient governance strategies in all it does, actively engage in local and
18 regional resilience planning, incorporate resilience into their finance and budgeting processes, ensure
19 staff are well-informed and collaborating across departments, and encourage County and State actors to
20 invest in climate research in order to strategically work through an evolving process of climate change
21 preparedness.

22

RESILIENT GOVERNANCE STRATEGIES

Research and Planning

- RP-1 Conduct a hazard risk vulnerability assessment.
- RP-2 Integrate resilience into Berlin’s other municipal plans.
- RP-3 Develop a strategic growth plan.
- RP-4 Adopt more stringent codes and ordinances.

Finance and Budget

- FB-1 Integrate resilience into the Town's operational and capital budgets.
- FB-2 Adopt a community budgeting process.
Maintain resilience as a priority criteria for the procurement of the Town's goods and
- FB-3 services.
- FB-4 Coordinate with nonprofit and other local partners on resilience in the region.

Operationalization Integration

- OI-1 Engage decision-makers and Town leadership in resilience initiatives.
- OI-2 Develop core competencies for staff around climate change.

23

24

25

1 Research and Planning

2 **RP-1 Conduct a hazard risk vulnerability assessment.**

3 With climate change, Berlin can generally expect more severe coastal storms, floods, thunderstorms,
4 wind, heat, and drought, as well as threats due to increased sea-level rise and poor air quality. The Town
5 will want to better assess local risk and vulnerability in order to determine how climate change threats
6 will directly impact their physical infrastructure, natural resources, and cultural assets.

7 Berlin should develop climate hazard projections and map out potential hazards and key community
8 assets at the block or neighborhood scale. This assessment should consider where assets are located,
9 the current conditions of individual assets, population demographics, and where threats are likely to
10 occur. In addition, the assessment should include a discussion on potential interactions between
11 different risks that might further exacerbate problems (e.g. a storm surge combined with heavy rain
12 could prohibit evacuation or transport because there is nowhere for the water to retreat, or a power
13 outage could lead to failing drinking water or sewage pumps). This assessment would help identify the
14 most vulnerable infrastructure, focus on populations at greatest risk, and avoid the areas likely to be
15 impacted when siting new projects.

16 Conducting a hazard risk vulnerability assessment can help the Town strategically invest in public
17 infrastructure and be environmentally proactive in a way that minimizes future costs to the Berlin
18 taxpayers by helping decision-makers avoid potentially high-risk investments. This strategy can also help
19 identify sensitive areas for flooding around the Town and could serve as the basis for developing flood-
20 prone overlay zones, which aligns with a major community concern of stormwater flooding.

21 Whenever possible, the Town of Berlin should leverage the County’s Hazard Mitigation Plan. The Town
22 can pull available data and information from the County and consider leveraging the consultants that
23 are developing the hazard risk assessment for the County Hazard Mitigation Plan update in order to
24 develop a Town-specific assessment. In addition, the Town can advocate for integrating more resilience
25 practices into the County’s planning process and strategies.

26

Hazards	Assets	Social
<ul style="list-style-type: none">• Sea-level rise• Precipitation• Flooding• Storms• Heat Island hot spots• Erosion hot spots• Historical impacts	<ul style="list-style-type: none">• Critical Infrastructure (roads, hospitals, utilities, schools, etc.)• Emergency Management Routes• Natural resources (trees, rivers, agriculture, etc.)• Community assets (downtown, historic locations, churches, etc.)• Potential project sites	<ul style="list-style-type: none">• Low income communities• Elderly populations• Youth populations• Communities of color• Public health• Demographics

Figure 2. Potential Data Layers to Consider Mapping for Hazard Risk Vulnerability Assessment.

1

2 **RP-2 Integrate resilience into Berlin's other municipal plans.**

3 Even in small communities there can be a number of competing interests - departments may have
4 different mandates, changes in elected officials can affect priorities, and staff may have to juggle unique
5 concerns from the public. Historically, these competing interests and silos are reflected in a town's
6 planning process where specialists do not have the resources or time to interact with the full network of
7 stakeholders. As a result, there can be misalignment between a town's plans, which in turn pulls
8 investments and initiatives in different directions.

9 For Berlin to holistically think about resilience, decision-makers cannot be siloed, and climate change
10 impacts must be considered in every part of community visioning, planning, and development. Berlin
11 should set resilience as a top priority across all plans, integrate all departments and their associated
12 plans and projects so that they consider the long-term impacts of climate change, and identify and
13 reduce incongruities within networks of plans during community plan updates.³³

14 Integrating resilience into Berlin's municipal plans can improve government transparency by clearly
15 identifying community priorities in the Town's primary guidance documents. In addition, integrating
16 resilience criteria throughout the community plans helps identify overlapping objectives and
17 opportunities for projects that yield multiple community benefits. Leveraging projects across multiple
18 objectives and benefits can reduce costs and support the implementation of smart growth practices.

19 **RP-3 Develop an environmentally friendly strategic growth plan that emphasizes smart growth.**

20 In the last 10 years, the Town of Berlin has grown by approximately 12 percent and by 2030 the
21 population of Berlin is expected to reach 6,300. For many families seeking an improved quality of life,
22 Berlin's small-town character, community connectedness, and strong sense of place make the Town an
23 attractive destination. In addition to increased population from those interested in moving to
24 Maryland's "Coolest Small Town,"³⁴ there is also a concern that Berlin may be expected to absorb a
25 growing population from Maryland's shore communities migrating inland as they seek refuge from
26 increased flooding due to sea-level rise. This shift in population can have transformational impacts on
27 the character and quality of life in Berlin.

28 Addressing the growth of the Town is a major priority identified in the community stakeholder meetings,
29 stakeholder survey, and the Town's Strategic Plan. By anticipating and planning for certain likely
30 changes, Berlin can reduce the community's vulnerability to associated risks, such as strain on drinking
31 water resources or increased traffic congestion, while at the same time maximizing beneficial
32 opportunities associated with these changes. By promoting responsible growth, connecting people and
33 places, and supporting balanced housing opportunities through the implementation of various planning
34 documents and processes, Berlin can mitigate the negative effects of development on the land and
35 safeguard its natural resources while helping to ensure that the needs of the community are met.

36 **RP-4 Adopt more stringent codes and ordinances.**

37 Climate vulnerability and resilience are related to both how we build and where we build. Adopting
38 land-use policies and municipal codes that account for the future impacts of climate change can help the
39 Town of Berlin safeguard its infrastructure and people from risk and economic losses. The full benefits of

1 regulatory tools, like developing overlay zones, adopting more stringent building codes to protect public
2 and private property, and requiring onsite stormwater management, can take many years to be realized;
3 however, codifying these requirements sooner rather than later can empower the Town to begin
4 transitioning the built environment to more resilient standards. It provides the Town the authority to
5 shift development away from sensitive areas and enforce stricter designs so that new and re-developed
6 buildings might withstand rising seas, increased stormwater flooding, and extreme heat.

7 The Town should conduct a code and ordinance review and identify opportunities to strengthen
8 requirements in order to protect community assets well into the future.

9 Finance and Budget

10 **FB-1 Integrate resilience into the Town's operational and capital budgets.**

11 In order to deal with local climate change impacts, the Town of Berlin will need to prioritize investment
12 in preparing communities and upgrading infrastructure systems to be more resilient. Embedding
13 resilience criteria into the Town's primary funding mechanisms, the operational and capital budgets, will
14 help leverage existing revenue to ensure that current and future investments in the Town's
15 infrastructure and services are going towards smart, resilient, and long-term community solutions.

16 Specifically, the Town of Berlin should consider developing a capital improvement program (CIP) for
17 projecting, budgeting, and financing the development of resilient public infrastructure and other fixed
18 assets. At very least, the CIP should include Berlin's priority stormwater projects, and be continually
19 updated as projects are completed and new priorities are identified. CIPs can help reduce costs both by
20 enabling the Town to anticipate needs before assets fail and require expensive emergency repair and by
21 allowing capital projects to be bundled, coordinated, or phased so that they achieve multiple benefits at
22 once. Through the CIP process, Berlin could identify existing assets that need to be relocated,
23 retrofitted, or assigned altered maintenance regimes based on climate risk. The CIP process could also
24 be used to ensure that new facilities and infrastructure are designed and located to be resilient to risks
25 expected over the asset's lifetime, including flooding, precipitation, and elevated temperatures.
26 Establishing a CIP with strong criteria for climate change resilience would allow Berlin to solidify their
27 commitment to community resilience.

28 Innovative financing methods and external sources of funds do exist, but it is critical to emphasize that
29 there is no magic bullet for financing community resilience. Increasingly, it will be necessary for Berlin to
30 make regular allocations from the general fund for adaptation and mitigation projects. Integrating
31 resilience criteria into the municipal budgeting processes helps to address the number one concern of
32 Berlin residents (local taxes) and it helps the Town more efficiently spend public funds, leveraging
33 opportunities to minimize project costs and maximize community benefits.

34 While general funds are typically consistent from year to year, municipalities should be aware that
35 competing local priorities can make allocations of annual operating budgets from taxes unreliable. As a
36 result, the Town may want to explore increasing impact fees for residential and commercial new
37 construction permits, developing a resilience component factor that is integrated into building permit
38 fees, establishing a resilience enterprise fund, or applying a new tax on a good or service that negatively
39 impacts the environment, such as carbon. The development of a consistent, reliable funding source can
40 be rolled out over time and would represent a worthwhile investment in the community's long-term
41 health, safety and well-being.

1 **FB-2 Adopt a community budgeting process.**

2 Local governments are responsible for providing services to maintain the health, safety, and welfare of
3 all residents. However, with many competing priorities and increasingly limited resources, allocating
4 taxpayer dollars to public goods and services can be quite a challenge. Community residents and
5 stakeholders with competing priorities may have different perspectives on how funds should be
6 allocated, and residents who have not been thoroughly engaged in the process may feel displeased with
7 the results. In order to improve transparency, make financial sustainability everyone’s business, and
8 increase community buy-in, many local governments are turning to participatory budgeting.

9 The Town of Berlin has seen a decrease in general fund balance in addition to a significant operating loss
10 in the sewer fund and stormwater funds.³⁵ Since 2012, the Town had not had a significant increase in
11 local taxes or readjustment in enterprise funds. Although property taxes increased to \$0.80 per \$100 in
12 2019, this increase was not sufficient to cover Town expenses. Berlin residents have expressed growing
13 concern over the Town’s spending and have not been well-engaged in the process to understand the
14 difficult decisions the Town has been required to make.

15 Berlin should adopt a participatory budgeting framework to improve transparency and more thoroughly
16 engage residents in the budgeting process throughout the year. With a participatory budget, residents
17 will have the opportunity to more directly inform how resources will be allocated, prioritize social
18 policies, and monitor public spending. The process will also help residents gain a better appreciation for
19 the decision-making process and build trust in the local government, which ultimately leads to better
20 decisions that are more widely supported by community residents.

21 **FB-3 Maintain resilience as a priority criteria for the procurement of the Town's goods and services.**

22 The procurement of public goods and services is a primary function of local governments. Berlin’s
23 purchasing decisions and major public investments present a unique opportunity to create additional
24 value for the community and generate resilience benefits. Berlin should continue to consider the future
25 impacts of climate change in purchasing decisions; specifically, increased heat and precipitation can
26 reduce the useful life of an asset while storm surge and sea-level rise can dictate where an asset should
27 be geographically located to preserve its useful life and criticality.³⁶ Berlin should consider reducing
28 consumption altogether and purchasing climate-friendly products that can help mitigate greenhouse gas
29 emissions associated with conventional products whenever appropriate.³⁷ The Town should develop
30 specific resilience criteria for the purchase of goods and services to help determine thresholds for their
31 environmentally friendly procurement. Whether it is investing in climate-resilient infrastructure or
32 choosing energy efficient appliances, the Town of Berlin’s purchasing policy can help build resilience and
33 reduce their long-term emissions.³⁸

34 **FB-4 Coordinate with nonprofit and other local agency partners on resilience in the region.**

35 Climate change is too large and complex an issue for any one town to address alone, preparing for
36 impacts and developing resilience will require major assistance from, and coordination with, the County
37 State, and other regional stakeholders. As municipal budgets are strained and staff capacity is limited,
38 Berlin will need to rely on cooperative programs that provide for the coordination of services and the
39 pooling of resources from regional partners across all sectors.

1 While Berlin should continue to advance local strategies, the Town should actively participate in regional
2 planning efforts aimed at maintaining local input and decision-making while addressing the
3 shortcomings of fragmented governmental authority. Worcester County's Hazard Mitigation Plan
4 update, the Lower Eastern Shore Climate Action Network, and the Maryland Commission on Climate
5 Change Adaptation and Resiliency Working Group meetings are all regional efforts to advance resilience
6 that the Town of Berlin should take advantage of and leverage to advance their own local resilience
7 initiatives.

8

DRAFT

1 Operationalization Integration

2 **OI-1 Engage decision-makers and Town leadership in resilience initiatives.**

3 The Town of Berlin should identify cross-departmental resilience milestones and track progress towards
4 achievements. The Town of Berlin should embed resilience across all Town committees and
5 departments. Each committee and department should review the Town's resilience strategies and
6 identify any overlapping objectives. Each committee should address complementary resilience strategies
7 within their respective working groups and each department should ensure that all future plans cross-
8 reference the Resilience Element.

9 In addition, all local elected officials and Town staff should be engaged in implementation of the
10 Resilience Element and should be encouraged to participate in town-wide climate change meetings. The
11 Town should develop a process to coordinate action across committees, departments, and elected
12 officials. Consider having quarterly or bi-annual meetings where committee and departmental leaders
13 meet to discuss on-going activity. The Town should ensure that no single individual becomes responsible
14 for the implementation and enforcement of resilience strategies, but instead that resilience becomes
15 central to all Town operations.

16 **OI-2 Develop core competencies for staff around climate change.**

17 Climate change will affect how local government operates. As a result, government staff will need to be
18 prepared for and adapt to these changes. The Town of Berlin should identify climate change-related
19 core competency criteria for all government positions and work with staff members to develop these
20 proficiencies.

21 While each staff member will have different responsibilities depending on the tasks that fall under their
22 specific purview, everyone including local elected officials should have a basic understanding of climate-
23 related risks and how various resilience strategies can improve the economic and social well-being of
24 the Town. Foundational knowledge includes a basic understanding of what climate change is, how
25 climate change will impact the Town, and examples of what the Town is doing to plan for and adapt to
26 those impacts. Other staff members, such as the department of public works staff, may require more
27 robust core competency criteria in order to ensure staff can evaluate climate change risks and
28 vulnerability of critical infrastructure. Alternatively, staff responsible for purchasing may require
29 proficiency in evaluating service contracts to ensure contractors are using environmentally preferable
30 and climate smart materials.

31 The Town of Berlin should identify the various levels of expertise each staff member is expected to have
32 and help provide support towards achieving the determined competency by encouraging on-going
33 training for all municipal staff and elected officials.

34 There are a number of training opportunities for government staff and elected officials when it comes to
35 climate change and resilience. Staff and elected officials can register for the Maryland Department of
36 Natural Resources Climate Change Academy, attend Sustainable Maryland Webinars and Leadership
37 Trainings, take issue-specific Municipal Online Stormwater Training Center courses, or participate in
38 regional and national climate change-related training and workshops.

39 Regardless of the form, Berlin staff and elected officials should be encouraged to maintain annual
40 continuing education goals.

1 **Implementation Planning**

2 This section provides a “worksheet” for all of the resilience strategies formulated as part of the
3 Resilience Element development process. This tool can be used by the Town of Berlin to track and guide
4 resilience actions. For each resilience category, the worksheet contains the primary strategies that were
5 identified in the Resilience Element section along with a more extensive list of actions that can be
6 considered over the long-term. In addition, the worksheet contains columns for implementation
7 planning. This includes a space to identify who will take the lead on each strategy, the timeframe for
8 completing the strategy, approximate costs, and the status of the action.

9 The Implementation Planning worksheet should be considered a living document. The Town of Berlin
10 may wish to add new strategies as community priorities evolve, or the Town may include new action
11 steps as different technologies are developed and new best management practices are established. The
12 worksheet is also designed so that the Town can keep track of actions taken and serve as an inventory or
13 rubric to monitor—and show—progress towards becoming more resilient.

14 It is important to remember that everyone must play a role in ensuring Berlin’s resilience. Individual
15 committees or partner organizations may elect to take the lead on some actions, while others may be
16 more efficiently, effectively, or appropriately lead by Town personnel or other stakeholders. Many of
17 the Resilience strategies involve engaging residents and catalyzing community participation. This
18 worksheet helps coordinate efforts and provides a tool to manage the primary point of contact for each
19 action.

20 Ultimately, this section can serve as a clear strategy implementation tool to provide ideas and examples
21 of actions that align with the community’s priorities. It also supplies a process for addressing and
22 documenting the feasibility of each action, including careful consideration of the action steps timeline,
23 the Town’s capacity, and the costs.

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RESILIENT ACTION STRATEGIES						
Flooding						
Strategy	Action Steps	Lead	Timeframe	Cost	Status	
F-1	Adopt more aggressive flood standards.	Adopt a 0.2% floodplain or at very least the 1% (100-year) flood zone plus 30 feet.				
		Create voluntary and/or regulatory standards for development and redevelopment that would prevent development in flood prone areas.				
F-2	Identify and address nuisance and chronic flooding hotspots.	Develop an integrated monitoring system with standardized recording methods to track recent, ongoing and future flooding and/or inundation problems throughout the community. The system should identify specific locations, types of problems (road flooding, storm drain failures, septic system failures, well problems, flooded properties, etc.), frequency, and duration of these occurrences.				
		Identify those road segments in vulnerable areas where flooding has been a known problem and where future impairment would have the most severe impacts, potentially cutting off access to individual properties or entire neighborhoods, and study feasible alternatives that can be put in place in both the short term and longer term to ensure road access.				
		Encourage the adoption of stormwater best management practices in flooding hotspots to include integrating stormwater infiltration into plans and parking lot designs, permeable pavement in low-use roadways, and the installation of green streets.				

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F-3	Require the use of green infrastructure solutions for all new and redevelopment projects.	Develop a guide for planners and developers to assist incorporating green stormwater infrastructure including land development ordinances and codes, and identifying funding sources for demonstration projects.				
		Update all relevant city standards to consistently support the protection of wetlands and sub-surface waters, whether during plan review, construction, or during operations.				
		Require water conservation elements such as green roofs, rain gardens, cisterns, and bioswales on residential, commercial, industrial, and city- owned properties to capture stormwater.				
		Integrate natural buffer requirements, such as wetlands and soft shorelines, into new development or redevelopment.				
		Develop an inventory of sites that can be targeted for wetland or forest mitigation projects by private developers where development plans propose off-site mitigation.				
F-4	Integrate flood mitigation objectives with open space, parks, and groundwater recharge plans.	Evaluate green corridors and parks for possible improvements for floodplain management.				
		Conduct regular maintenance of stream restoration projects and stormwater quality facilities.				
		Provide natural habitat as much as possible in open space planning to support biodiversity and as a measure of flood control.				

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F-5	Promote stormwater management best practices to private property owners.	Develop outreach material to promote stormwater best management practices including proper application of fertilizers and pesticides for lawn and garden, proper disposal of waste fluids, precautions for applying de-icers to pavement, proper maintenance of existing septic systems (if applicable), and maintaining your car and boat properly.				
		Provide volunteer opportunities for citizen engagement in watershed stewardship including storm drain stenciling events, tree plantings, litter clean up, and rain barrel workshops.				
		Educate residents on the co-benefits of trees, native plants, and wildlife habitat.				
		Promote the use of conservation landscaping on private property which incorporates environmentally sensitive design, low impact development, non-invasive native plants, and integrated pest management.				
		Encourage residential homeowners to participate in the National Wildlife Federation Certified Wildlife Habitat® recognition program.				
F-6	Partner with county to seek certification in the national flood insurance program community rating system (CRS).	Partner with county to lower the Town's flood insurance premium by implementing more rigorous floodplain management practices that can qualify for flood insurance premium discounts.				
		Continue to coordinate with the county to ensure that the city's floodplain ordinances reflect current flood hazards; consider implementation of floodplain ordinances that reflect future flood hazards.				

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Energy					
Strategy	Action Steps	Lead	Timeframe	Cost	Status
E-1	Increase energy efficiency and renewable energy capacity in all municipally owned facilities.	Partner with a consulting firm to audit all Town-owned facilities.			
		Revisit audit recommendations every two years for energy saving opportunities. Various technologies may become more cost effective as technologies improve or price of utilities change.			
		Replace all interior and exterior lighting with LED bulbs.			
		Promote energy star and water sense for all appliance and system replacements as appliances come to the end of their useful life.			
		Investigate available energy financing mechanisms including energy performance contracts, and state, federal, and utility energy efficiency incentives.			
		Upgrade streetlights to energy efficient and eco-friendly lights that reduce light pollution.			
		Conduct feasibility study to determine if a green or white roof is appropriate for any of the municipal buildings.			
		Pursue grant funding to hire a consulting firm or partner with an engineering school to conduct a base-line renewable energy feasibility study, include costs and electric generation capacity for solar and wind.			
		Explore renewable energy financing strategies including power purchase agreement, cooperative purchasing contracts, and state and utility incentive programs.			
		Continue to make progress towards achieving state-level renewable energy goals and evaluate the benefit-cost of transitioning the municipal utility to clean energy at an accelerated rate.			

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E-2	Promote clean and efficient energy consumption to residents.	Partner with interfaith power & light or other local nonprofits to host residential and commercial energy efficiency workshops at the school, local library, or Town hall.				
		Provide incentive programs to promote installation of water/energy efficient appliances and fixtures.				
		Encourage residents and businesses to invest in energy efficiency building envelope measures (i.e. sealing and insulation).				
		Promote Maryland's energy efficiency and weatherization programs via social media and the Town's local newsletter.				
		Identify low-cost financing products available for residents and small businesses such as on-bill financing and pace financing.				
		Develop and promote a residential solar bulk purchasing program.				
		Explore and promote existing community solar opportunities to Town residents.				
		Explore opportunities to develop a community solar facility.				
		Research successful energy affordability programs with a specific focus on low and fixed-income residential programs.				
		Research current point-of-sale residential and commercial energy efficiency upgrade requirements across the country and adopt an ordinance for the Town.				

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E-3	Encourage the transition to electric vehicles.	Develop an inventory of all fleet vehicles including year, make and model, mileage, usage, and expected end of useful life.				
		Evaluate cost effectiveness of converting municipal fleet to electric vehicles and develop a replacement schedule to retire older, less efficient, or infrequently used vehicles. When purchasing new vehicles, transition municipal and police department fleet to electric vehicles where appropriate.				
		Identify potential financial incentives and develop a capital budget for switching vehicles out.				
		Install fast charging electric vehicle charging stations in the Town center and identify appropriate locations for installing charging stations throughout the Town.				
		Assess the pros and cons of various strategies for managing public e-vehicle charging stations to determine if and how the Town will charge for station usage.				
		Research potential financing options for installing stations including grants and partnering with a private management company.				
		Host a residential electric vehicle workshops to promote the environmental benefits and long-term cost savings of electric vehicles.				

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Heat					
Strategy	Action Steps	Lead	Timeframe	Cost	Status
H-1	Conduct an assessment of the heat impact on the electric supply reliability.	Work with a consultant to assess the impacts of heat on the electric supply. Analyze peak demand, heat impacts, and develop efficiency measures.			
		Review best practices for electricity sector adaptation to heat waves including technological fixes, grid modernization, and behavioral changes.			
		Adopt a holistic risk management perspective with increased transparency and communication around the effects of climate change on the electric supply.			
H-2	Increase the urban tree canopy.	Develop a baseline tree assessment and inventory and identify “heat island” areas of the community as well as potential areas for afforestation or reforestation			
		Adopt a strong and equitable urban tree canopy goal and implement a forestry program that addresses heat island, air quality, and other resiliency values delivered by a diverse, healthy urban tree canopy.			
		Provide public education on the Town's tree assessment and progress towards the urban tree canopy goal.			
		Review Town ordinance in regards to tree permitting, tree protection on construction sites, heritage or historic trees, incentives and alternatives, planting and irrigation standards, and landscape standards.			
		Plant shade trees and increase ground cover and shade by creating or expanding urban forests, gardens, parks, and native vegetation-covered, open spaces.			
		Engage private property owners in characterizing, managing, and growing the urban canopy by promoting state and local outreach and incentive programs.			
		Participate in Tree City USA to establish a standard tree management program to include: a tree board, tree care ordinance \$2 per capita minimum budget to community forestry, and arbor day observation.			

Community Resilience and Preparedness						
Strategy	Action Steps	Lead	Timeframe	Cost	Status	
CR-1	Continue to facilitate community outreach and education opportunities.	Develop resilience outreach and education programs to educate residents about the local impacts of climate change, the importance of being prepared, benefits of conservation, and how personal consumption choices at home and work can affect change.				
		Coordinate with local schools and partner on green initiatives. Target youth with positive messages and education on conservation of natural resources.				
		Build sustainability resource center via website (e.g. Energy, recycling, and seismic testing).				
		Engage residents and work with organizations based in vulnerable communities to inform the scope of the adaptation research, how it will be carried out, and how results will be shared with impacted communities, and hold public meetings to develop locally appropriate climate change adaptation plans.				
CR-2	Develop green jobs and economic resilience strategy.	Continue to monitor the scientific result of climate projections and their implications and include it incorporate resiliency and uncertainty into the city's economic development and master planning efforts.				
		Review which economic sectors are at greatest risk to climate-induced workforce migration.				
		Promote and preserve economic base and tourism in the face of a changing climate through collaboration with visitor center, downtown association and other community groups to promote tourism. Monitoring and proactive steps should be taken as information becomes available.				
		Create a green business certification and/or awards program.				

CR-3	Enhance community connectivity between both sides of U.S. Route 113.	Work with state DOT to develop a strategy for increasing physical connectivity between both sides of U.S. Route 113. Consider installing a pedestrian bridge, installing flashing pedestrian light, increasing length or crosswalk light, or other technical connectivity measures for encouraging pedestrian traffic.				
		Host town wide events on Flower Street on the east side of U.S. Route 113 to encourage the integration of residents.				
		As part of public outreach and education, hold public meetings to develop locally appropriate climate change adaptation plans that promote awareness and preparedness for both catastrophic events and the longer term or more permanent impacts of climate change.				
		Develop an audience-appropriate all-hazard warning strategy that utilizes e-mail, text messages, social media, radio, and television to ensure proper citizen notification.				
CR-4	Explore developing resilience hubs and cooling centers.	Identify lead contacts and convening centers serving vulnerable populations and coordinate actions to maximize safety and information sharing.				
		Improve access to cooling centers and coordinate programming efforts among trusted neighborhood convening centers where at-risk populations can access social services and resources before, during, and after extreme events.				
		Formally engage the full community in planning and preparing for an effective disaster response, as well as climate change mitigation and adaptation. Prepare and implement emergency response plans in concert with the most vulnerable segments of the community for extreme storms, floods, heat waves, poor air quality days, disease outbreaks.				

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RESILIENT GOVERNANCE STRATEGIES						
Research and Planning						
Strategy	Action Steps	Lead	Timeframe	Cost	Status	
RP-1	Conduct a hazard risk vulnerability assessment.	Contract with a professional consulting firm to develop climate hazard projections. Consider the following hazards: sea-level rise, flooding, storms, heat islands hot spots, erosion hot spots, and historical impacts.				
		Conduct an asset inventory to include the location, function, and current conditions of individual assets.				
		Assess the impact of climate change on all public investments and identification of vulnerabilities in order to produce strategies for mitigation and adaptation. These assessments should utilize a 50-year planning horizon and should include hazard vulnerability maps of key community assets at the block or neighborhood scale. Consider social, environmental, and economic assets (i.e. Town-owned facilities, water and sewer facilities, roads, schools, hospitals, community and economic centers, private property, natural resources etc.				
		Continue to monitor information related to climate change planning, data, and resources as it becomes available through state and federal agencies, other local jurisdictions, and academic research. Update the vulnerability assessment when needed as more refined projections and resources become available.				
		Update list of Town's repetitive flood loss properties to include properties, encourage owners of repetitive and severe repetitive loss properties to participate in mitigation activities such as flood proofing, elevation, or buyout programs, and prepare a floodplain management plan for the repetitive loss areas.				

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RP-2	Integrate resilience into Berlin's other municipal plans.	Develop guidelines and a check list to include climate risk projections and resilience goals for cross-referencing when updating existing plans or developing new plans.				
		Consider climate change impacts for all required comprehensive plan elements.				
		Identify and evaluate plans already in place and adapt existing municipal plans, such as economic development, water resource management, and/or strategic plans to incorporate climate-related risks and resilience strategies.				
		Develop a timeline and work plan for implementation, help secure necessary funding and other resources, and design metrics to assess the effectiveness of implementation efforts in partnership with vulnerable communities.				
		Identify chosen response options that will address climate change impacts that can be implemented quickly. Addressing these more time-critical impacts of climate change first will help gain acceptance for the response strategy and momentum in implementing it. Establish no-regrets actions that can be incorporated in existing plans and codes which will both build resilience and resolve some of the current flooding and erosion problems in the Town.				

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RP-3	Develop a strategic growth plan.	Use smart growth principles to develop density designs that are attractive and highly functional; provide incentives for cluster development community, water and sewer systems; bring realtors and developers on board.				
		Work with planning to ensure that new growth areas in Berlin will include a range of affordable housing opportunities or ways to provide the opportunity to create affordable and independent housing options to other family members of the owner.				
		Prepare for possible in-migration of affected coastal populations as a result of rising sea level. All areas of social support will be impacted, including housing, jobs, social services, and food supply.				
		Identify areas within the city that have infill or redevelopment potential and are outside an area of potential significant impact to flooding. Develop a specific goal for the general infill development strategy such 50% infill by 2027.				
		Devise incentives to foster infill development in areas within the city that have been identified as being at low risk for flooding.				
		Use prototype example plans for preferred housing types so that people who want to build infill housing can do so at reduced costs and with fast-tracked permitting.				
		Create a pedestrian environment through enhanced landscapes, streetscapes, and public infrastructure projects.				
		Work with state agencies to promote mixed-use public transportation areas that improve the safe use of the street network by all users, including pedestrians, bicyclists, motorists and freight deliverers.				

		Host a regional convening to engage residents and regional partners on the issue of public transportation.				
		Adopt a complete streets policy requiring context sensitive design features in any highway improvement project, site plan or subdivision within the Town.				
		Evaluate all development proposals for viable connectivity options to the existing neighborhoods, commercial districts, and the Town center.				
		Establish financing strategies that fund transportation improvements and programs.				
		Conduct a comprehensive parking management study to determine the best mix of solutions to support a vibrant Town center.				
RP-4	Adopt more stringent codes and ordinances.	Conduct a code and ordinance review and consider climate change vulnerabilities and resilience strategies.				
		Review existing building codes for municipal, residential, and commercial development to determine if revisions are needed to improve the structures ability to withstand climate change impacts. Adopt and enforce updated building codes where appropriate for example increased freeboard standard for homes in the floodplain; stricter flood regulations for critical facilities; specific development prohibition in floodplain areas; floodplain setback; incentives for increased renewable energy and on-site storage capacity; updating flood maps to include future flood risk.				
		Establish development requirements for mixed-use community activity areas which promote alternative forms of multi-modal transportation.				

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		Work with the county to develop and adopt a set of codes (i.e., floodplain ordinances, stream buffer ordinances, creek protection overlay districts) to protect and promote vegetated riparian buffers, construct stormwater BMPs and discourage additional development and construction of impervious surfaces in the floodplain.				
		Require warning notices for developers and buyers regarding the potential impacts of climate change impacts as well as a flood disclosure form, and educational information as part of lease agreements for commercial and residential properties.				
		Incentivize new construction to comply with stricter energy efficiency building code standards. Partner with an academic institution to conduct research on baseline building codes for the state of Maryland and opportunities for developing stretch codes.				
		Establish policy directives and develop the criteria that will be used if needed to determine when, where, and under what circumstances public infrastructure in vulnerable areas would be abandoned.				
		Implement code changes to prohibit construction of new homes in flood prone areas.				
		Establish no-rebuild zones. Creation of incentives for retreat zoning and/or zoning and redevelopment restrictions and building code changes or enforcement to prevent building in the most vulnerable locations.				
		Develop relocation incentives (to get property owners away from high-risk areas), such as tax incentives, transfer of development rights, or government purchase of vulnerable property.				

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Finance and Budget						
Strategy	Action Steps	Lead	Timeframe	Cost	Status	
FB-1	Integrate resilience into the Town's operational and capital budgets.	Adopt policies to encourage or require CIPs and capital budgets to be consistent with resilience goals either through the CIP's policy framework and/or in the relevant section of the local government charter.				
		Require that all Town departments review climate risks for each proposed project and assess contributions to resilience goals and vulnerabilities prior to project approval.				
		Develop capital improvement program resilience criteria, for example - does the capital improvement plan limit or prohibit expenditures on projects that would encourage new development or additional development in areas vulnerable to natural hazards?				
		Engage a cross-departmental collaboration in designing the CIP program and ensure broad representation in all its phases, including developing the CIP framework and scoring criteria, designing and submitting projects, scoring and prioritizing proposals, and implementing and evaluating projects.				
		Bundle and coordinate projects so that they achieve multiple goals at once (this concept is often referred to as "dig once" and a good example is incorporating green infrastructure elements into road repair projects).				
		Identify efforts that support resiliency during the budget review process, including program accomplishments, initiatives and performance measures.				
		Increase communication and outreach to elected officials and increase funding streams for conservation through taxes, easements, and other avenues.				
		Dedicate municipal funds to implement resilience projects and outreach initiatives.				

		Ensure funding and support for no-regrets projects.				
		Research grants and available cost-saving programs for project implementation.				
		Consider available financing and incentive programs that could help the Town implement projects.				
FB-2	Adopt a community budgeting process.	Conduct an assessment of existing Town fees and determine if they accurately reflect the cost of Town services.				
		Provide regular updates with regards to the implementation of resilience strategies and goals.				
		Develop a public sector budgeting 101 training or webinar for residents and post regular budget updates on the website using infographics or short engaging videos.				
		Host annual budget fair where each department discusses their budgets and finances with the public.				
		Develop a community-wide budgeting process, either allowing residents to vote on public spending annually or by instituting a budget review process based on a ranking criteria developed with deep public input on priorities.				
FB-3	Maintain resilience as a priority criteria for the procurement of all Town's goods and services.	Adopt a green purchasing or environmentally preferred procurement policy.				
		Assess current purchasing practices to determine what goods and services are being purchased annually.				
		Engage municipal purchasing personnel, operations and maintenance personnel, and all municipal departments who purchase goods and services to develop a policy to select environmentally preferable products and services for all municipal facilities.				
		Create a procedure by which to apply environmental criteria to product purchases and train appropriate staff throughout relevant departments.				
		Disseminate policy reminder throughout relevant departments annually.				

		Purchase recycled and environmentally preferable products.				
		Communicate the municipality's desire for these products to vendors and service providers.				
		Include environmental preference statement in all service contracts and monitor service providers for compliance.				
		Consider utilizing existing green/sustainable cooperative purchasing agreements.				
		Document and evaluate purchases that demonstrate a commitment to the purchasing of recycled products.				
FB-4	Coordinate with nonprofit and other local partners on resilience investment in the region.	Establish partnerships, both formal and informal, with other governmental entities, including local, state, and federal governments; the private sector; non-governmental organizations; and other stakeholders in the county. Partnerships should focus on cooperative efforts to restore existing natural ecosystems; protect natural and open lands; mitigate impacts; and monitor natural systems and indicators of climate change.				
		Align the community planning vision with the Worcester county comprehensive plan to the extent feasible.				
		Prior to a hazard event, identify lead contacts serving vulnerable populations and coordinate actions to maximize safety and information sharing.				

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Operationalization Integration						
Strategy	Action Steps	Lead	Timeframe	Cost	Status	
OI-1	Engage decisions-makers and Town leadership in resilience initiatives.	Provide on-going training to all municipal staff and elected officials on the importance of climate change resilience and how long-term planning can improve the economic and social well-being of the Town.				
		Embed resilience across all Town committees and require that each of the Town's committees review the Town's resilience goals to identify any overlap and address complementary resilience goals within their respective working groups.				
		Develop a process to coordinate action across committees. Consider having quarterly or bi-annual meetings where committee leaders meet to discuss on-going activity.				
		Develop a multi-stakeholder adaptation planning process that involves all city agencies charged with: 1) developing, assessing, and repairing public infrastructure that could improve community resilience to climate change; 2) providing key services during climate-related emergencies; and 3) managing municipal budgets for city programs and projects.				
OI-2	Develop core competencies for staff around climate change.	Participate in regional and national climate change related training and workshops.				
		Clearly define staff roles and responsibilities with regards to planning for and implementing resilience strategies. Set personalized goals and milestones.				
		Identify cross departmental resilience milestones and regularly update community on progress.				

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1 Three Year Action Plan

2 This three-year planning section provides recommendations for immediate next steps. It pulls from the
3 *Implementation Planning* tables to highlight actions the Town of Berlin’s local elected officials,
4 government staff, and Green Team or environmental committee will want to prioritize in the first three
5 years after adopting the Town’s Resilience Element. These recommendations include strategies to
6 integrate resilience throughout the Town’s processes, empower residents to adopt resilience practices,
7 and establish the conditions that will facilitate implementation of on-the ground projects.

9 Year 1 – Through the end of 2020

10 Year one focuses on embedding resilience into the Town's economic, administrative, and social
11 processes. **This includes having elected officials, government staff, and the Town committees take**
12 **ownership of the Resilience Element and start incorporating resilience strategies into current and**
13 **ongoing processes, plans, procedures, and projects.** A secondary focus for year one is to begin
14 generating interest in resilience and cultivating residents and stakeholders to take action. The following
15 strategies and action steps are recommended for the first year:

- 16 1. Train elected officials and staff on the importance of specific resilience strategies and how they
17 can improve the economic and social well-being of the Town. (OI-1)
- 18 2. Maintain an active environmental committee and proactively recruit new members and skilled
19 volunteers to help implement the Berlin Resilience Element. (CR-1, OI-1)
- 20 3. Have each of the Town's committees and departments review the Town's resilience goals and
21 strategies, identify any project or scope overlap, and address complementary resilience goals
22 within their respective working groups. Begin facilitating quarterly or bi-annual meetings so that
23 committee and department leaders can work together to embed resilience goals into upcoming
24 projects and initiatives. (OI-1)
- 25 4. Develop a check list of resilience goals for cross-referencing when updating existing plans or
26 developing new plans. (RP-2)
- 27 5. Develop a system to track recent, ongoing and future flooding and/or inundation problems
28 throughout the community. (F-2)
- 29 6. Conduct an assessment of town budget to determine if existing fees and revenue accurately
30 reflect the cost of Town services. Identify any costs associated with resilience goals or that have
31 the potential to have co-benefits that could improve the Town’s resilience. (FB-2)
- 32 7. Assess current purchasing practices to determine what goods and services are purchased
33 annually and develop a policy to select environmentally preferable products and services for all
34 municipal facilities. (FB-3)
- 35 8. Develop resilience and climate change outreach campaign. Educate residents on the local
36 impacts of climate change, the importance of being prepared, and facilitate engagement in
37 existing watershed stewardship and resilience opportunities. (F-5, E-2, E-3, CR-1)
- 38 9. Identify grant opportunities and available cost-saving programs that could help the Town
39 implement resilience projects. (FB-1)
- 40 10. Actively participate in Worcester County’s Hazard Mitigation Plan update, the Lower Eastern
41 Shore Climate Action Network, and the Maryland Commission on Climate Change Adaptation
42 and Resiliency Working Group. (FB-4)

1 Year 2 – Through the end of 2021

2 The primary focus of year two is to plan and prepare for more in-depth implementation. This includes
3 setting resilience as a strategic priority in the Town budget and developing baseline assessments of
4 several major resilience concerns. A secondary focus for year two is to begin partnering on regional
5 solutions and continue to cultivate residents and stakeholders to take action on their own while building
6 support for Town actions. The following strategies and action steps are recommended for the second
7 year:

- 8 1. Develop core competencies for staff around climate change. Clearly define individual staff roles
9 and responsibilities with regards to planning for and implementing resilience strategies and set
10 personalized goals and milestones. (OI-2)
- 11 2. Contract with a professional consulting firm to conduct a climate vulnerability assessment.
12 Consider how population growth, sea-level rise, flooding, storms, heat, and erosion are
13 projected to impact key social, environmental, and economic community assets at the block or
14 neighborhood scale. (RP-1)
- 15 3. Adopt a more aggressive floodplain and standards for development and redevelopment that
16 would prevent development in flood prone areas. (F-1)
- 17 4. Partner with Worcester County to seek certification in the National Flood Insurance Program
18 Community Rating System. (F-6)
- 19 5. Develop a public sector budgeting 101 training or webinar for residents and post regular budget
20 updates on the website using infographics or short engaging videos. (FB-2)
- 21 6. Use a community driven process to develop and adopt a capital improvement program with
22 resilience scoring criteria for designing and submitting capital projects, scoring and prioritizing
23 proposals, and implementing and evaluating projects. (FB-1)
- 24 7. Update the Town’s environmentally preferable purchasing policy and train appropriate staff on
25 applying environmental criteria to all product purchases, such ENERGY STAR and Water Sense
26 for all appliances, clean greening supplies, and recycled content products. (FB-3)
- 27 8. Develop an inventory of all fleet vehicles and develop a replacement schedule to transition
28 municipal and police department fleet to electric vehicles. (E-3)
- 29 9. Promote energy efficiency and renewable energy opportunities to residents via social media,
30 the Town's local newsletter, and community events. (E-2)
- 31 10. Encourage the adoption of stormwater best management practices in flooding hotspots
32 throughout the town. Promote and incentivize conservation elements such as green roofs, rain
33 gardens, cisterns, and bioswales on residential, commercial, industrial, and city- owned
34 properties to capture stormwater. (F-2, F-3, F-5)
- 35 11. Host town wide meeting on Flower Street to update Berlin residents with regards to the
36 implementation of resilience strategies, goals, and budgetary needs. (CR-3, FB-2)

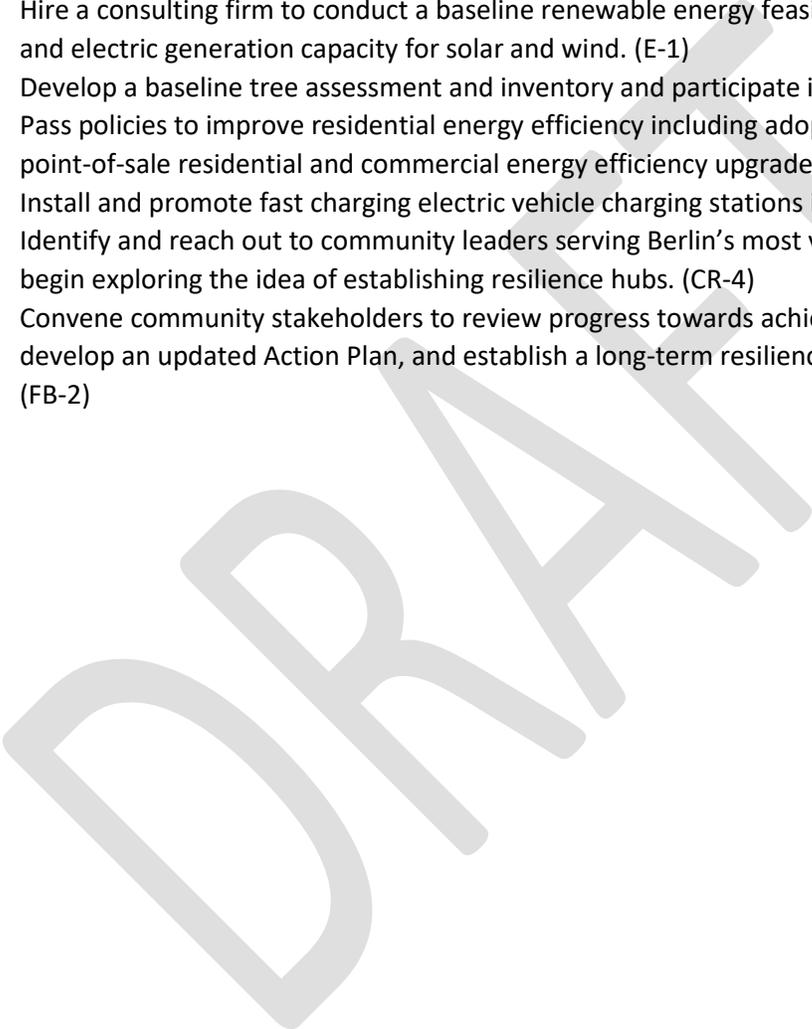
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1 Year 3 – Through the end of 2022

2 The primary focus of year three is to continue assessment efforts, implement additional on-the ground
3 projects, and conduct deep planning for the future. The following strategies and action steps are
4 recommended for the third year:

- 5 1. Review existing codes and ordinances to identify opportunities for improving the Town’s climate
6 change resilience capacity. (F-3, E-2, RP-4)
- 7 2. Work with municipal staff, local elected officials, and residents to approve an annual budget for
8 advancing resilience projects and outreach efforts. (FB-1)
- 9 3. Hire a consulting firm to conduct a baseline renewable energy feasibility study, including costs
10 and electric generation capacity for solar and wind. (E-1)
- 11 4. Develop a baseline tree assessment and inventory and participate in Tree City USA®. (H-2)
- 12 5. Pass policies to improve residential energy efficiency including adoption of PACE legislation and
13 point-of-sale residential and commercial energy efficiency upgrade requirements. (E-2)
- 14 6. Install and promote fast charging electric vehicle charging stations in the Town. (E-3)
- 15 7. Identify and reach out to community leaders serving Berlin’s most vulnerable populations and
16 begin exploring the idea of establishing resilience hubs. (CR-4)
- 17 8. Convene community stakeholders to review progress towards achieving resilience goals,
18 develop an updated Action Plan, and establish a long-term resilience implementation strategy.
19 (FB-2)

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**All web links in the Berlin Resilience Element were accessed and active as of December 2019.*

1 Appendices
 2 Appendix A: Community Outreach
 3
 4

Agenda: Making Berlin Resilient Community Meeting

Making Berlin Resilient!

The Town is developing a Resilience Element for our Comprehensive Plan. This Element will enable the community to develop strategies that address climate change impacts; implement policies, plans and actions to advance the concept of resiliency; and, ensure community quality of life.

Help make Berlin resilient, both now and into the future.

Agenda

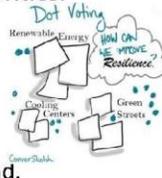
6:00-6:10	Welcome and Introductions
6:10-6:25	Preparing for a Changing Climate
6:25-7:00	Resilience and community planning – Reshaping challenges into opportunities
7:00-8:00	Setting priorities – how do we get there together?
8:00-8:40	Investing in our future/ Investing in solutions
8:40-8:50	Open forum discussion Q&A
8:50-8:55	Next steps and wrap up

MARYLAND IS ALREADY EXPERIENCING THE IMPACTS OF CLIMATE CHANGE, INCLUDING:

- 
SEA-LEVEL RISE
 Sea-level rise of more than one foot in the last century, causing increased coastline flooding and erosion.
- 
WATER TEMPERATURE
 Increasing water temperatures in the Chesapeake Bay, which reduces suitable habitat for blue crab and oysters.
- 
HEAVY RAINS
 More frequent heavy rain and flooding events, which can devastate local communities.
- 
HEAT WAVES & DROUGHT
 Intensifying heat waves and drought, which damage agricultural crops, raise energy bill costs and put vulnerable populations at risk.
- 
TOURISM IMPACTS
 Climate change impacts threaten tourism through reduced opportunities for winter snow sports and loss of beach coastline.

5

Today's Activities

<p>1-2-4-All</p> <p>Silent self-reflection, discuss in pairs of two, share in groups of four, report out</p> <p>Prompts:</p> <ul style="list-style-type: none"> Resilience, what does it mean to you? What makes Berlin special? What should Berlin look like in 50 years? 	<p>Conversation Mapping</p> <p>Silently write your thoughts about a trigger. Respond to someone else's ideas by drawing a line to their statement/question or start a new chain directly connected to the trigger.</p> <p>Trigger Topics:</p> <ul style="list-style-type: none"> Growth Berlin's future The Environment 
<p>Post-it Prioritization</p> <p>Brainstorm challenges and solutions, use dots to vote for top five priorities.</p> <p>Prompts:</p> <ul style="list-style-type: none"> Red – Top five challenges Green – Top five solutions Use all of your dots on one issue or spread them around. 	<p>1-2-4-All</p> <p>Silent self-reflection, discuss in pairs of two, share in groups of four, report out</p> <p>Prompts:</p> <ul style="list-style-type: none"> What steps should we take to ensure a strong financial future for our community? How do you want to participate in the budget process?

6



2
3
4 **TOWN OF BERLIN, MARYLAND**
5 **Office of the Mayor**
6 ***Press Release***

7
8
9 **FOR IMMEDIATE RELEASE**

10 For Information Contact:
11 Town Administrator Laura Allen
12 410-641-2770
13 info@berlinmd.gov
14

15 **Making Berlin Resilient Meetings Begin**

16
17 ***Town hosts community meetings to hear citizens' ideas***

18
19 **(March 12, 2019)** --- This week the Town of Berlin is preparing its first Resilience Element for
20 the Comprehensive Plan by hosting three community meetings to ask citizens what they want to
21 be considered and included in that document.

22
23 “Our community has a strong environmental ethic. It’s one of the values that came out strongly
24 in our strategic planning meetings,” Mayor Gee Williams said. “The ‘Making Berlin Resilient’
25 meetings are a great opportunity for the community to share their concerns about climate change,
26 growth and financial sustainability,” he added.

27
28 The Town received a \$20,000 grant from the Maryland Department of Natural Resources (DNR)
29 and the National Oceanic and Atmospheric Administration (NOAA) to prepare the element. The
30 Town’s comprehensive plan is updated every 10 years.
31

1 “We’re partnering with the University of Maryland Environmental Finance Center to facilitate
2 the meetings and to draft the Resilience Element,” said Town Administrator Laura Allen.

3
4 The community meetings are scheduled as follows:

5
6 Thursday, March 14th from 6 pm to 9 pm – Buckingham Elementary School

7 Saturday, March 16th from 10 am to 1 pm – Worcester County Library, Berlin Branch

8 Monday, March 18th from 6 pm to 9 pm – Town Hall

9
10 The Town is also partnering with Worcester Youth and Family to provide free youth activities
11 for the children of parents attending the meetings on March 14th and March 16th.

12
13 The Berlin Youth Club will be offering an activity and a light meal for children during the
14 meetings. Parents can drop their children off at Worcester Youth and Family (124 North Main
15 St.) 30 minutes before the start of the Making Berlin Resilient meetings and pick them up when
16 the meeting is over.

17
18 “The thoughts and ideas that come from the Making Berlin Resilient meetings will form the
19 basis of the Resilience Element,” stated Town Administrator Laura Allen. “We expect to post the
20 draft document to the Town’s website for additional public review and comment by June.”

21
22 “Our goal is to have the draft Resilience Element to the Planning Commission before the end of
23 summer and to the Mayor and Council before the end of the year,” she added.

24
25 “I encourage everyone to take the opportunity to participate in the community meetings and be a
26 part of co-creating Berlin’s future,” stated Mayor Williams.

27
28
29 ###
30
31

1 **Community Survey: Making Berlin Resilient**

2 Resiliency is the ability for a person or community to anticipate, prepare for, and respond to change and
3 sudden disruptions in order to survive and prosper. Please help us as we develop the resilience element
4 for Berlin’s Comprehensive Plan by filling out this brief survey.
5

6 **Did you attend one of the following Making Berlin Resilient workshops?**

- 7 Thursday, March 14th | Buckingham Elementary 9 Monday, March 18th | Town Hall
8 Saturday, March 16th | County Library 10 I didn’t participate in a workshop

11
12 **If you did not attend one of the Making Berlin Resilient workshops, why not? (Select all that apply)**

- 13 I didn’t know hear about the workshops 15 I had a scheduling conflict
14 I wasn’t interested in the topic 16 Other _____

17
18 **If we scheduled another Making Berlin Resilient workshop, would be interested in attending? (Select
19 all that apply)**

- 20 No 22 Yes, if it is scheduled on a weekend
21 Yes, if it is scheduled on a weekday evening 23 It depends on _____

24
25 **How do you prefer to stay engaged in community efforts? (Select all that apply)**

- 26 Facebook other social media 30 Workshops and town meetings
27 Email notification 31 Word of mouth
28 Town newsletter 32 Other _____
29 Newspapers and local news outlets

33
34 **What do you love most about Berlin?**

35
36 **What are your biggest concerns for the community?**

37
38 **Please rank the following issues from 1-14, with 1 being your biggest concern and 14 being your
39 smallest concern.**

- 40 the Environment 47 Growth
41 Extreme heat events 48 Local Economy
42 Electricity sources 49 Tourism
43 Recycling 50 Local taxes
44 Climate Change 51 Local schools
45 Stormwater/flooding 52 Ease of access crossing highway 113
46 Sea-level rise 53 Other _____

54
55 **Are there any projects, programs, strategies, or practices that you would like the Town to consider for
56 addressing any of your key issues of concern?**

57
58 **Are there any activities that you think that the Town should stop doing?**

59
60 **Other Comments or questions:**

61
62 **Name (optional):** **Email (optional):**

63
64 **Thank You for your feedback!**

1 **Common Themes: Making Berlin Resilient Community Meeting**

2 **Flooding**

- 3 • Stormwater issues
 - 4 ○ Reduce impervious surfaces
 - 5 ○ Increase Green Infrastructure
- 6 • Utilize Berlin Falls Park
- 7 • Greenbelt
- 8 • Litter problems
 - 9 ○ No universal compliance with recycling

10

11 **Energy**

- 12 • Diversify energy sources
 - 13 ○ Renewable energy sources
 - 14 ○ Efficiency with existing energy sources
 - 15 ○ Utilize wind, solar

16

17 **Heat**

- 18 • Improved tree canopy
 - 19 ○ Native plants

20

21 **Community Resilience**

- 22 • Diversify economy
 - 23 ○ Equal economic opportunity
 - 24 ○ Balance between tourist economy and local economy
- 25 • Vibrant downtown
 - 26 ○ Keep historic charm
 - 27 ○ Emphasis on local businesses, not big box stores
- 28 • Connect the town
 - 29 ○ Tie the town together
 - 30 ○ Embrace diversity
 - 31 ○ Bridge rt. 13
- 32 • Keep small town feel
 - 33 ○ Protect feeling of community
 - 34 ○ Keep the younger generation in the town
 - 35 ○ Improve population services
- 36 • Safety

37

38 **Research and Planning**

- 39 • Strategic growth
 - 40 ○ Slow
 - 41 ○ Avoid urban sprawl
 - 42 ○ Prioritize land use and control zoning
 - 43 ○ Minimize environmental impact
 - 44 ○ Growth boundary
- 45 • Infill before annexation
- 46 • Developers utilize greener building practices/policies

- 1 • Affordability
- 2 • Reduce traffic and parking congestion
- 3 ○ Pay parking
- 4 ○ Employees take up a lot of spaces
- 5 ○ Not enough spaces for town and for tourists
- 6 ○ Electric charging stations
- 7 • Improved walkability and bikability
- 8

9 **Finance and Budget**

- 10 • Cost of growth analysis (scenarios)
- 11 ○ Concerns of maintenance for new developments responsibility and future changes
- 12 ○ Should the town reassess impact fees?
- 13 ○ Need strong enforceable agreements
- 14 • Want more transparency in government decisions specifically with regards to budgeting
- 15 ○ Educate citizens and engage everyone
- 16 ▪ Intergenerational communication/engagement
- 17 ▪ office hours or video blog describing town’s financial status and explaining any
- 18 shortfalls
- 19 ▪ Meetings hearings on specific budget items/depts (i.e. police)
- 20 ▪ Budget fair on main street/town hall each department discusses their budget
- 21 ▪ Graphs on website
- 22 ▪ Public sector budgeting 101/infographics/video/education (i.e. funds)
- 23 ▪ Volunteer ambassadors to educate and inform
- 24 ○ Provide additional opportunities for citizens to be involved in budgeting process
- 25 ▪ provide a list of Town expenditures that citizens can rank in order to prioritize
- 26 community investment
- 27 ▪ Prioritize town spending and ensure funds are available prior to starting a project
- 28 ▪ Too many town events can oversaturate town with tourists and increase parking
- 29 needs
- 30 ○ Increase Fed-local-state connection and communication
- 31

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1 Appendix B: Plan and Documentation Review

2

Reference Documents				
Type	Name	Year	Notes	Link
Plan	Sea Level Rise Response Strategy Worcester County, Maryland	2008	This study was developed to assess response options for the expected impacts of accelerated sea level rise caused by climate change in order to plan responses to sea level rise impacts on the local communities and ecosystems within Worcester County. Berlin was found to be entirely outside of the projected inundation zones but the report lacked complete GIS data for the Berlin service area.	https://dnr.maryland.gov/ccs/Publication/SeaLevelWorcester.pdf
Plan	Comprehensive Parks & Recreation Plan: Final Recommendations and Conceptual Design Report	2009	This executive summary outlines the five-step process toward the creation of a Comprehensive Park(s) and Recreation Plan for Berlin's three parks. No reasonable possibility exists to establish a connected open space/green space network, however, base plans were complete, public meetings were held, a community survey was issued, and conceptual designs were developed.	https://berlinmd.gov/wp-content/uploads/2019/03/Parks_Master_Plan.pdf
Plan	Town of Berlin Comprehensive Plan	2010	The State of Maryland requires certain elements to be incorporated into the Comprehensive Plan, many of which directly relate to resilience initiatives. Berlin's Comprehensive Plan addresses - Transportation, Water Resources, Smart Growth, Sensitive Areas, Land Use, Community Facilities, Areas of Critical State Concern, Development Regulations, Economic Development, Community Revitalization, and Housing and Community Development with in their comprehensive plan. Climate change will impact all of these different components of a community, and actions to adapt to these impacts can be integrated throughout a comprehensive plan. As a policy document, it is important that the Town's Comprehensive Plan recommendations are consistent with the Town's local regulations and actions.	https://berlinmd.gov/wp-content/uploads/2014/07/ADOPTED-COMP-PLAN.pdf

Plan	EFC Financing Feasibility Study for Stormwater Management in Berlin, Maryland	2012	A stormwater financing feasibility study was completed for the Town in 2012 by the University of Maryland Environmental Finance Center. The goal of that effort was to provide the town guidance for implementing a self-sustaining stormwater management program. Stormwater flooding was enough of a concern for the Town that they followed recommendations to create a stormwater utility and charge fees to support a more robust stormwater management program. Because the stormwater flooding problem will only be exacerbated by the increased precipitation that comes with climate change, it is important to sustain efforts to maintain existing stormwater infrastructure and to implement new projects that better handle runoff.	https://berlinmd.gov/wp-content/uploads/2019/03/BerlinStormwaterFeasibilityStudyFinalReport1.pdf
Plan	Walkable Bikeable Berlin A Master Plan for a Walkable, Bikeable Berlin, Maryland	2013	A master concept plan for implementing community trails throughout the Town of Berlin and surrounding area, linking parks, residential communities and shopping amenities with a network of bike and pedestrian –friendly routes.	http://036d600.netsolhost.com/landwp/wp-content/uploads/2013/03/CONCEPT-PLAN.pdf
Plan	Worcester County Hazard Mitigation Plan Update	2014	Hazard Mitigation Plans (HMP) are important documents for communities that seek to mitigate impacts of natural and human-induced disasters. The Town of Berlin does not have its own plan, but is covered by Worcester County's HMP. This plan outlines the County's and Town's vulnerabilities to disasters, particularly flooding, and identifies mitigation actions. Because natural disaster impacts are expected to increase due to climate change, it is particularly important and logical to address these as part of a resilience strategy. Many communities begin their climate adaptation process by incorporating it into their HMPs. Berlin should work closely with County staff to integrate resilience into the next County Hazard Mitigation Plan Update.	https://www.co.worcester.md.us/website/sites/default/files/departments/emergency/2014-Worcester-County-Hazard-Mitigation-Plan-Update.pdf

Plan	Town of Berlin 2016-2018 Strategic Plan	2015	The Town's strategic plan provides the Mayor and Council with an overview of Berlin's collective community values, hopes, dreams and aspirations for the future; identifies both immediate goals (2016-2018), plus future longer-term goals for the community; and, identifies a detailed work plan for achieving the Town's immediate goals over the next three years.	https://berlinmd.gov/wp-content/uploads/2016/01/Strategic-Plan.final_.pdf
Plan	Our Path Forward: The Comprehensive Conservation & Management Plan for Maryland's Coastal Bays (2015-2025)	2015	The CCMP is a living plan that identifies tangible products and strategies that will be incorporated over its lifetime. The actions listed within the CCMP provide a basis for furthering directing regional attention towards financial planning, monitoring and research, public involvement and communications, habitat improvements and coastal resiliency. Direct recommendations for the Town of Berlin or identified in this document.	https://mdcoastalbays.org/pdf/ccmp-2015-2025.pdf
Plan	Town of Berlin Energy Reduction and Renewable Energy Assessment Plan for Maryland Smart Energy Communities	2016	This document outlines the Town's energy consumption and renewable energy policies, municipal energy use, baseline inventory, and identifies potential action strategies for reducing municipal energy consumption and increasing the Town's renewable energy usage.	electronic copy
Plan	Berlin Green Team Three Year Action Plan	2018	The Green Team Action Plan is a strategy for completing actions towards Sustainable Maryland certification. The Action Plan is intended to help move sustainability initiatives forward and keep the Green Team motivated.	http://sm-site-persistent-prod.s3.amazonaws.com/fileadmin/cicbase/documents/2018/8/31/15357440979739.pdf
Plan	Town of Berlin, Maryland Mayor and Council of Berlin, Inc. Adopted Budget Fiscal Year 2018-2019	2018	Annual budget outlines the Town's on-going priorities.	https://berlinmd.gov/wp-content/uploads/2018/07/FY19BUDGETADOPTED.pdf

Study	Stormwater System Improvement Study for the Town of Berlin, Maryland. US Army Corps of Engineers Baltimore District	2007	The overall study purpose was to evaluate the factors and conditions contributing to the flooding problems experienced by the Town of Berlin within its corporate limits. Based upon the results of the modeling and analysis and discussions, problem areas were identified and prioritized accordingly. The priority areas were defined as being High, Medium, or Low. High priority areas are those that have significant stormwater system deficiencies. Alternative solutions were developed for each identified problem area and ranked.	electronic copy
Study	EECBG Audit Report. Maryland Energy Administration's EmPOWER Energy Efficiency and Conservation Block Grant program.	2010	Field audit summary showing preliminary energy savings and financial analysis of energy efficiency improvements for the Town, including upgrades to lighting, HVAC, and building envelope.	electronic copy
Study	Town of Berlin, Maryland Auditors' Communications	2018	Memo summarizing the Town's audited the financial statements. Findings included that the Town's enterprise funds continue to operate at a loss resulting in the use of general funds for sewer and stormwater. Recommendations include establishing a formal policy which sets the level of unrestricted (total of committed, assigned, and unassigned) fund balances that should be maintained in the general fund for budgetary purposes, and a policy should provide guidelines for how resources would be directed to replenish the fund balance should the balance fall below the prescribed level in order to mitigate current and future risks such as revenue shortfalls and unanticipated expenditures and help to ensure stable tax rates.	electronic copy
Study	Town of Berlin Roadway Evaluation 2017/2018 Report	2018	Town wide assessment of the condition of the streets. Ranked worst to best condition. Being used as the primary driver for capital improvements.	electronic copy

Inventory	Berlin Sustainable Maryland Community Certification Report	2018	The Sustainable Maryland Community Certification Report acts as an inventory of all sustainability related actions taken in the past three years. This report can be used to help identify gaps in action.	http://sustainablemaryland.com/?type=1336777441&tx_sjcert_certification[certification][identity]=63
Inventory	Technical Assistance Memo: Data Availability. What data is already available at a downscaled version, or one that I can extrapolate from to include in our Comprehensive Plan Update, resiliency component?	2018	This memo identifies available downscaled data that can be used during the development of Berlin's vulnerability assessment process. Data sources include environmental health indicators, comprehensive plan examples, vulnerability indexes, and downscaled data sets.	electronic copy
Program	Economic and Community Development	2019	Main Street, Façade grants, Event planning and support	identified by staff
Program	Electric Utility	2019	Residential service, Commercial service, Residential energy inspections, Plan review	identified by staff
Program	Engineering (under contract)	2019	Plan review, Preparation of and updates to construction standards , Annexation and Development agreement review	identified by staff
Program	General Administration	2019	Administration, Finance, Human Resources	identified by staff
Program	Parks	2019	Maintenance (in coordination with PW), Events, Staff to the Parks Commission	identified by staff
Program	Planning	2019	Code enforcement, Plan Review, Building inspection, Support to the Historic District Commission	identified by staff
Program	Public Works	2019	Streets, Sanitation, Water (Stormwater, Wastewater, Drinking Water)	identified by staff
Program	Police	2019		identified by staff

1

2

1 Appendix C: Action Strategy Resources

RESILIENT COMMUNITY ACTION STRATEGIES

Flooding

F-1. Adopt more aggressive flood standards.

An Introduction to FEMA Coastal Floodplain Mapping - tutorial on how coastal risks are shown on Flood Insurance Rate Maps (FIRMs, or flood maps). Guidance to better understand how to read and use flood maps in coastal communities. mapping

<https://www.arcgis.com/apps/MapSeries/index.html?appid=89d2e393f2c64d7cae07264f4d00c19d>

FEMA's National Flood Hazard Layer (NFHL) - digital flood plain viewer is an online resource that compiles the current effective flood data for the Country. The best online resource for official National Flood Insurance Program (NFIP) purposes when determining locations in relation to regulatory flood hazard information. mapping

<https://hazards->

[fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd](https://hazards-fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd)

F-2. Identify and address nuisance and chronic flooding hotspots.

Managed Coastal Retreat: A Legal Handbook On Shifting Development Away From Vulnerable Areas - Handbook collects examples, case studies, and lessons learned from some of the legal tools that already exist to assist federal, state, and local governments in conducting managed retreat away from the most vulnerable coasts. guidance

https://web.law.columbia.edu/sites/default/files/microsites/climate-change/files/Publications/Fellows/ManagedCoastalRetreat_FINAL_Oct%2030.pdf

F-3. Require the use of green infrastructure solutions for all new and redevelopment projects.

EPA Green Infrastructure - Tools, strategies, and lessons learned with regards to the benefits of integrating green infrastructure into community project. Also has a quick Infographic guidance/tool

<https://www.epa.gov/green-infrastructure>

EPA Green Infrastructure for Climate Resiliency - One page infographic that explains how green infrastructure can improve a community's climate resilience. outreach

<https://www.epa.gov/file/green-infrastructure-climate-resiliency-infographic>

F-4. Integrate flood mitigation objectives into open space, parks, and groundwater recharge plans.

Climate-Smart Cities program - The Trust for Public Land's program looks at how parks, greenways, walk-bike trails, wetlands, urban forests and other green features can protect cities from climate threats like extreme heat and flooding. The program uses data and community input to target these efforts to reach underserved neighborhoods and populations that are most at risk. This climate equity lens is the central pillar of their work. technical assistance

<https://web.tplgis.org/csc-project-gallery/>

NOAA Office for Coastal Management - How to Map Open Space for Community Rating System Credit - an online "how-to" training that provides a step-by-step approach for earning this credit (CRS Activity 420) in areas that are already protected and identifying places where additional credit could be earned through future preservation efforts. Relates to FEMA's Community Rating system. mapping

<https://coast.noaa.gov/digitalcoast/training/crs.html>

The Role of Land Use in Adaptation to Increased Precipitation and Flooding: A Case Study in Wisconsin's Lower Fox River Basin - framework for determining the costs and benefits of using land-use policy to mitigate flood damage. While the case study is specific to Wisconsin, the methodology applies equally to other locations guidance/case study

<https://pdfs.semanticscholar.org/af7a/9d10cd9ecee4faf0fc37ecf35dfb6b87c283.pdf>

F-5. Promote stormwater management best practices to private property owners.

<p>Must Floodplain Buyouts Decrease Tax Revenue? - blog post highlighting the strategies local governments can use to lower the tax burden of buyouts including: https://riskcenter.wharton.upenn.edu/lab-notes/buyouts_tax/</p>	guidance
<p>Managing Wet Weather with Green Infrastructure Municipal Handbook, Incentive Mechanisms - a list of incentive mechanisms currently being used by municipalities around the United States. https://www.epa.gov/sites/production/files/2015-10/documents/gi_munichandbook_incentives.pdf</p>	guidance/ funding/tool
<p>Pet Waste Outreach Material - EFC developed a Dropbox resource folder with various pet waste outreach material including flyers, a listed of example pet waste management videos, social media fun facts, and a community survey. https://www.dropbox.com/sh/f4prfhjca1yo9h/AAC4b6Sa10GNEpaVbV344FyFa?dl=0</p>	outreach/ example
<p>Poop Toss Game - originally developed by Snohomish County Public Works, this game is a fun interactive way to engage youth and adults of all ages with learning how to best dispose of their pet waste. https://www.dropbox.com/sh/vp4lpplqh3n9maq/AACe0Zmh6sclTxyswxmSynj4a?dl=0</p>	outreach/ example
<p>National Wildlife Federation’s Community Wildlife Habitat™ program - communities earn community-wide certification by promoting the use of native trees and plants, work to reduce or eliminate the use of pesticides and chemicals, and integrate wildlife-friendly practices into sustainability plans and park master plans. https://www.nwf.org/CommunityWildlifeHabitat</p>	outreach/ example
<p>Certified Wildlife Habitat - residential certification program to encourage property owners to re-establish native plant communities and protect the local watershed with sustainable gardening practices. https://www.nwf.org/Garden-for-Wildlife/Create/At-Home https://www.nwf.org/CertifiedWildlifeHabitat/</p>	outreach/ example
<p>Lawn and Garden information - University of Delaware Cooperative Extension guidance and resources for lawn and garden care. http://extension.udel.edu/lawngarden/</p>	outreach/ example
<p>Lawn Care Guide - this website provides tips and best practices for switching to organic lawn care, explains the current laws and regulations, and has a list of resource providers. https://www.montgomerycountymd.gov/lawns/</p>	outreach/ example
<p>RainScapes Rain Barrels and Cisterns - how to guide for installing a rain barrel or cistern including, what is the difference between rain barrel or cistern, what are the benefits, how to assess your property, developing a design and plan, and how to install them on your own. https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/rainscapes/fact-sheets/rainbarrelsCisterns.pdf</p>	outreach/ example
<p>Rain Barrels - Basic flyer explaining rain barrels. https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/stormwater/signs/Rain-Barrel-sign.pdf</p>	outreach/ example
<p>RainScapes Rain Gardens - How to guide for installing a rain garden including, what is rain garden and what are the benefits, how to assess your property, developing a design and plan, and how to build and implement. https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/rainscapes/fact-sheets/rain-gardens.pdf</p>	outreach/ example
<p>Bioretention Gardens - Basic flyer explaining bioretention gardens.</p>	outreach/

https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/stormwater/signs/Bioretention-sign.pdf	example
Rain Gardens - Basic flyer explaining rain gardens. https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/stormwater/signs/Rain-Garden-sign.pdf	outreach/ example
RainScapes Dry Wells - How to guide for installing a dry well including, what is a dry well and when is it appropriate to install one, how to assess your property, developing a design and plan, and questions to ask a contractor. https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/rainscapes/factsheets/drywells.pdf	outreach/ example
RainScapes Conservation Landscaping - How to guide for conservation landscaping techniques, what is conservation landscaping and what are the benefits, how to assess your property, developing a design and plan, appropriate native plants, and questions to ask a contractor. https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/rainscapes/factsheets/ConservationLandscapingTechniques.pdf	outreach/ example
RainScapes Pavement Removal - How to guide for installing a green roofs including, what is a green roof and what are the benefits, how to assess your property, developing a design and plan, and questions to ask a contractor. https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/rainscapes/factsheets/pavementremoval.pdf	outreach/ example
RainScapes Permeable Pavers - How to guide for installing a permeable pavers including, what is permeable pavement and what are the benefits, how to assess your property, developing a design and plan, and how to build and implement. https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/rainscapes/factsheets/permpavers.pdf	outreach/ example
Porous Pavement - Basic flyer explaining porous pavement. https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/stormwater/signs/Porous-Pavement-sign.pdf	outreach/ example
Wet Ponds - Basic flyer explaining wet ponds. https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/stormwater/signs/Wet-Pond-sign.pdf	outreach/ example
RainScapes Green Roofs - How to guide for installing a green roofs including, what is a green roof and what are the benefits, how to assess your property, developing a design and plan, and questions to ask a contractor. https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/rainscapes/factsheets/greenroofs.pdf	outreach/ example
Green Roofs - Basic flyer explaining green roofs. https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/stormwater/signs/Green-Roof-sign.pdf	outreach/ example
Keep Your Storm Drain Clean - Steps to keep residential storm drains clean, information on reporting illegal dumping, and an educational video on how stormwater destroys our streams. https://mygreenmontgomery.org/project/keep-your-storm-drain-clean/	outreach/ example
Stenciling Storm Drains - Steps for developing a storm drain stenciling event including setting a budget, identifying locations, recruiting volunteers, and follow up. Includes additional resources and links to local programs. https://www.potomacriver.org/resources/get-involved/water/storm-drains/	outreach/ example
F-6. Partner with County to seek certification in the National Flood Insurance Program Community Rating System (CRS).	

<p>FEMA Community Rating Service for Community Resilience - provides guidance on actions that increase a community's rating and works directly with communities to increase their resiliency through the CRS process. https://www.floodsciencecenter.org/products/crs-community-resilience/</p>	<p>guidance/ technical assistance</p>
<p>National Flood Insurance Program Community Rating System - fact sheets and details about the voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. https://www.fema.gov/national-flood-insurance-program-community-rating-system</p>	<p>guidance/ technical assistance</p>

Energy
 E-1. Increase energy efficiency and renewable energy capacity in all municipally owned facilities.

<p>ICLEI ClearPath™ - the leading online software platform for completing greenhouse gas inventories, forecasts, climate action plans, and monitoring at the community - wide or government -operations scales. http://icleiusa.org/clearpath/</p>	<p>technical assistance/tool</p>
<p>Maryland Energy Administration (MEA) - has financial incentives and programs to assist municipalities in converting to alternative fueled vehicles as well as purchasing and installing electric vehicle charging stations. https://energy.maryland.gov/transportation/Pages/incentives.aspx https://energy.maryland.gov/transportation/Pages/default.aspx</p>	<p>guidance/funding</p>
<p>Maryland Smart Energy Communities (MSEC) - have local governments adopt policies and commit to them for the long term, leading to sustained energy savings and additional opportunities for renewable energy development. https://energy.maryland.gov/govt/Pages/smartenergycommunities.aspx</p>	<p>funding</p>
<p>Guidelines for Selecting Cool Roofs - 2010 report with descriptions of cool roof strategies, benefits, costs, and guidance on how to select the appropriate option. https://heatisland.lbl.gov/sites/all/files/coolroofguide_0.pdf</p>	<p>guidance</p>
<p>Cool Roofs - Cool Roofs 101. Short video and article on the benefits of cool roofs. https://www.energy.gov/energysaver/energy-efficient-home-design/cool-roofs</p>	<p>outreach</p>
<p>LED Street Lighting Assessment and Strategies for the Northeast and Mid-Atlantic - report assesses the current status of LED street light conversion barriers in the Northeast and Mid-Atlantic region, provides a quantitative analysis of the regional street lighting efficiency opportunity, and a recommended strategy to address the barriers and achieve large scale conversion. https://neep.org/led-street-lighting-assessment-and-strategies-northeast-and-mid-atlantic</p>	<p>guidance</p>

Action Plan to Accelerate Strategic Electrification in the Northeast - goals and policies to aggressively cut carbon emissions. guidance

<https://neep.org/sites/default/files/resources/Action%20Plan%20To%20Accelerate%20Strategic%20Electrification%20in%20the%20Northeast.pdf>

E-2. Promote clean and efficient energy consumption to residents.

Solar United Neighbors - national organization dedicated to representing the needs and interests of solar owners and supporters. Can help establish a residential Solar Co-op. technical assistance

<https://www.solarunitedneighbors.org/>

Emerging State Policies to Support Community Shared Solar - white paper on community solar in different states and policies to help promote it. guidance

<http://my.solarroadmap.com/userfiles/Emerging-State-Policies-to-Support-Community-Shared-Solar.pdf>

Community solar: What is it? - article breaking down what community solar is, the benefits, and ways to get involved. It also has a link to a decision guide to help custom ores think through the issues of solar power. guidance

<https://www.energysage.com/solar/community-solar/community-solar-power-explained/>

Policies to Support Community Solar Initiatives: Best Practices to Enhance Net Metering - 2012 University of Delaware report on community solar policies, community-owned energy models, and recommendations for boosting customer awareness. guidance

http://freefutures.org/wp-content/uploads/2014/02/2012_READY_Community_Solar.pdf

E-3. Convert municipal fleet to electric vehicles and promote residential use of electric vehicles.

Electric Vehicle for Municipalities Program Feasibility Study Requirements - provides guidance on the requirements for a Feasibility Study to ensure municipalities receive high-quality reports that help to inform fleet electrification decisions. Please note that the provisions in this document outline the minimum level of rigor required. This document is specific for a program in Alberta Canada but can be used to model any municipal study. guidance

<https://mccac.ca/app/uploads/EVM-Feasibility-Study-Requirements.pdf>

Emerging Best Practices for Electric Vehicle Charging Infrastructure - 2017 white paper on charging infrastructure deployment practices, challenges, and emerging best practices in major electric vehicle markets, with an emphasis on public charging facilities. guidance

https://theicct.org/sites/default/files/publications/EV-charging-best-practices_ICCT-white-paper_04102017_vF.pdf

EV Infrastructure Best Practices Explained For Confused Fleet Managers - easy to understand article explaining some basic best management practices for ev-infrastructure. guidance

<https://insideevs.com/news/333807/ev-infrastructure-best-practices-explained-for-confused-fleet-managers/>

Making Your City "EV Ready" - easy to understand article explaining how cities can prepare themselves for including ev-charging stations. guidance

<https://www.driveelectricmn.org/making-your-city-ev-ready/>

Creating EV-Ready Towns and Cities A Guide to Planning and Policy Tools - best practices and policy options for public officials seeking to prepare their jurisdiction for EVs. guidance

<https://www.transportationandclimate.org/creating-ev-ready-towns-and-cities-guide-planning-and-policy-tools>

<https://www.nyserda.ny.gov/Researchers-and-Policymakers/Electric-Vehicles/Resources/Best-Practice-Guides-for-Charging-Stations>

EPA Energy Saver - webpage with resources and tools for energy saving technologies and practices.

guidance/
funding/tool

<https://www.energy.gov/energysaver/energy-saver>

Electric Vehicle Feasibility Study and Business Case Feasibility Report - report outlining the viability and business case for the uptake of electric vehicles and viable collaborative procurement of this technology.

guidance

https://www.localgovernment.vic.gov.au/_data/assets/pdf_file/0019/334243/Electric-Vehicle-Feasibility-FINAL-Public-Version.pdf

Maryland EV - an electric vehicle education and outreach resource serving Maryland and the Mid-Atlantic. Helps to facilitate discussion, information exchange, education, business and economic development, public policy and planning related to electric vehicles (EVs) and EV infrastructure in support of climate prosperity.

guidance/
outreach

<https://marylandev.org/>

Alternative Fuels Data Center Maryland Laws and Incentives - summaries of all current Maryland laws, incentives, regulations, funding opportunities, and other initiatives related to alternative fuels and vehicles, advanced technologies, or air quality.

guidance/tool

<https://afdc.energy.gov/laws/all?state=MD>

AchiEVe: Model State & Local Policies to Accelerate Electric Vehicle Adoption

guidance/tool

Policy Toolkit - effective policies driving adoption of these clean vehicles today, with links to specific templates and real-world examples.

<https://www.sierraclub.org/sites/www.sierraclub.org/files/program/documents/EV%20Policy%20Toolkit.pdf>

Principles for Fair and Equitable Investment in Electric Vehicles and Transportation

guidance

Electrification - discusses the four major principles to policy and funding decisions that will be made to advance the electrification of transportation.

https://www.nclc.org/images/pdf/electric_vehicles/nclc-ev-principles-oct18.pdf

The Greenlining Institute - Electric Vehicles for All: An Equity Toolkit - information about different tools used to increase access to EVs, an equity guide that gives considerations to ensure the tool creates real access to EVs for underserved communities, tips for success to point out additional important considerations, helpful links & examples that readers can use for further research and learning, and other resources to provide easy access to more EV access related information.

guidance/
technical
assistance

<https://greenlining.org/publications/online-resources/2016/electric-vehicles-equity-toolkit/>

<http://greenlining.org/publications-resources/electric-vehicles-for-all/>

Heat

H-1. Conduct an assessment of the heat impact on the electric supply reliability.

Impact of Cold Waves and Heat Waves on the Energy Production Sector - A review of the existing literature on climate risk management in the electric utility industry, with a focus on (1) climate change impacts; (2) measurements of risk; (3) stakeholder engagement and cross-sectoral collaboration; and (4) adaptation actions.

guidance

<https://www.mdpi.com/2073-4433/8/11/209/htm>

Climate Risk Management and the Electricity Sector - A review of the existing literature on climate risk management in the electric utility industry, with a focus on (1) climate change impacts; (2) measurements of risk; (3) stakeholder engagement and cross-sectoral collaboration; and (4) adaptation actions.

guidance

<https://reader.elsevier.com/reader/sd/pii/S2212096317301572?token=3FB9B32C7501BD6C2AD1E220922AA8AABC326E54C8BDF449876A09F18BCOD47AEB5AFD7296B6E29AF6D99A47FC548C37>

Electricity Sector Adaptation to Heat Waves – this White Paper describes and analyzes options available for electricity sector adaptation to the increasing risk and recurrence of heat waves, examines the impacts of heat waves on electricity systems and presents case studies highlighting the need for climate change preparedness, and analyses technological, behavioral and institutional adaptation options for the electricity sector.

<http://columbiaclimatelaw.com/files/2016/06/Aivalioti-2015-01-Electricity-Sector-Adaptation-to-Heat-Waves.pdf>

H-2. Increase the urban tree canopy.

Vibrant Cities Lab - resources and tools to help plan and account for urban forest services

<https://www.vibrantcitieslab.com/>

Financing Urban Tree Canopy Programs Guidebook for Local Governments in the Chesapeake Bay Watershed - practical strategies for funding and financing municipal urban tree canopy, case studies, and regional resources.

http://chesapeaketrees.net/wp-content/uploads/2019/04/FinancingUrbanTreeCanopyPrograms_LowRes_040919.pdf

Tree City USA Standards - standards established by the Arbor Day Foundation and the National Association of State Foresters to ensure that every qualifying community would have a viable tree management program and that no community would be excluded because of size.

<https://www.arborday.org/programs/treecityusa/standards.cfm>

i -Tree Tools for Assessing and Managing Forests and Community Trees - free software suite from the USDA Forest Service that can help strengthen forest management and advocacy efforts by quantifying forest structure and the environmental benefits that trees provide.

<https://www.itreetools.org/>

Community Resilience

CR-1. Continue to facilitate community outreach and education opportunities.

EverGreen Links - environmental and sustainability education resources.

<https://www.engagingeverystudent.com/links/>

Resources for Rethinking - lesson plans, books, videos and other materials that explore the environmental, social and economic dimensions of important issues.

<http://resources4rethinking.ca/en/>

Maps for Community Organizing - toolbox for identifying, organizing, and sharing its collective voice with decision makers at the local and state levels.

https://hc-v6-static.s3.amazonaws.com/media/resources/tmp/Community_Organizing.pdf

Community Engagement Toolkit: Organizing Your Community - toolkit is designed for individuals and organizations implementing local community engagement campaigns. This resource is an example of community organizing around demand for energy services but the principles can be applied to stormwater or other sustainability issues.

https://powershift.org/sites/default/files/resources/1.31.2012_Organizing_Your_Community.pdf

CR-2. Develop a green jobs and economic resilience strategy.

EcoDistricts - a new model of urban development to empower just, sustainable, and resilient neighborhoods. The Protocol and EcoDistricts Certified guide city makers to

take a collaborative, holistic, neighborhood-scale approach to community design to achieve rigorous, meaningful performance outcomes that matter to people and planet.

<https://ecodistricts.org/>

A Roadmap For Economic Resilience: the bay area regional economic strategy - report offers concrete actions for growing regional prosperity and a flexible framework for developing actions.

guidance/
case study

http://documents.bayareacouncil.org/RoadmapforEconomicResilience_BACEI.pdf

Economic Resilience Planning Evaluation Tool - tool summarizes lessons learned from disaster recovery experience and addresses aspects of economic mitigation, preparedness, or recovery that could find expression in an economic development plan.

guidance/tool

<https://files.hudexchange.info/resources/documents/Economic-Resilience-Planning-Evaluation-Tool.pdf>

Strategies to Bolster Economic Resilience County Leadership in Action - This publication highlights eight counties that are applying innovative approaches to economic development to bolster economic growth and improve community quality of life.

guidance/
case study

<https://www.naco.org/sites/default/files/documents/Strategies%20to%20Bolster%20Economic%20Resilience.pdf>

CR-3. Enhance community connectivity between both sides of route 113.

Assessing Health Vulnerabilities and Adaptation to Climate Change: A Review of International Progress - examines the evolution of climate change and health vulnerability and adaptation assessments, including guidance developed for such projects, the number of assessments that have been conducted globally and implementation of the findings to support health adaptation action.

guidance

<https://www.mdpi.com/1660-4601/15/12/2626>

Methods of assessing human health vulnerability and public health adaptation to climate change - this report describes the objectives and the steps for assessing vulnerability and adaptation.

guidance

http://www.euro.who.int/_data/assets/pdf_file/0009/91098/E81923.pdf

USDN Equity Foundations - an independent study professional development program for sustainability directors and their staff to master best practices for adding a racial equity lens to sustainability.

training

<https://www.usdn.org/public/page/55/Equity-Foundations-Training>

Connected Multimodal Networks - resources, examples, and webinars to help shift toward developing complete and connected multimodal transportation networks.

guidance/
training

<http://www.pedbikeinfo.org/topics/multimodalnetworks.cfm>

Pedestrian Bridge - example of pedestrian bridges that link a pedestrian or bike path over or around a major roadway, railway, or waterway.

implementation/
example

<https://bridgebrothers.com/pedestrian-bridges/>

CR-4. Explore developing resilience hubs and cooling centers.

The Use of Cooling Centers to Prevent Heat-Related Illness: Summary of Evidence and Strategies for Implementation - this document gives a summary of the effectiveness of cooling centers, with a focus on highly relevant peer-reviewed literature. It also provides an overview of steps for the implementation of cooling centers.

guidance

<https://www.cdc.gov/climateandhealth/docs/UseOfCoolingCenters.pdf>

Resilience Hubs – this webpage helps to establish definitions and capture ideas to help community organizations, local governments, and other interested parties implement and support community Resilience Hubs. It provides guidance on how to support residents and coordinate resource distribution and services before, during, or after a natural hazard event.

<http://resilience-hub.org/>

guidance/
technical
assistance

Maryland Energy Administration. Quick Reference: Resiliency Hub Grant Program - provides funding to partially recompense solar/microgrid developers for costs incurred in the development and construction of Resiliency Hubs within high density, Low and Moderate Income (LMI) neighborhoods in Maryland.

<https://energy.maryland.gov/Pages/Resiliency-Hub.aspx>

funding

RESILIENT GOVERNANCE STRATEGIES

Research and Planning

RP-1. Conduct a hazard risk vulnerability assessment.

U.S. Climate Resilience Toolkit - information and tools to help you understand and address your climate risks including regional data, case studies, and planning strategies.

<https://toolkit.climate.gov/>

guidance/tool

NOAA Digital Coast - a website focused on helping communities address coastal issues and has become one of the most -used resources in the coastal management community. Has different mapping tools on website.

<https://coast.noaa.gov/digitalcoast>

guidance/
mapping

Surging Seas Risk Finder - Berlin, Maryland fact sheet on sea-level rise vulnerability.

guidance/
mapping

https://riskfinder.climatecentral.org/place/berlin.md.us?comparisonType=place&forecastType=NOAA2017_int_p50&level=5&unit=ft

American Planning Association Hazard Planning Information Exchange - there are different webinars such as Planning Integration for Resilience webinars and different publications on the website.

guidance/training

<https://www.planning.org/nationalcenters/hazards/planninginformationexchange/pastwebinars.htm>

Planning for an Emergency: Strategies for Identifying and Engaging At-Risk Groups.

guidance

A guidance document for Emergency Managers - This document introduces the concept of at-risk groups, gives examples of approaches and tools that can be used to identify social vulnerabilities, and plan for, and assist the at-risk groups or socially vulnerable populations within your community.

https://svi.cdc.gov/Documents/Publications/SVI_Community_Materials/atriskguidance.pdf

Maryland's Coastal Resiliency Assessment - a landscape-level spatial analysis and modeling effort that identifies where natural habitats provide the greatest potential risk reduction for coastal communities. The Resiliency Assessment produced multiple data products that can be used in resiliency and adaptation planning.

guidance/
technical
assistance

<https://dnr.maryland.gov/ccs/coastalatlus/Pages/CoastalResiliencyAssessment.aspx>

CoastSmart - a program dedicated to assisting Maryland's coastal communities address short- and long-term coastal hazards, such as coastal flooding, storm surge, and sea level rise. CoastSmart connects local government staff and partners to essential information, tools, people, and trainings.

guidance/tool

<http://dnr.maryland.gov/ccs/coastsmart/Pages/default.aspx>

Maryland Department of Natural Resources Coastal Atlas - an online mapping and planning tool that allows state and local decision-makers to visually analyze and explore data for coastal and ocean planning activities.

mapping

<https://data.imap.maryland.gov/datasets/25d20760402947659487bc7520cbc00e>

Maryland Commission on Climate Change (MCCC) - most up to date information on Climate Change in Maryland.

guidance

<https://mde.state.md.us/programs/Air/ClimateChange/MCCC/Pages/index.aspx>

Sea Level Rise and Coastal Flood Web Tools Comparison Matrix - expandable chart designed to compare the functions and methods of publicly available sea level rise and coastal flood web tools.

guidance/tool

<http://sealevel.climatecentral.org/matrix/>

<https://sealevel.climatecentral.org/matrix/MD.html?v=1>

Adaptation Clearinghouse - Georgetown Climate Center's searchable resource for climate change resources. Filter by state, impacts, keywords, etc.

guidance

http://www.adaptationclearinghouse.org/search/?type_a=t&type%5B%5D=&i_a=t&i%5B%5D=10636&j_f_a=&ri_a=&rc_a=&s_a=&sid_a=t&sid%5B%5D=280&keyword_a=f&q=&map_a=

Preparing for Climate Change in Maryland - provides an overview of the steps Maryland is taking to prepare for the impacts of climate change. Includes resources on state agency action, local support, state laws and policies, and local and regional plans.

guidance

<http://www.georgetownclimate.org/adaptation/state-information/overview-of-marylands-climate-change-preparations/overview.html>

Climate Adaptation Knowledge Exchange (CAKEX) - case studies, virtual library, directory, tools, and community forums for the discussion of current issues in climate adaptation. Searchable by adaptation phase, topic, or region.

guidance/tool

<https://www.cakex.org/>

Maryland's Green Infrastructure Assessment: GreenPrint - The GreenPrint map displays Targeted Ecological Areas (TEAs), lands and watersheds of high ecological

mapping

value that have been identified as conservation priorities by the Maryland Department of Natural Resources (DNR).

<http://www.greenprint.maryland.gov/>
<https://geodata.md.gov/greenprint/>

Maryland's Environmental Resources and Land Information Network (MERLIN) - compilation of Maryland data that allows users to create custom map of any location in Maryland. This can be used to develop maps of floodplain, sea-level rise, green infrastructure, etc.

mapping

<https://dnr.maryland.gov/pages/Merlin.aspx>

A Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change - report lays out the specific priority policy recommendations to address short-and long-term adaptation and response measures, planning and policy integration, education and outreach, performance measurement, and, where necessary, new legislation and/or modifications to existing laws.

guidance

<http://mde.maryland.gov/programs/Air/ClimateChange/Documents/www.mde.state.md.us/assets/document/Air/ClimateChange/Chapter5.pdf>

Sea Level Rise: Technical Guidance for Dorchester County - guidance document to support planning for sea-level rise in Dorchester County with a focus on necessary changes at the local level. Allows readers to understand how sea level rise may affect him or her in their daily lives, and to provide educators, planners, engineers, and elected officials a clear picture of the challenges facing them.

guidance/
case study

https://dnr.maryland.gov/ccs/Publication/SeaLevel_Dorchester.pdf

Somerset County, Maryland: Rising Sea Level Guidance - recommendations for modifications to the County's planning and regulatory mechanism, including the Floodplain Management Ordinance/Building Code, Zoning Ordinance, Subdivision Regulations, Comprehensive Plan, and Hazard Mitigation Plan.

guidance/
case study

https://dnr.maryland.gov/ccs/Publication/SeaLevel_Somerset.pdf

NOAA Office for Coastal Management: Digital Coast - this page provides technical assistance and highlights federally approved state programs that provide day-to-day implementation. Website also provides tools, training, and information needed to make data truly useful. Data sets range from economic data to satellite imagery. The site contains visualization tools, predictive tools, and tools that make data easier to find and use. Training courses are available online or can be brought to the user's location. Information is also organized by focus area or topic.

technical
assistance/tool/
mapping

<https://coast.noaa.gov/digitalcoast/>

<https://coast.noaa.gov/states/maryland.html#>

RP-2. Integrate resilience into Berlin's other municipal plans.

Planning for Flood Recovery and Long-Term Resilience in Vermont: Smart Growth Approaches for Disaster-Resilient Communities – lessons learned from an assessment of local and state policies in Vermont to enhance flood resilience. Guidance on land use policies, regulations, and strategies to enhance community flood resilience.

guidance/
case study

<https://www.epa.gov/sites/production/files/2014-07/documents/vermont-sgia-final-report.pdf>

Regional Resilience Toolkit 5 Steps to Build Large Scale Resilience to Natural Disasters – Toolkit to help cities, regions, and other partners integrate various planning processes – including for hazard mitigation, climate adaptation, sustainability, and equity – into a single process to create a common action plan.

guidance/tool

https://www.epa.gov/sites/production/files/2019-07/documents/regional_resilience_toolkit.pdf

Local Comprehensive Plan Evaluation for Sustainable Stormwater Management and Flood Mitigation - outlines steps for integrating sustainable stormwater

guidance/tool

management principles into the local comprehensive planning and plan quality evaluation.

<https://oaktrust.library.tamu.edu/bitstream/handle/1969.1/156476/KIM-DISSERTATION-2015.pdf?sequence=1&isAllowed=y>

Storm Smart Cities: Integrating Green Infrastructure Into Local Hazard Mitigation Plans - EPA provides an overview of Local Hazard Mitigation Planning; captures an approach used to establish a planning team; identifies lessons learned and important considerations for other communities interested in pursuing this approach; and provides a crosswalk between the steps in Local Hazard Mitigation Planning, considerations for integrating green infrastructure, and examples from the Huntington, West Virginia Case Study.

guidance/
case study

https://www.epa.gov/sites/production/files/2018-04/documents/storm_smart_cities_508_final_document_3_26_18.pdf

EPA's Adaptation Resource Center (ARC-X) – an interactive resource to help local governments to find information about: the risks posed by climate change to the issues of concern; relevant adaptation strategies; case studies illustrating how other communities have successfully adapted to those risks and tools to replicate their successes; and EPA funding opportunities.

guidance/
funding/tool

<https://www.epa.gov/arc-x>

The Community Recovery Management Toolkit (CRMT) – a compilation of guidance, case studies, tools, and training to assist local communities as they are in the midst of managing recovery post-disaster. Pre-disaster planning and preparedness resources for recovery are available soon.

guidance/
tool/case study

<https://www.fema.gov/community-recovery-management-toolkit>

FEMA - Silver Jackets Team (FEMA) - interagency team to address hazard mitigation and natural resource planning

technical
assistance

<http://silverjackets.nfrmp.us/About-the-Silver-Jackets-Program.cfm>

Carbon -Free City Handbook - Reveals 22 actions-and associated resources-for cities globally to move toward climate -neutrality and see results within a year.

guidance

<https://rmi.org/carbonfreecities/>

The Climate Registry - assists organizations in measuring and reporting their greenhouse gas emissions. Tools and resources for local governments to create a greenhouse gas inventory.

guidance/tool

<https://www.theclimateregistry.org/who-we-are/about-us/>

RP-3. Develop a strategic growth plan.

Smart Growth Fixes for Climate Adaptation and Resilience – guidance and best management practices to address some of the expenses and political challenges of preparing for and adapting to climate change. Chapters include quick tips; examples of communities implementing the policies; resources; and metrics.

guidance

https://www.epa.gov/sites/production/files/2017-01/documents/smart_growth_fixes_climate_adaptation_resilience.pdf

EPA Smart Growth Resource Site - an in-depth look at Smart Growth, including strategies communities can use to promote Smart Growth, key tools and resources to help communities implement more sustainable practices, and links to grants and potential funding for Smart Growth initiatives.

guidance/
funding/tool

<http://www.epa.gov/smartgrowth/smartlocationdatabase.htm>

<https://www.epa.gov/smartgrowth/tools-and-resources-sustainable-communities>

EPA Mapping Tools for Communities - Tools for communities to use to identify assets and hazards in local areas. Links provided for a number of great resources. <https://www.epa.gov/sites/production/files/2015-02/documents/team-ej-mapping-tools.pdf> mapping

Sustainable Jersey Natural Resource Inventory - guidance on how to develop a natural resource inventory, example inventories, and resources. http://www.sustainablejersey.com/actions-certification/actions/?type=1336777436&tx_sjcert_action%5BactionObject%5D=60&tx_sjcert_action%5Baction%5D=getPDF&tx_sjcert_action%5Bcontroller%5D=Action&cHash=59c21b7c2e09718013d5861c4b73c790 guidance

Creating a Natural Resources Inventory A Guide for Communities in the Hudson River Estuary Watershed - this report explains what a natural resource inventory is, why they are important, what is included in the inventory, and steps you can take to develop one. http://www.dec.ny.gov/docs/remediation_hudson_pdf/nriall.pdf guidance/
case study

Affordable Housing and Anti-Displacement Policies - policies to aid municipalities in strategies that provide and preserve affordable housing and mitigate the displacement impacts that are often generated from gentrification. <https://www.scag.ca.gov/Documents/ComprehensiveGuideToLocalAffordableHousingPolicy.pdf> guidance

Preserving, Protecting, and Expanding Affordable Housing: A Policy Toolkit for Public Health - a library of local housing policies and strategies that communities can use to ensure the availability of affordable housing options, with a particular focus on rental affordability. <https://kresge.org/sites/default/files/Preserving-affordable-housing-policy-tools-April-2015.pdf> guidance

RP-4. Adopt more stringent codes and ordinances.

Maryland Climate Change and Coast Smart Construction Infrastructure Siting and Design Guidelines – state guidance for development in vulnerable areas, include planning principles, a policy framework, and siting and design guidelines for structures and infrastructure such as roads and bridges. <https://www.adaptationclearinghouse.org/resources/maryland-climate-change-and-coast-smart-construction-infrastructure-siting-and-design-guidelines.html>
https://climatechange.maryland.gov/wp-content/uploads/sites/16/2014/12/climate_change_and_coast_smart_final_report1.pdf guidance

ACEE State and Local Policy Database - state and local policy database with a summary of Maryland's policies, programs, and financial incentives for all things energy. <https://database.aceee.org/state/maryland>
<https://aceee.org/topics/building-codes> guidance/
funding/tool

Updated Code and Ordinance Worksheet for Improving Local Development Regulations - a tool to help communities evaluate their local development regulations to identify revisions that allow (or require) site developers to minimize impervious cover, conserve natural areas and use runoff reduction practices to manage stormwater runoff. <https://www.cwp.org/updated-code-ordinance-worksheet-improving-local-development-regulations/> guidance/tool

Finance and Budget

FB-1. Integrate resilience into the Town's operational and capital budgets.

Integrating Resilience into Local Capital Improvement Programs - section in the Eastern Shore Land Conservancy (ESLC) Mainstreaming Sea Level Rise report that outlines best practices for embedding climate risk assessments into capital improvement planning processes at the municipal and county level, as a cost- guidance

effective means of building community resilience to climate-related threats. This process can also be applied to more general sustainability goals.

<https://www.eslc.org/wp-content/uploads/docs/coastal-resilience/regional-sea-level-rise-study-2019.pdf>

“Dig Once” Strategy Development Workshop Report - Explore better ways to integrate green infrastructure (GI) into other infrastructure projects.

guidance

https://www.chesapeakebay.net/documents/GI_Integration_Final_Workshop_Report.pdf

MOST Dig Once: Integrating Capital Improvement Planning into Green

training

Infrastructure - online training module outlines strategies for integrating green infrastructure into capital projects such as roads, utilities, parks, and schools.

https://www.chesapeakebay.net/channel_files/19528/dig_once_one_pager.pdf

<https://mostcenter.org/courses/integrating-green-infrastructure-capital-improvement-planning>

Unlocking Private Capital to Finance Sustainable Infrastructure - framework to mobilize private finance for sustainable infrastructure projects

guidance

http://business.edf.org/files/2017/09/EDF_Unlocking-Private-Capital-to-Finance-Sustainable-Infrastructure_FINAL.pdf

Environmental Finance Center - University of Maryland based outreach and research center providing communities with the tools and information necessary to manage change for a healthy environment and an enhanced quality of life.

technical assistance

<https://efc.umd.edu/>

EPA - Water Infrastructure Financial Leadership: Successful Financial Tools for Local

guidance

Decision Makers - guidance for local officials on how to identify what is needed for financial planning, determine how to fund and finance a project, and consider which strategic approaches can be used to protect local investments. This document also compiles existing resources and descriptions of successful community examples as tools to help inform your water infrastructure investment decisions.

https://www.epa.gov/sites/production/files/2017-09/documents/financial_leadership_practices_document_final_draft_9-25-17_0.pdf

Financing Integrated Green Stormwater Infrastructure to Improve Community Health, Resiliency - Getting the Best Deal for the Money! - paper that describes the needs and effective financing solutions for building a comprehensive integrated green stormwater infrastructure program that combines the strengths of green and grey solutions to provide multiple community benefits, including mitigation and rehabilitation of critical infrastructure damaged by extreme wet weather events.

guidance

https://www.epa.gov/sites/production/files/2016-10/documents/bloomberg_bna_financing_gi_greeninfoc2016.pdf

Local Government Stormwater Financing Manual: A Process for Program Reform -

guidance

provide a foundation for local officials to move forward by focusing on leadership and the ability to move communities towards effective action. This guidance document addresses Reducing costs through the use of performance-based financing; Establishing effective stormwater rebate and credit programs; Using markets and offsets in an urban environment; and, Maximizing stormwater benefits through the use of green infrastructure practices.

[https://efc.umd.edu/assets/stormwater_projects/2efc_stormwater_financing_manual_final_\(1\).pdf](https://efc.umd.edu/assets/stormwater_projects/2efc_stormwater_financing_manual_final_(1).pdf)

Clean Water State Revolving Fund (CWSRF) - EPA webpage provides information and resources on the CWSRF program, a federal-state partnership that provides

funding

communities a permanent, independent source of low-cost financing for a wide range of water quality infrastructure projects.

<https://www.epa.gov/cwsrf>

How to Issue a Green Muni Bond, The Green Muni Bonds Playbook - U.S. green bond primer describes what is a green bond, the current market, and best practices to implementation. guidance

<https://www.mayorsinnovation.org/images/uploads/pdf/6 - How to Issue a Green Muni Bond.pdf>

Mitigation Planning Program Resource List - FEMA resources including financial assistance, for State, local, and tribal governments to engage in mitigation planning to identify risks associated with natural disasters and to develop long-term strategies for protecting people and property from future hazard events. funding

<https://www.fema.gov/media-library/assets/documents/131310>

FEMA's Hazard Mitigation Grant Program (HMGP) - this page provides general information on hazard mitigation and the Hazard Mitigation Assistance (HMA) grant programs. funding

<https://www.fema.gov/hazard-mitigation-assistance>

EPA Section 319 Nonpoint Source (NPS) Pollution Grant Program for States and Territories - states, territories and tribes receive grant money that supports a wide variety of activities including technical assistance, financial assistance, education, training, technology transfer, demonstration projects and monitoring to assess the success of specific nonpoint source implementation projects. funding

<https://www.epa.gov/nps/319-grant-program-states-and-territories>

EPA's Urban Waters Small Grants Programs - to help local residents and their organizations, particularly those in underserved communities, restore their urban waters in ways that also benefit community and economic revitalization. Awarded every two years with individual award amounts up to \$60,000. funding

<https://www.epa.gov/urbanwaters/urban-waters-small-grants>

NOAA's Coastal and Marine Habitat Restoration Grants - the Community-based Restoration Program supports restoration projects that use a habitat-based approach to rebuild productive and sustainable fisheries, contribute to the recovery and conservation of protected resources, promote healthy ecosystems, and yield community and economic benefits. funding

<https://www.fisheries.noaa.gov/grant/coastal-and-marine-habitat-restoration-grants>

The Department of Housing and Urban Development (HUD) Community Development Block Grants (CDBGs) - provides communities with resources to address a wide range of unique community development needs. The CDBG program provides annual grants on a formula basis to 1209 general units of local government and States to ensure decent affordable housing, to provide services to the most vulnerable in our communities, and to create jobs through the expansion and retention of businesses. funding

https://www.hud.gov/program_offices/comm_planning/communitydevelopment/programs

U.S. Department of the Interior Bureau of Reclamation WaterSMART grants - provides 50/50 cost share funding to irrigation and water districts, tribes, states and other entities with water or power delivery authority. Projects conserve and use water more efficiently; increase the production of hydropower; mitigate conflict risk in areas at a high risk of future water conflict; and accomplish other benefits that contribute to water supply reliability in the western United States. Projects are selected through a competitive process and the focus is on projects that can be completed within two or three years. funding

<https://www.usbr.gov/watersmart/weeg/>

EPA Water Finance Clearing House – a web-based portal to help locate information and resources that will assist communities in making informed decisions for their drinking water, wastewater, and stormwater infrastructure needs. Contains searchable databases for available funding sources and resources, such as reports, web links, webinars etc. on financing mechanisms and approaches that can help communities access capital to meet their water infrastructure needs.

guidance/
funding/tool

<https://www.epa.gov/waterdata/water-finance-clearinghouse>

EPA Water Infrastructure and Resiliency Finance Center - an information and assistance center, helping communities make informed decisions for drinking water, wastewater, and stormwater infrastructure to protect human health and the environment.

guidance

<https://www.epa.gov/waterfinancecenter>

Climate Resilience Funding Guide - Funding sources for climate adaptation Model Forest Policy Program. This resources provides guidance to assist communities in identifying potential funding sources for climate adaptation projects and highlights a collection of funding sources that have evolved to provide funding for climate adaptation activities.

funding

<http://www.mfpp.org/wp-content/uploads/2017/07/Climate-Resilience-Funding-Guide.pdf>

From Projects to Portfolios, Mainstreaming Large-Scale Investment in Integrated Infrastructure - A blueprint for increased investment in green infrastructure, actionable steps that must be taken to grow our urban portfolios of green infrastructure assets to scale.

guidance

https://static1.squarespace.com/static/561dcdc6e4b039470e9afc00/t/5c50ae954ae237e26d90a55c/1548791453440/ProjectsToPortfolios_EarthEconomics_012919-W.pdf

EPA - Financing Alternatives Comparison Tool - a financial analysis tool that helps municipalities, utilities, and environmental organizations identify the most cost-effective method to fund a wastewater or drinking water management project. FACT produces a comprehensive analysis that compares financing options for these projects by incorporating financing, regulatory, and other important costs.

guidance/
funding/tool

<https://www.epa.gov/cwsrf/financing-alternatives-comparison-tool>

Financing Climate Resilience, Funding and Financing Models for Building Green and Resilient Infrastructure in Florida - identifies and evaluates twelve creative funding and financing models that can help accelerate investment in infrastructure projects that incorporate resilient design features.

guidance

https://ash.harvard.edu/files/ash/files/financing_climate_resilience_final_report.pdf

Playbook 1.0: How Cities Are Paying for Climate Resilience - challenges and strategies for funding climate resilience in eight cities.

guidance

<https://static1.squarespace.com/static/5736713fb654f9749a4f13d8/t/5d275d9135b62f0001df44b5/1562860947122/Playbook+1.0+How+Cities+Are+Paying+for+Climate+Resilience+July+2019.pdf>

EPA - Getting to Green: Paying for Green Infrastructure Financing Options and Resources for Local Decision-Makers - identifies various funding sources that can be used to support stormwater management programs or finance individual projects.

guidance

https://www.epa.gov/sites/production/files/2015-02/documents/gi_financing_options_12-2014_4.pdf

A Business Model Framework for Market-Based Private Financing of Green Infrastructure - report identifies the barriers to private investment in green infrastructure and recommends how best to eliminate those barriers.

guidance

<https://stormwater.wef.org/wp-content/uploads/2015/01/Final-Report-on-A-Business-Model-Framework-for-MarketBased-Private-Financing-of-Green-Infrastructure.pdf>

FB-2. Adopt a community budgeting process.

<p>Participatory Budgeting Project - organization that empowers people to decide together how to spend public money through a processes that deepens democracy, builds stronger communities, and makes public budgets equitable and effective.</p>	<p>guidance/ technical assistance</p>
<p>https://www.participatorybudgeting.org/ https://www.citizenlab.co/ebooks-en/the-beginners-guide-to-participatory-budgeting</p>	
<p>ioby "in our backyards" - online platform that gives local leaders the ability to crowdfund the resources they need to build real, lasting change from the ground up.</p>	<p>guidance/ funding/tool</p>
<p>https://ioby.org/</p>	
<p>FB-3. Maintain resilience as a priority criteria for the procurement of the Town's goods and services.</p>	
<p>Responsible Purchasing Network (RPN) - promotes and practices responsible purchasing by identifying best practices, developing effective purchasing tools, educating the market, and using collective purchasing power to maximize environmental stewardship, protect human health, and support local and global sustainability.</p>	<p>technical assistance</p>
<p>http://www.responsiblepurchasing.org</p>	
<p>Environmentally Preferable Purchasing (EPP) by the Northeast States - 2015 report about environmentally preferable purchasing programs in the Northeast.</p>	<p>guidance/ case study</p>
<p>https://nerc.org/documents/green_purchasing/Environmentally%20Preferable%20Purchasing%20by%20the%20Northeast%20States.pdf</p>	
<p>National Association of State Procurement Officials (NASPO) Green Purchasing Guide - recommended steps and proven strategies to enable the implementation of a green purchasing program with links to other resources offering detailed information on elements of the process.</p>	<p>technical assistance</p>
<p>https://www.naspo.org</p>	
<p>http://www.naspo.org/green/index.html</p>	
<p>U.S. General Services Administration (GSA) Green Purchasing page - Federal resources to aid in green procurement and acquisitions.</p>	<p>technical assistance</p>
<p>https://www.gsa.gov/about-us/regions/welcome-to-the-rocky-mountain-region-8/sustainability-in-action/green-purchasing</p>	
<p>Strength in Numbers: An Introduction to Cooperative Procurements - an issue brief designed to provide public procurement officials, elected officials, government executives, government suppliers and citizens with an introduction to cooperative purchasing—particularly its definition, purpose, authority, value, and best practices.</p>	<p>guidance</p>
<p>https://www.naspo.org/dnn/portals/16/documents/Cooperative_Purchasing0410update.pdf</p>	
<p>The Cooperative Purchasing Network (TCPN) -This brings up a pull-down menu with the cooperative purchasing laws for each of the 50 states.</p>	<p>technical assistance</p>
<p>http://www.tcpn.org/</p>	
<p>CoProcure - a central platform where local governments can find, compare, and use cooperative public contracts from the federal government, national and regional purchasing cooperatives, states, and local agencies. Our free technology platform helps public servants save time and taxpayer dollars and lowers the costs of selling into the government market for suppliers.</p>	<p>technical assistance</p>
<p>https://www.coprocare.us/</p>	
<p>FB-4. Coordinate with nonprofit and other local partners on resilience in the region.</p>	
<p>Small Watershed Grants (SWG) NFWF - SWG-I grants are awarded to projects within the Chesapeake Bay watershed that promote on-the-ground community-based efforts to protect and restore the diverse natural resources of the bay and its tributary rivers and streams. Projects result in improvements to local stream health and habitat, and/or the water quality of the Chesapeake Bay. SWG-PTA grants are awarded to projects that enhance local capacity to more efficiently and effectively</p>	<p>funding</p>

implement future on-the-ground conservation efforts through assessment, planning and design, and other technical assistance-oriented activities.

<https://www.nfwf.org/chesapeake/Pages/small-watershed-grants.aspx>

https://www.georgetownclimate.org/files/report/GCC-Lessons-in-Regional-Resilience-Synthesis-Jan_2017.pdf

Operationalization Integration

OI-1. Engage decision-makers and Town leadership in resilience initiatives.

OI-2. Develop core competencies for staff around climate change.

Municipal Online Stormwater Training Center - online platform to provide stormwater education and training that includes tools, resources, and brief educational videos for the purpose of increasing awareness and empowering its stakeholders to take action toward effective stormwater management. training

<https://mostcenter.org/>

Antioch University Climate Change Resilience Series - a series of online courses focused on the fundamentals of climate change resilience and sustainability. training

<https://www.antioch.edu/new-england/resources/centers-institutes/center-climate-preparedness-community-resilience/climate-change-resilience-series/>

Naturally Resilient Communities - a guide of nature-based solutions and included case studies of successful projects from across the country to help communities learn more and identify which nature-based solutions might work for them. guidance/
case study

<http://nrcsolutions.org/>

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