DEVENS *FORWARD*

Embracing the Past, Transforming the Future

2020

CLIMATE ACTION & RESILIENCE PLAN

PREPARED FOR

Devens Enterprise Commission

BY

Kim Lundgren Associates, Inc.

with a grant from the Massachusetts Executive Office of Energy and Environmental Affairs Municipal Vulnerability Preparedness (MVP) Program.

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Moving Devens Forward

A Letter from William P. Marshall, Chairman of Devens Enterprise Commission

Transforming the future of our community for those that work, live, and play here on Devens.

It is a great pleasure to release the Devens Forward Climate Action and Resilience Plan. This plan illustrates the importance of community stakeholder participation and incorporates the ideas and feedback derived from surveys, meetings, and interviews—conducted both in-person and virtually over the past year. The Devens Enterprise Commission is pleased to have partnered with MassDevelopment, MassDevelopment, Kim Lundgren Associates, Inc. (KLA), and our many regional and community stakeholders to bring this plan to fruition.

Devens has a unique history as a former army base carved out of three underlying communities in the lead up to the United States' entry into World War I. That history is acknowledged in the subtitle of our plan: "embracing the past and transforming the future." **Our ability to understand the past and embrace the science of today enables us to prepare Devens for the current and future impacts of climate change and public health crises** like the current COVID-19 pandemic. In May of 2019, the Devens Enterprise Commission helped dedicate a memorial in Devens to the doctors, nurses, soldiers, and civilians who dealt with the 1918 Spanish Influenza pandemic. Learn the lessons of the past and apply them to the future. The Devens Forward Climate Action and Resilience Plan builds off of our recent Municipal Vulnerability Preparedness Plan and Greenhouse Gas Inventory which recognizes the changing weather patterns that climate change is already bringing to the region. KLA helped our staff and stakeholders apply this knowledge to Devens to craft our Devens Forward plan.

Devens has transformed into a world class location for businesses with over 100 businesses and 6,000 employees, as well as a growing residential community. We have worked hard to serve as a model for sustainable redevelopment of a former military base. Devens Forward builds on our 4-Star STAR Sustainable Community Rating, our LEED for Cities and Communities certification, our status as the premier eco-industrial park in the United States, and the integration of sustainable development into every aspect of the reuse of the base. The Devens Enterprise Commission looks forward to continuing its collaboration with MassDevelopment—as well as our stakeholders, businesses, and citizens—on the sustainable redevelopment of Devens, as we implement this plan and transform our community's future in a way that benefits all of those who live, work, learn, or play at Devens now and in the future.

Sincerely,

William P. Marshall
Chairman
Devens Enterprise Commission

Acknowledgments

Devens Enterprise Commission

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Patricia Stern, Loaves and Fishes
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Todd Sumner, Parker Charter School
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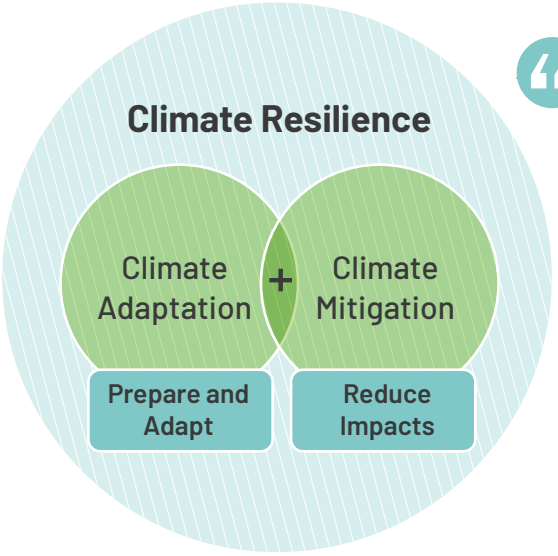
Executive Summary

The Devens Regional Enterprise Zone (Devens) is a 4,400-acre community and an award-winning model for military base reuse. The modern community of Devens was born out of the 1994 Devens Reuse Plan, which established the principles of sustainable development and reuse as essential to Devens future. Devens was created as an example of what sustainable development and sustainable economic growth could be.

Devens is co-governed by the Devens Enterprise Commission and MassDevelopment. From our Net Zero Energy structures to our status as a USGBC LEED for Cities and Communities certified development and 4-Star sustainability rating from STAR Communities, we work hard to make responsible decisions and equip our businesses and residents with the resources they need to thrive in the face of a changing world.

Embracing the past and transforming the future has always been our mission and we are continuing to stay on the cutting edge of what it means to be a sustainable community. **Devens Forward is the next step in this process.**

Devens is known for its military roots and as a world-class location for businesses, a growing residential community, and a leading destination for sports and recreation. With nearly 100 businesses and organizations that collectively employ more than 6,000 workers and over 1,400 acres of permanently protected open space, Devens is a desirable place to live, work, learn, and play. Devens is also home to a number of important community and social services that benefit the region as a whole: Veterans housing, Transitions at Devens, TaraVista Behavioral Health Center, Dragonfly Wellness Center, and Clear Path for Veterans, among others. Our goal is to protect those economic, social, and environmental assets that make us unique and preserve them for future growth. In this spirit, the Devens Enterprise Commission launched a climate action and resilience planning process with funding from the Massachusetts Executive Office of Energy and Environmental Affairs' Municipal Vulnerability Preparedness (MVP) Program and in coordination with MassDevelopment.



> The ability to anticipate, accommodate and positively adapt to or thrive amidst changing climate conditions, while enhancing quality of life, reliable systems, economic vitality, and conservation of resources.
>
> Urban Sustainability Directors Network (USDN)

Devens Forward will serve as a roadmap to reduce our greenhouse gas emissions and holistically prepare our community as we consider the impacts of climate change that we expect to see in the coming years and decades.

With Devens Forward, we will continue the foresight and leadership created over the years by developing the tools and systems to foster a more resilient community.

In addition to our responsibility to address climate change, we acknowledge our responsibility to ensure our community develops a vibrant economy that supports a high standard of living for those who live, work, learn, and play here. Our far-reaching approach looks beyond the typically narrow definition of sustainability and supports many of the United Nations' (UN) Sustainable Development Goals that emphasize equality, health, education, innovation, and more.

By following the actions outlined in this plan, we will not only come closer to our ultimate goals around climate change, but we will create a healthier, happier community that is ready for the years to come.

To achieve our sustainability goals, we are undertaking 73 ambitious and achievable actions across seven planning elements that will both reduce our environmental impact and improve our community's resilience in the face of climate change. Of these actions, we have developed detailed implementation blueprints for 22 of them to support the immediate start to implementing this plan and making progress towards our goals.

Climate & Energy

Economic Development

Housing

Infrastructure

Natural Resources

Public Health & Safety

Transportation & Land Use

Action Summary Table

Climate & Energy

	Actions
GOAL CE.1 The entire Devens community prioritizes the significant reduction of greenhouse gas emissions.	Continue to explore the installation of smart meters for new development alongside applications that support peak load management, as appropriate
	Engage Devens businesses to share and promote results of energy efficiency and sustainability projects
	Continue working with developers to encourage sustainable development and redevelopment
	Encourage energy efficiency upgrades in residential and commercial buildings through incentives and education and partnerships with programs such as the Industrial Assessment Center
	In coordination with the State, support the development and implementation of Net Zero Energy building standards for all new buildings and major redevelopment projects
	Support battery storage projects within Devens, where technically feasible
	Promote the use of Life Cycle Analysis/Life Cycle Cost Analysis in building and infrastructure projects
GOAL CE.2 Municipal operations lead by example through the increased utilization of renewable energy sources.	Support Devens businesses in development of on-site solar installations for direct charge of vehicles, backup generator power, or other suitable equipment
	Increase the type and number of installations of renewable energy on municipal property
	Utilize Net Zero Energy building standards for all new municipal buildings and redevelopment projects wherever technologically and financially feasible
	Engage with Devens business community to identify opportunities for demonstration projects that advance the transition to clean and renewable energy

Economic Development

	Actions
GOAL ED.1 Devens' businesses are implementing sustainable business practices and are prepared for the impacts of climate change.	Actively encourage future development and businesses to prioritize access to public or non-motorized transportation
	Engage more businesses in Devens and the surrounding region with the Devens Eco-Efficiency Center (DEEC) and its educational programs and technical assistance
GOAL ED.2 Devens has a diverse, 24-hour economy that supports emerging industries, such as the creative economy, tourism, technology, and manufacturing.	Develop and promote services, recreation, and amenities to attract/keep people on Devens after work and on weekends
	Facilitate the sharing of building space and resources for businesses, schools, and organizations
	Facilitate the sharing of information and services to promote a collaborative regional economy
GOAL ED.3 Devens' economy is supported by trainings and workforce development opportunities to meet the needs of current and potential future industries.	Locate and site industries that contribute to and capitalize on environmental and emerging technologies (Reuse Plan)
	Partner with local and regional schools and colleges to incorporate climate curricula and job training opportunities
	Partner with Devens Eco-Efficiency Center and local and regional schools to provide workforce development/retraining programs tied to business, industry, institutions, and diverse populations throughout the region
	Collaborate with industries that can use the by-products of existing businesses in the region

Housing

	Actions
GOAL H.1 Housing development and redevelopment in Devens minimizes negative impacts on the environment.	Collaborate with developers and community stakeholders to further advance DEC's high-performance building standards with education and technical assistance
	Continue reuse of existing housing stock, compatible new housing types, and transit-oriented development
	Initiate an educational campaign on ways to improve residential energy efficiency and resilience in existing housing
GOAL H.2 Devens features diverse, affordable housing options that are accessible to all, reducing commuting needs of the local and regional workforce.	Support housing developments that will provide adequate and diverse housing options for seniors, local workforce, veterans, low/mid income levels, and people with disabilities
	Redevelop Vicksburg Square zoning district into a mixed use residential/ retail center
	Remove or modify the housing cap

Infrastructure

	Actions
GOAL I.1 Devens is recognized as a regional hub for resource recovery, sustainable materials management, and designing waste out of systems.	Implement a community curbside composting program (and continue yard waste program)
	Regionalize commercial waste diversion and reuse strategies
	Maximize the collection and proper disposal of specialty waste items
	Design and implement effective waste reduction and recycling programs in businesses and schools
GOAL I.2 New and redevelopment projects regularly incorporate green infrastructure, low impact development, and water and energy efficiency measures.	Promote sustainable construction & demolition practices (i.e. Life Cycle Analysis, Zero Waste, solar ready homes, wood-based construction, green roofs, resale/salvage of building materials)
	Increase efficiency of all water users through the promotion of water conservation measures for business and residential users
	Continue to improve stormwater management by reducing impervious surface and incentivizing rain barrels, rain gardens, and green roofs.
	Encourage industries and businesses to share infrastructure to lower costs and increase efficiency
GOAL I.3 Critical utilities and infrastructure are resilient to climate hazards.	Upgrade and maintain drainage infrastructure
	Ensure redundancy of critical infrastructure, community facilities, and utilities

Natural Resources

	Actions
GOAL NR.1 Devens' open spaces are healthy, resilient places that are accessible to all residents and visitors.	Continue implementing multi-use trail network plan
	Boost awareness about recreational options, trails, open space through events
	Proactively educate residents and developers on sustainable landscaping best practices that minimize water and chemical use and maximizes native species
	Adopt a community-wide policy to use low-input landscaping, with a focus on pollinator plantings
GOAL NR.2 Air, water, and soil quality meet or exceed state and federal standards.	Continue to assure that the Army's agreement with EPA to clean up Superfund contamination is successfully completed to allow for future development of once contaminated lands
	Continue implementing Devens Water Resources Protection Plan
	Continue to implement NPDES MS4 Permit requirements to improve water quality
GOAL NR.3 Devens manages protected open space to protect ecosystem services and maximize carbon sequestration.	Develop a Resource Management Plan as part of Devens Open Space and Recreation Plan that emphasizes best management practices for natural systems and environmental issues within Open Space Zones
	Update the Open Space and Recreation Plan with prioritized short list of actions, including completing the permanent protection of identified open space parcels
	Coordinate land management with neighboring towns, land managing agencies, and organizations to maintain the health of the tree canopy and protect the functioning of its ecosystem-services

Public Health & Safety

	Actions
GOAL PHS.1 Residents, businesses, and municipal operations are prepared to recover quickly from climate impacts.	Update DEC pest and vector-borne disease management plan
	Improve access to mental and physical health and wellness services
	Pilot a microgrid, district energy, or self-contained power system in an area of greatest need
	Launch a coordinated preparedness campaign that encourages residents and businesses to take actions that improve their ability to protect themselves and our community in advance of a crisis
	Expand the reach and accessibility of emergency preparedness communications
	Invest in resilient energy systems at critical facilities
	Build out the community's "cooling capacity" through parks, recreational sites, and designated cooling centers
GOAL PHS.2 Residents and employees working in Devens have access to fresh, affordable, and healthy food.	Support the production and consumption of healthy, local food
	Partner with local public and private health and wellness services to promote access for residents and employees (ex: Dragonfly Wellness Center, Nashoba Associated Boards of Health)
GOAL PHS.3 Residents and employees have safe access to open space and opportunities to actively participate in recreational activities that contribute to a healthy, active lifestyle.	Develop and promote an array of programs that encourage active lifestyles for a diverse population
	Develop an ADA transition plan for those sites lacking access and incorporate ADA compliance measures as part of future planning proposals
	Expand sidewalk, trail, and bike lanes to provide safe alternative modes of transportation and access to recreational resources

Transportation & Land Use

	Actions
GOAL TLU.1 Devens provides multimodal, universally accessible, safe, and, efficient community and regional links between housing, schools, recreation facilities, conservation areas, shops, workplaces, parking areas, and public transportation stops.	Continue work on a forward-looking regional plan for bike/pedestrian transportation that creates an interconnected system with neighboring towns
	Continue implementing the Complete Streets priority actions
	Encourage reuse of previously developed sites that are transit-oriented and mixed-use
	Provide clear, efficient links between housing, schools, recreation facilities, conservation areas, shops, workplaces, parking areas, and public transportation stops
	Explore regional Transfer of Development Rights (TDR)
GOAL TLU.2 Devens designs for and promotes the proliferation of transportation choices that reduce GHG emissions.	Expand low-carbon transportation options for the workforce that commutes to Devens
	Encourage multimodal transportation through outreach and installation of necessary infrastructure
	Encourage local businesses to adopt commuter incentives for employees, to promote alternative modes of commuting such as walking, biking, and transit
	Enforce anti-idling laws
	Expand infrastructure and promote policies that encourage the use of electric vehicles (EV)
	Require all new commercial construction to meet electric vehicle (EV) readiness requirements
GOAL TLU.3 As a regional logistics hub, Devens is a leader in electrified freight transportation.	Engage with Devens logistics companies to identify opportunities for the development of electric or hydrogen fueled freight truck fueling and support infrastructure
	Electrify the municipal fleet as electric vehicle options are available for fleet needs
	Utilize an electric community shuttle
	Work with intermodal facility (PanAm) to electrify freight rail and all supporting freight infrastructure

Devens Background

History

Recent Sustainability Action in Devens

Devens has already undertaken steps to make progress towards our original goal of sustainability derived from the 1994 Reuse Plan. From developing resilient infrastructure to becoming both a local and state leader in eco-industrial park development, energy efficiency and clean, renewable energy, Devens is not starting from square one.

2000

The Devens Industrial Ecology Project developed. Began transformation of the large industrial portion of Devens into an eco-industrial park - an environmentally friendly version of an industrial park.

2004

EcoStar
Economy•Ecology•Community

EcoStar Environmental Branding and Achievement Program launches. Unique program developed in Devens to further the Eco-Industrial Park initiative and the sustainable redevelopment goals of the Reuse Plan.

2008

Devens Eco-Efficiency Center
Helping firms protect resources.

The establishment of the Devens Eco-Efficiency Center. The Devens Eco-Efficiency Center provides education, technical assistance, networking forums, and partnership opportunities that help local establishments make better use of resources and achieve triple bottom line benefits.

2011

Devens Net Zero and E+ Housing. In a 2011 pilot project, Devens became the home to several Net Zero Energy (NZE) and E+ homes.

DEVENS

4,400

acre site internationally recognized as an Eco-Industrial Park.

Created by statute in 1993 to support business growth and attract economic development opportunities in the region, the Devens Regional Enterprise Zone (Devens) is a 4,400-acre site featuring fast-track permitting and other incentives for businesses. The former military installation is internationally recognized today as an Eco-Industrial Park and a national model for sustainable military base redevelopment. Along with its business tenants, the Devens community also includes more than 2,100 acres of recreation and open space, private residences, schools, and a network of human and social services providers.

2012

The release of the Sustainable Indicators Report. Devens released a Sustainable Indicators Report which evaluated the progress Devens had made toward its ReUse Plan goal of Sustainable Redevelopment.

2018

Devens becomes a LEED Certified Community by USGBC, following on its 4-STAR rating by STAR Community Rating System, both leading frameworks for evaluating and recognizing local sustainability.

The Devens Municipal Vulnerability Preparedness Plan. Devens completed a comprehensive Climate Change and Natural Hazard Vulnerability Assessment, Preparedness, and Action Plan.

2019

The release of the Greenhouse Gas Inventory. Completed a Greenhouse Gas Inventory for community-wide and local government GHG emissions in Devens for the baseline year of 2015.

2020

SUSTAINABLE DEVELOPMENT GOALS

The release of DEVENS 20/20: Advancing the United Nation's Sustainable Development Goals. The report examined how Devens has contributed to these global goals and identified improvement areas to further foster sustainable development of the community.

Devens Today

Devens has made significant strides to grow our economy, sustainably develop our built environment, and leverage and protect the inherent value of our natural systems. Devens is known for its military roots, as a world-class location for businesses, a growing residential community, and a leading destination for sports and recreation. It is a local and state leader in energy efficiency and clean, renewable energy.

The U.S. Green Building Council has recognized Devens as a Leadership in Energy and Environmental Design (LEED) for Cities and Communities certified development, one of only 75 certified communities in the nation. Devens also earned a 4-STAR Sustainability Rating recognized for national excellence from STAR Communities, a third-party organization that evaluates and certifies sustainable communities. The LEED for Cities and Communities certification and the STAR Community rating are awarded for responsible, sustainable, and specific plans for green energy, water, waste, transportation, and many other factors that contribute to a cleaner environment. Critical Devens initiatives that led to the LEED and STAR certifications include:

DEVENS ECO-EFFICIENCY CENTER

encourages businesses to share and reuse excess materials

ACCESSIBLE OPEN SPACE

2,100

acres

LAND

1,400+

acres is permanently protected

DEVENS

TOTAL 2020 POPULATION: **1,776***

SQUARE MILES: **6.8**

* 2017 ACS 5-Year Data
(includes incarcerated population)

SOLAR

10%

of Devens' energy is generated by solar
(rooftop & ground mounted systems)

EMPLOYMENT

100

businesses and organizations collectively employ over **6,000 workers**

CONTRIBUTIONS

$3.8 billion

each year to Massachusetts economy

FREE SCHOOLING ACCESS

100%

for children in Devens, including kindergarten
(Hildreth Elementary & Bromfield Schools in Harvard)

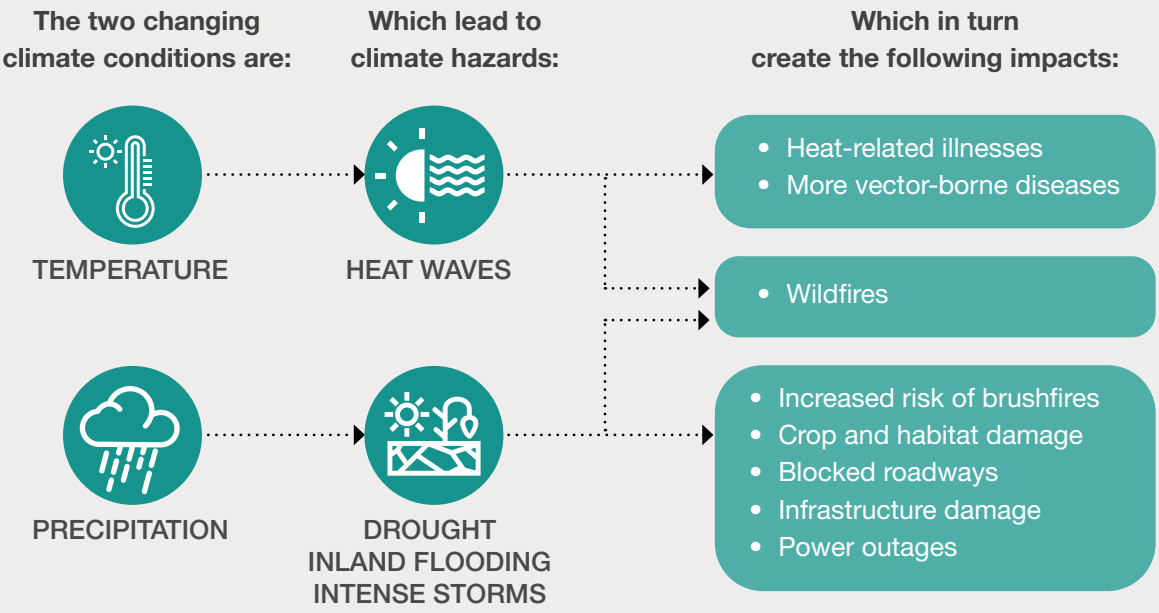
HOUSING

25%

reserved for low-moderate income and special needs populations

Climate Change in Devens

Devens—like the rest of Massachusetts—is already experiencing the effects of climate change in the form of increased precipitation and flooding, severe storm events, extreme heat, and increased risk of wildfires. In addition to taking steps to reduce its emissions, Devens must prepare to adapt to changing conditions.



Temperature

Temperatures across the state, and within the Nashua River Basin, are projected to increase significantly throughout this century. As a result, Devens may experience warmer winters and more extreme heat in the summer. These changes bring an increased risk of heat-related illnesses and vector-borne diseases, especially for vulnerable populations. Higher temperatures also stress habitats and bring an increased demand for energy for cooling in the warmer months.

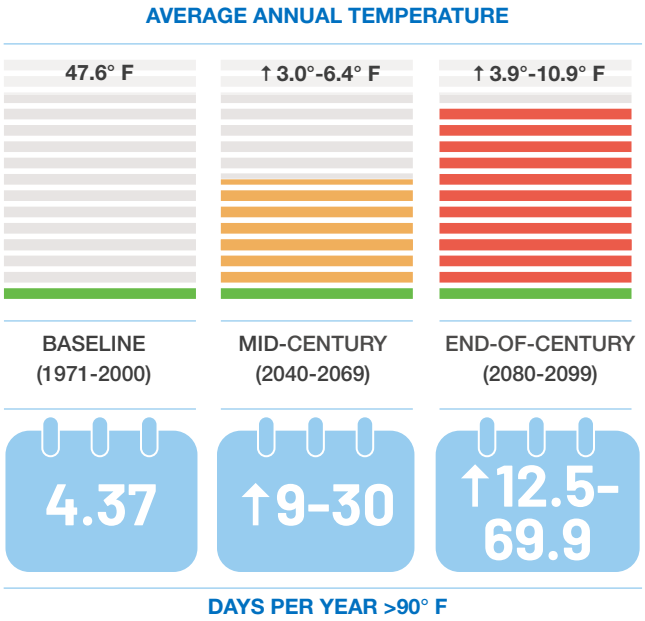
What We've Seen

INCREASE
3° F
in state average annual temperature from 1900-2014

OVER 90°
2010-2014
period with highest number of days with maximum temperature over 90°

What's to Come

Projected Temperature Changes for the Nashua Basin



Precipitation

In the Nashua River Basin, there is some uncertainty in terms of projected changes in precipitation, but we are already seeing precipitation coming in fewer, more intense events with longer dry periods in between. This shift in precipitation patterns results in increased potential for drought during the periods with no rainfall. Drought stresses the water supply, impacts habitats, and increases the risk of wildland fires (especially relevant as one-third of Devens' land area is protected open space).

Stronger storms with more precipitation can lead to infrastructure damage and power outages. Flooding caused by these severe weather events blocks roadways, stresses stormwater infrastructure, and impacts the health of water systems.

What We've Seen

AVG. ANNUAL PRECIPITATION*
51"
over last ten years

*compared to long-term average of 45" between 1895-2009

INCREASE IN EXTREME PRECIPITATION EVENTS*
30%
since 2005

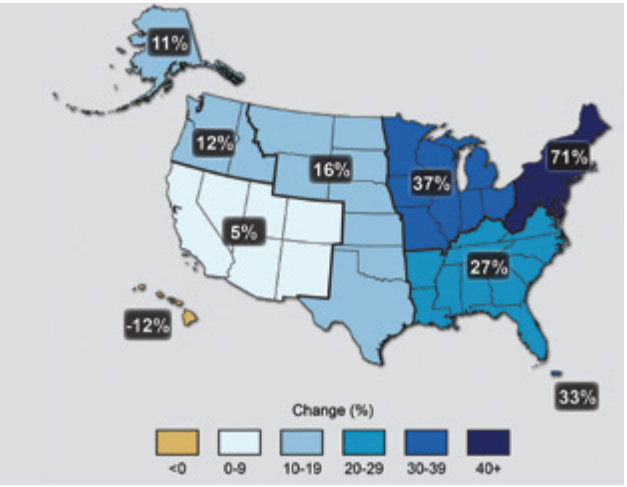
*days with rainfall above 2"

POWERFUL STORMS IN N.E.
71%
more precipitation during their lifecycles than in 1958

DROUGHT
48
weeks between June 2016-May 2017; the longest duration in MA since 2000

EXCEPTIONAL DROUGHT
52.13%
of land area in MA in October 2016

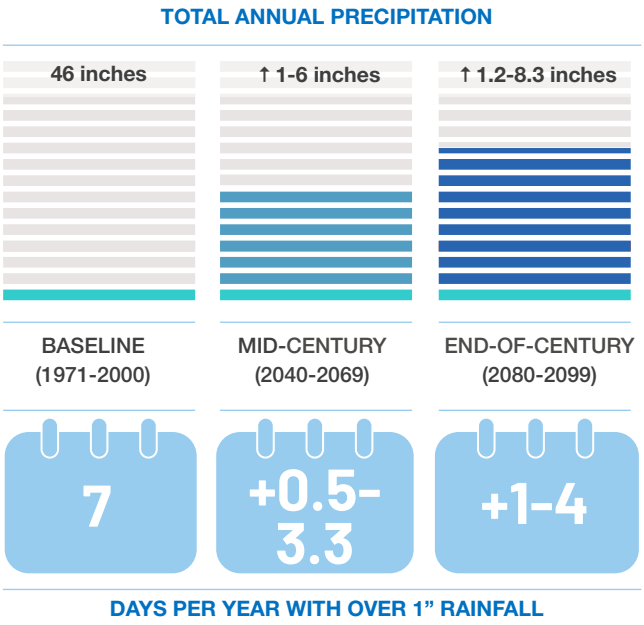
Observed Change in Very Heavy Precipitation



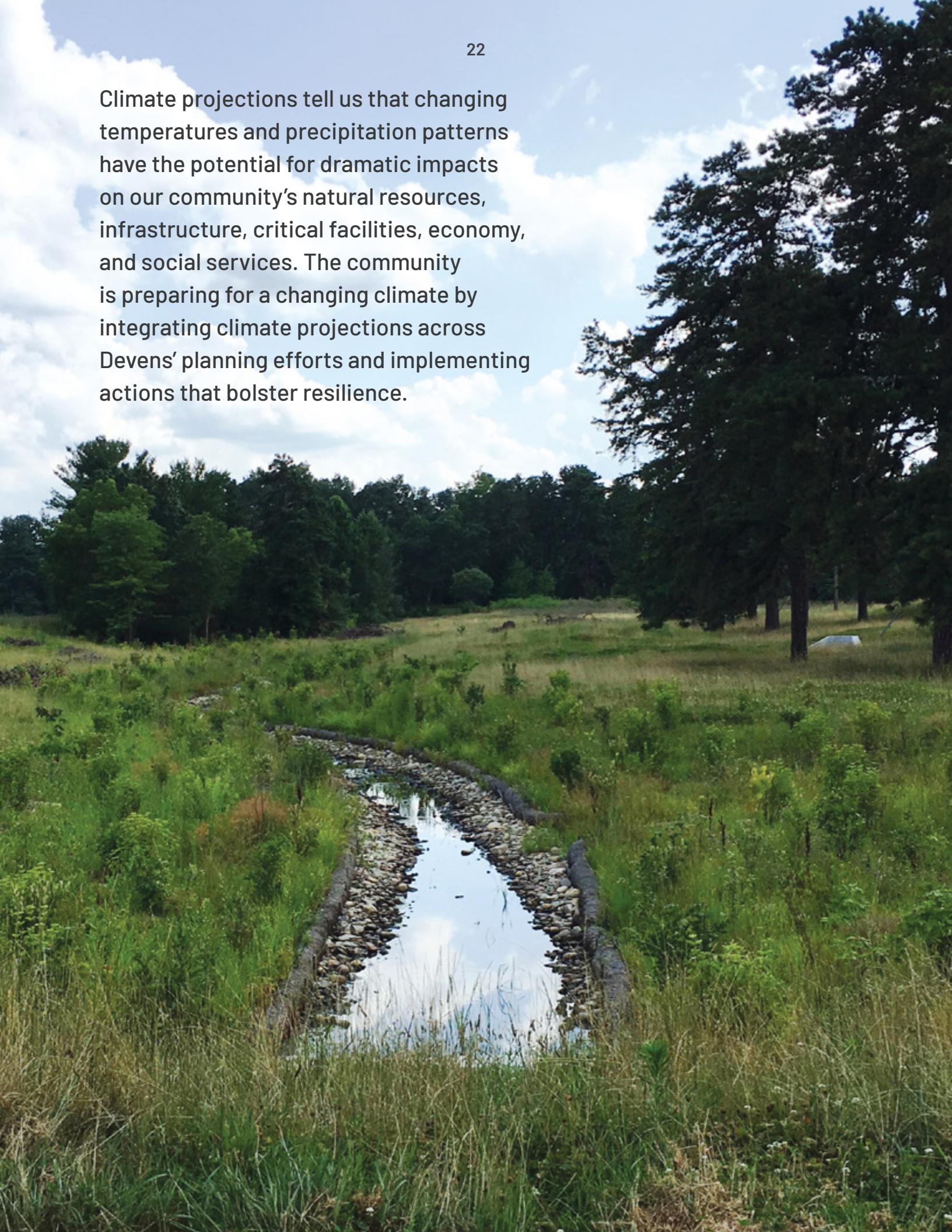
U.S. National Climate Assessment (2014). Climate Change Impacts in the United States

What's to Come

Projected Changes in Precipitation for the Nashua Basin



Climate projections tell us that changing temperatures and precipitation patterns have the potential for dramatic impacts on our community's natural resources, infrastructure, critical facilities, economy, and social services. The community is preparing for a changing climate by integrating climate projections across Devens' planning efforts and implementing actions that bolster resilience.



Robust partnerships with surrounding communities

Devens has established great relationships with the adjacent towns and communities of Ayer, Harvard, and Shirley, which has proven helpful for the sharing of information and resources such as public works equipment and emergency response services.

Maintaining such strong connections will help streamline the regional planning and recovery efforts, as well as the communications around these efforts during and after emergency weather events. The E-911 Regional Dispatch and the continued presence of the U.S. Army and Massachusetts National Guard are regional assets that play important roles in recovery and resiliency for Devens and the surrounding region.

Fortunately, the Devens community possesses many strengths and assets that already contribute to its resilience to changing climate conditions:

- Strong and redundant electrical infrastructure network
- Partnerships with adjacent communities
- Natural flood protection (Mirror Lake, Little Mirror Lake, Nashua River Corridor, Black Spruce Bog, Robins Pond, Cold Spring Brook, Grove Pond, Willow Brook, Grove Pond and associated wetland resource areas that help naturally regulate stream flows and reduce flooding impacts)
- Adequate designated shelters for extreme weather and/or emergency events
- Emergency evacuation and communication protocols

Based on vulnerabilities identified during stakeholder workshops, the highest priority actions to enhance Devens' resilience to climate change include:

- Provide the ability for more staff coverage for the Fire Department during extreme weather events
- Partner with and engage military in Emergency Operations Center (EOC) exercises
- Perform more regular maintenance of existing culverts throughout Devens and specifically along Willow Brook, Patton Road, and Barnum Road to reduce flood issues, as well as seek funding for culvert improvements throughout Devens
- Develop a resource-and-supply relocation plan for organizations that provide community resources and services
- Develop a relocation plan for the Women's Shelter, Veterans Housing and all other social services within Devens to ensure that the facilities can be accessed at all times
- Promote CodeRED (community notification system), by encouraging more local employees (and not just employers) to subscribe to the system.
- Develop multi-lingual and accessible emergency management messaging

Contributions to Climate Change – Greenhouse Gas Emissions Summary

To assess the community's contribution to climate change, a greenhouse gas (GHG) emissions inventory was performed for both the municipal operations of Devens and the community as a whole. This assessment provides a guide for identifying areas where actions have the greatest potential for reducing GHG emissions and as a benchmark for evaluating progress towards emissions reduction targets.

The GHG profile of Devens highlights the unique structure of this eco-industrial park and growing community and provides opportunities to think differently about how Devens can best impact global GHG emissions going forward.

These results should be interpreted in light of the type of community Devens is today, but also as a guide to how it will grow in the future. Many communities in the United States are predominantly consumer economies with substantial residential populations. The bulk of GHGs from the goods and services they consume occur elsewhere in producer cities. Devens today is primarily a producer and while substantial energy is used by Devens industries, the fact that they are a significant portion of Devens GHGs does not indicate that they are particularly inefficient.

Viewed in these terms, Devens is already a high performer in terms of contributing towards a low-carbon economy in the State of Massachusetts. Part of this performance is due to the actions that Devens has taken to be a model of sustainable development since its inception. Through the actions in this plan to develop cleaner energy supplies and make efficiency gains throughout, Devens becomes an even more attractive location for businesses who wish to locate in a place that helps them achieve their own goals for sustainability and greenhouse gas reduction.

The residential and service sector of Devens' footprint will continue to develop as well, and through Devens commitment to low impact and location-efficient development, these sectors are also becoming models of sustainable community development.

Devens 2015 GHGs by Sector

MUNICIPAL

LARGEST GHG EMISSION SOURCES

58% ELECTRICITY

23% NATURAL GAS

DEPARTMENT USAGE

28% WASTEWATER TREATMENT

19% PUBLIC WORKS

17% ADMINISTRATIVE

These results reflect the relatively small administrative size of Devens' municipal operations as compared to other local governments and does not indicate that Wastewater Treatment or Public Works are particularly high emitters for the functions they serve.

COMMUNITY-WIDE

GHG EMISSION SOURCES

94% BUILDINGS

5% TRANSPORTATION

<1% GHG EMISSIONS

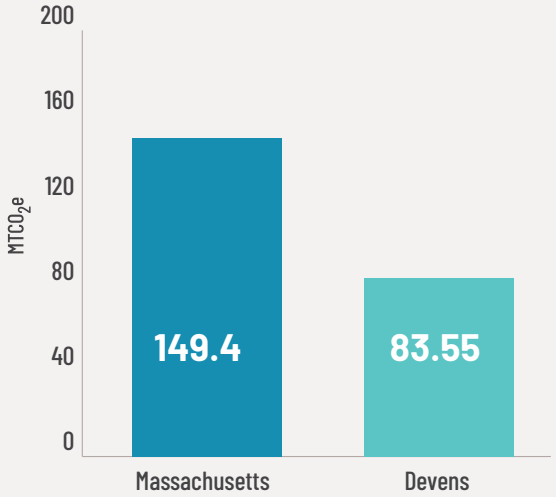
WASTEWATER TREATMENT

SOLID WASTE

WATER DELIVERY

The Economy

$MTCO_2e$ per Million Dollars Economic Output



As a producer community, Devens' GHGs can be evaluated in terms of the value of the economic activity that occurs there instead of the more typical metrics of emissions per capita. **In 2010, Devens businesses generated $1.02 billion in sales**[1]**.** Scaling that figure with Massachusetts GDP growth leads to $1.13 billion in sales in 2015. In 2015, the energy-related portion of the inventory totaled 95,015 $MTCO_2e$, meaning the carbon intensity of the local economy was 83.55 $MTCO_2e$ per million dollars. By contrast the US Energy Information Administration estimated the Massachusetts economy at 149.4 $MTCO_2e$ per million dollars[2], demonstrating that Devens is generating economic output much more efficiently than the state as a whole.

1 https://www.massdevelopment.com/assets/pdfs/news-pdfs/devens_commercial_report_062012.pdf

2 https://www.eia.gov/environment/emissions/state/analysis/pdf/table9.pdf

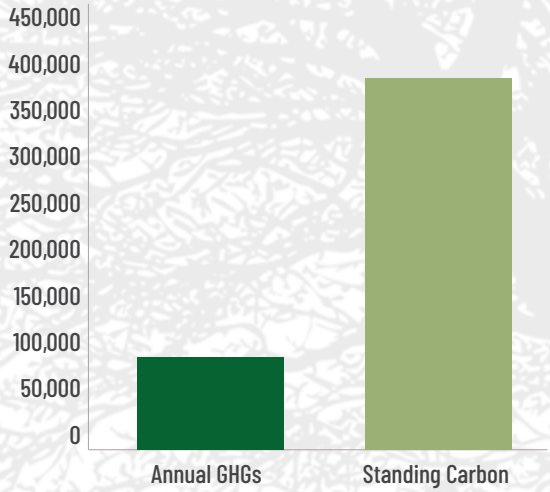
Sequestration in Devens Tree Cover

There has been increasing recognition by nations, states, and other actors that meeting our collective goals for reduction of carbon in the atmosphere must recognize and maximize the role of natural carbon sinks in stabilizing the climate. From its beginning as a community, Devens has recognized the ecosystem services provided by natural landscapes for protecting water and air quality as well as providing spaces for recreation and reflection. Understanding Devens contributions to climate change should also include those community assets that are working to reverse the trends. To accomplish this, a carbon sequestration analysis was performed for all tree cover within Devens. This analysis provides insights into the value of the lands preserved through Devens history of low-impact development and a framework for considering additional actions that can enhance natural resources and the services they provide.

As compared to the GHG emissions from the inventory, standing carbon from trees in Devens' forests, open spaces, and streets equates to approximately 4.2 years' worth of Devens annual emissions.

Devens tree cover, particularly the larger contiguous areas of it are connected to significant additional large tracts of forest land outside of the community boundary which are managed by surrounding towns, State and Federal agencies, land trusts and private landowners. Moving forward, as Devens seeks to not only protect this resource but enhance the carbon removal potential of these areas, coordination with these partners through efforts like updating a regional open space protection plan will be key.

Annual Emissions vs. Carbon in Trees



Using the MassGIS 2016 Land Use Land Cover data layer and standard carbon storage and sequestration rates for tree cover, the carbon benefit of trees in Devens was estimated. In addition to the calculation of carbon benefits, tree cover was classified by whether the trees were part of larger contiguous tree cover or whether the land is under a conservation protection of some kind.

Devens' tree cover provides ongoing carbon sequestration benefits, and perhaps even more importantly, require ongoing protection to ensure carbon stored in these trees (and their soils) does not get released.

Protection	Size Class	Area (Acres)	% Total Area	Standing Carbon ($MTCO_2e$)	Annual Sequestration ($MTCO_2e$/Year)
Preserved	Individual	0	0%	-	-
	Cluster	8	0.3%	1,402	13
	Stand	15	1%	2,602	24
	Forest	1,064	47%	190,119	1,778
Non-Preserved	Individual	34	2%	6,101	57
	Cluster	104	5%	18,515	173
	Stand	263	12%	47,103	441
	Forest	788	35%	140,794	1,317
Total		2,275	100%	406,636	3,803

Devens Acres of Tree Cover

ACRES PRESERVED

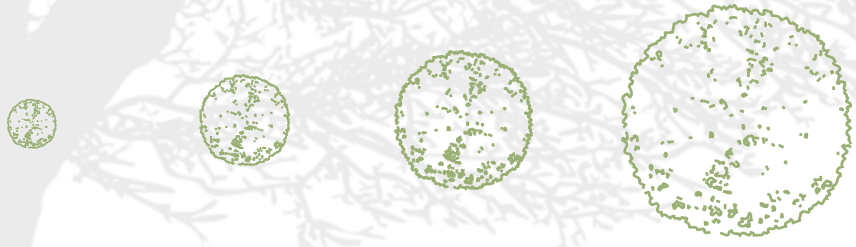
Individual **0**

Cluster **8**

Stand **15**

Forest **1,064**

ACRES NON-PRESERVED



Individual **34**

Cluster **104**

Stand **263**

Forest **788**

Cluster
Small groupings of trees within developed areas

Stand
Areas between **10,000 and 75,000 square meters** of continuous cover, but surrounded by roads and other development

Forest
Areas larger than **75,000 square meters** or that connect to larger areas of forest beyond Devens in the Oxbow NWA and other areas

Plan Development

8	1	7	2
INTERVIEWS	FOCUS GROUP	EVENTS & MEETINGS	SURVEYS

Engaging the Devens Community

Developing the plan relied on a significant level of community engagement from a diverse array of stakeholders to identify priorities and avenues for climate action in Devens. A Climate Action Stakeholder Group (CASG) was assembled to provide input on the plan goals, actions, and implementation. CASG members represented a diverse set of local organizations and businesses, including Transitions at Devens, United Native American Cultural Center, Dragonfly Wellness Center, Mt. Wachusett Community College, Parker Charter School, U.S. Army, and more. The group also brought a regional perspective with representatives from the Towns of Ayer, Harvard, Shirley, as well as regional organizations like the Nashua River Watershed Association.

Find us on

To reach a broader audience, Devens utilized social media to distribute messaging about the climate action and resilience plan, related tips and educational resources, and to invite the public to participate. To the right are a few posts from Devens Enterprise Commission's Facebook.

Engaging Devens' Veteran Population

Veterans are an important part of the Devens community. An event was hosted by Clear Path for Veterans New England to provide resources and support to disabled veterans across New England. The project team tabled at the event, providing information about the *Devens Forward* plan and encouraging attendees to fill out a survey about their climate concerns and priorities.

Students from Devens Parker Charter School indicated a desire to take active roles in addressing climate change in the Devens community.

Engaging Youth Leaders at Devens Parker Charter School

In a focus group with approximately 10 students, grades seven through 10, the team discussed day-to-day challenges brought about by climate change, how extreme weather events impact the school and its students, and how to take action. Students indicated a desire to take active roles in addressing climate change in the Devens community by emailing their principals, advocating for change, educating the community, and reducing their own consumption.

Engaging Devens' Vibrant Business Community

In an interview with the Nashoba Valley Chamber of Commerce, it was learned that recent updates to their website could be leveraged to facilitate more effective networking and connecting of businesses. One challenge identified is connecting smaller businesses to larger businesses for collaboration opportunities. Strengthened networking among the business community could lead to increased progress towards attaining Devens' sustainability and resilience goals.

Developing the Plan

The Devens Forward Climate Action and Resilience Plan promotes a holistic, balanced approach between economic development, quality of life, and environmental awareness. The Plan includes the following seven elements, each with its own goals and actions.

The Plan builds on years of sustainability and climate work, including:

- Municipal Vulnerability Preparedness Workshops
- EcoStar Environmental Branding and Achievement Program
- Devens Eco-Efficiency Center
- Greenhouse Gas Emissions Inventory
- STAR Community/LEED for Cities and Communities Certification
- Green Infrastructure Guidelines
- Complete Streets Policy
- Sustainable Redevelopment Mission

We also cast a wide net to collect potential climate actions from:

- Town and regional plans and reports
- High impact best practices from other communities
- Input from plan advisors
- Ideas and insight from the community

With a long list of potential actions, the plan advisors relied on five guiding principles to prioritize climate actions. The guiding principles represent Devens' values and climate goals. Actions that had the potential for the highest impact in these areas (see evaluation criteria on next page) became priority actions for this Climate Action and Resilience Plan.

GHG Reduction

Resilience

Equity

Economic Vitality

Regional Collaboration

Evaluation Criteria Framework

	Positive Contribution (+)	Neutral Contribution (o)
GHG Reduction 	The strategy will or is likely to minimize fossil fuel use or reduce GHG emissions.	The strategy will neither reduce nor generate new fossil fuel use or GHG emissions OR GHG emissions reduction potential is indirect, minimal, or nonquantifiable.
	The strategy addresses waste resources by keeping materials and products in use or designing waste out of the system, resulting in significant reductions in the amount of waste sent to a landfill.	The strategy does not prioritize waste reduction options OR the strategy does not involve the use of resources, materials, or products OR the product has no impact on the amount of waste sent to a landfill.
Resilience 	The strategy ensures new and existing infrastructure or development is prepared for flooding and extreme heat (with an emphasis on nature-based solutions).	The strategy neither increases or decreases the preparedness of existing or future infrastructure or development to flooding or extreme heat.
	The strategy helps to protect and/or allows for regeneration of the community's natural resources and preserves the functioning of eco-services (i.e. air filtration, carbon sequestration)	The strategy neither protects or allows for the regeneration of the community's natural resources or preserves the functioning of eco-services.
	The strategy helps to reduce vulnerability of communities either directly through reduced exposure to hazards or indirectly by mitigating chronic stresses that enhance the impact of climate hazards on community members.	The strategy does not reduce or increase vulnerability of communities based on exposure to hazards or to chronic stresses.
Equity 	The strategy helps reduce disparities in accessing community assets (i.e. parks, schools, and government programs).	The strategy does not create new disparities in accessing community assets.
	The strategy encourages diverse leadership of the project, policy, or program that is representative of the population served (e.g., race, gender, sexual orientation, etc.).	The strategy encourages some diversity in leadership of the project, policy, or program, but it is not representative of the population served.
	The strategy engages nontraditional stakeholders in decision making.	The strategy does not engage or disenfranchise nontraditional stakeholders in decision making
Economic Vitality 	The strategy supports local employment diversity (e.g., jobs suitable to a range of education levels) and/or encourages area employers to hire a diverse workforce.	The strategy neither encourages nor discourages local job diversity or the hiring of a diverse workforce.
	The strategy prepares the local workforce through job-related skills training, particularly for growing and/or targeted industries.	The strategy does not create nor strengthen local job-related skills training.
Regional Collaboration 	The strategy includes collaboration with other communities and institutions to pool efforts or resources, or take advantage of economies of scale (e.g., bulk tree purchasing, electricity aggregation, etc.).	The strategy does not include collaboration with other communities and institutions to pool efforts or resources, and does not result in redundancies or inefficiencies across similar programs.
	The strategy amplifies the effectiveness of projects, programs, and policies in neighboring communities through complementary or aligned approaches.	The strategy does not amplify or detract from the effectiveness of projects, programs, and policies in neighboring communities.
	The strategy creates opportunities for information sharing between neighboring towns that help other communities achieve similar goals.	The strategy does not enhance or disincentivize opportunities for information sharing between neighboring towns that help other communities achieve similar goals.

Negative Contribution (-)
The strategy will likely increase fossil fuel use or GHG emissions.
The strategy may increase waste generation as well as the amount of waste sent to the landfill.
The strategy increases the risk of existing or future infrastructure or development to be compromised by flooding or extreme heat.
The strategy negatively impacts the community's natural resources or the functioning of eco-services.
The strategy may increase vulnerability of communities through increasing exposure to hazards or because it increases chronic stresses experienced by communities.
The strategy creates new or enhances existing disparities in accessing community assets.
The strategy does not encourage diversity in leadership of the project, policy, or program and may reinforce non-diverse leadership.
The strategy serves to further disenfranchise non-traditional stakeholders by not involving them in decision making
The strategy reduces local job diversity and/or discourages the hiring of a diverse workforce.
The strategy reduces or eliminates resources for local job-related skills training.
The strategy results in redundancies and/or inefficiencies among communities and institutions in the region across similar projects or programs.
The strategy potentially detracts from the effectiveness of similar projects, programs, and policies in neighboring communities.
The strategy may disincentivize opportunities for information sharing between neighboring towns that help other communities achieve similar goals.

Each of the following planning element chapters provide highlights of activity to date in Devens as it relates to that element, the goals for that element, and the prioritized set of actions to achieve those goals. Also included is a table of performance indicators for tracking progress.

Devens has a good history of tracking its progress on a range of indicators that has helped the community measure and demonstrate its commitment to sustainable redevelopment of the area.

Many of those same metrics that have been part of Devens' regular tracking in the Sustainability Indicators Report will continue to do this. This plan introduces a few new metrics that should be tracked as Devens works to implement this Plan. Some metrics have explicit targets, especially where there are critical collective goals, such as the State of Massachusetts' greenhouse gas reduction targets. Others are metrics that will depend very much on how Devens matures as a community in the coming years.

Plan Elements

Climate & Energy

GOALS

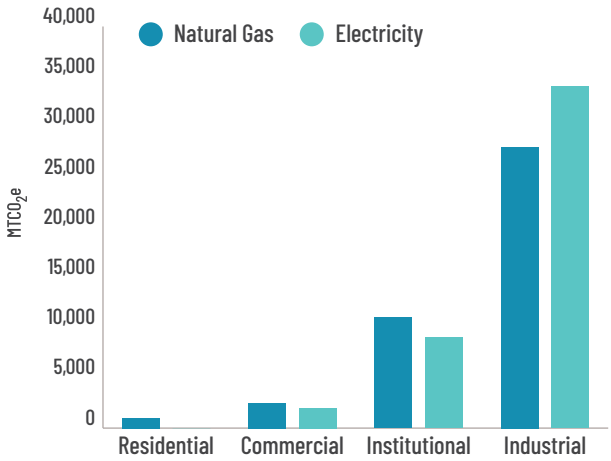
CE.1: The entire Devens community prioritizes the significant reduction of greenhouse gas emissions.

CE.2: Municipal operations lead by example through the increased utilization of renewable energy sources.

While there are climate related considerations throughout this plan, the ways in which we produce and consume energy are significant drivers of GHG emissions, which contribute to climate change. Energy-related emissions in buildings are by far the largest contributor to Devens' community carbon footprint.

Devens' unique history has allowed it to avoid significant emissions by making choices to develop its buildings and infrastructure sustainably since its beginning in 1996. The relatively low emissions intensity of the Devens economy is one way that longstanding commitment manifests today. As seen in the figure below, institutional and industrial buildings and operations offer the greatest opportunity for reduced GHG emissions from energy. Residential energy emissions are low given the small residential population, as well as Devens' emphasis on sustainable housing development.

Devens Building Energy GHGs



Net Zero Energy Buildings

According to the U.S. Department of Energy, a Net Zero Energy (NZE) building is "an energy-efficient building where, on a source energy basis, the actual annual delivered energy is less than or equal to the on-site renewable exported energy."[1]

1 https://www.energy.gov/sites/prod/files/2015/09/f26/bto_common_definition_zero_energy_buildings_093015.pdf p.4

Bristol-Myers Squibb, the biologics manufacturing facility, has a LEED Gold certified laboratory/administrative building, a LEED Silver certified cell culture manufacturing facility, a LEED Silver Biologics Development Building, and a LEED Certified Clinical Manufacturing Building, totaling over 640,000 square feet of certified green buildings on their Devens campus.

Working Towards Net Zero Energy

The Devens Enterprise Commission has been working closely with the State and other communities in the region to develop a Net Zero Energy (NZE) Stretch Code—an opportunity to require higher energy performance standards for new buildings.

Cleaning Up Our Energy Supply

Approximately 10% (12MW) of Devens' total power supply is provided from renewable sources, including more than 10 MW of local solar generation as well as purchased wind energy from Saddleback Ridge Wind Farm in Maine.

To build off of Devens' strong foundation of climate and energy leadership, and to move the community more aggressively towards its goals, the following set of actions have been prioritized for implementation. Detailed implementation blueprints have been developed for the highest priority actions, as noted below, and those blueprints can be found in Appendix A.

Action	Timeframe*	Relation to Other Elements	Implementation Blueprint
GOAL CE.1: The entire Devens community prioritizes the significant reduction of greenhouse gas emissions			
Continue to explore the installation of smart meters for new development alongside applications that support peak load management, as appropriate	LONG		
Engage Devens businesses to share and promote results of energy efficiency and sustainability projects	SHORT		
Continue working with developers to encourage sustainable development and redevelopment	ONGOING		
Encourage energy efficiency upgrades in residential and commercial buildings through incentives and education and partnerships with programs such as the Industrial Assessment Center	SHORT		
In coordination with the State, support the development and implementation of Net Zero Energy building standards for all new buildings and major redevelopment projects	MEDIUM		
Support battery storage projects within Devens, where technically feasible	MEDIUM		
Promote the use of Life Cycle Analysis/Life Cycle Cost Analysis in building and infrastructure projects	MEDIUM		
GOAL CE.2: Municipal operations lead by example through the increased utilization of renewable energy sources.			
Support Devens businesses in development of on-site solar installations for direct charge of vehicles, backup generator power, or other suitable equipment	ONGOING		
Increase the type and number of installations of renewable energy on municipal property	MEDIUM		
Utilize Net Zero Energy building standards for all new municipal buildings and redevelopment projects wherever technologically and financially feasible	LONG		
Engage with Devens business community to identify opportunities for demonstration projects that advance the transition to clean and renewable energy	MEDIUM		

* **SHORT** = less than 1 year **MEDIUM** = 1-3 years **LONG** = 4-5 years

Devens is a growing community with significant opportunity to locate new business and economic activity within its boundary in a sustainable manner. While total reductions in GHG emissions remains an important outcome, a measure in terms of carbon intensity allows for Devens to continue to grow, while capitalizing on new opportunities for efficiency and clean energy development. A performance metric in terms of economic carbon intensity gives Devens a framework to strive for the greenest development pathways possible as each new enterprise in the community will add to the denominator of the metric while the actions of the plan reduce the numerator.

Climate and Energy Indicators of Success

Metric	Baseline	Short-Term Target (2030)	Long-Term Target (2050)
$MTCO_2e$/million dollars of goods and services	83.55 (2015)	50.13	16.71
Percent of municipal energy use from renewable sources	8.50%	50%	100%
Total MW renewable energy generation capacity within Devens	12 MW	Maintain pace with energy demand (when technologically and financially feasible)	

Economic Development

GOALS

ED.1: Devens' businesses are implementing sustainable business practices and are prepared for the impacts of climate change.

ED.2: Devens has a diverse, 24-hour economy that supports emerging industries, such as the creative economy, tourism, technology, and manufacturing.

ED.3: Devens' economy is supported by trainings and workforce development opportunities to meet the needs of current and potential future industries.

Devens continues to be redeveloped as a community where new and growing businesses can thrive. It is home to nearly 100 businesses employing more than 6,000 workers. These businesses include scientific and technology firms, manufacturing, pharmaceutical, and film production, among others. Devens' economy continues to grow as businesses enjoy development incentives and expedited permitting.

As this growth continues, Devens aims to maintain and increase its attractiveness as a place to live, work, learn, and play, by supporting more diverse economic ventures and a 24-hour economy that can attract, train, and retain a resilient workforce across emerging industries. Devens seeks to promote sustainable economic growth by encouraging the adaptive reuse of buildings—the process of reusing existing buildings for purposes other than that for which they were originally built or designed. The large number of new and existing industrial and commercial buildings in Devens offers great opportunities for businesses to explore adaptive reuse.

The Devens population spikes on weekdays (with employees) and weekends (when thousands attend sports and recreational activities). There is tremendous opportunity to support more recreational and experiential retail, restaurants, and other services.

In 2019, Quiet3PF, an internet fulfillment order company, converted an industrial manufacturing and warehouse building to their corporate headquarters. This strategy lowered construction costs and took advantage of existing materials, reducing carbon emissions.

In 2007, Apex Properties acquired the former Military Intelligence building and renovated the space while preserving a piece of Devens history. The building is now home to Mount Wachusett Community College, Applewild Pre-school and Kindergarten, and a few other small businesses.

To continue developing Devens sustainably and moving it towards its development goals, the following set of actions have been prioritized for implementation. Detailed implementation blueprints have been developed for the highest priority actions, as noted below, and those blueprints can be found in Appendix A.

Action	Timeframe*	Relation to Other Elements	Implementation Blueprint
GOAL ED.1: Devens' businesses are implementing sustainable business practices and are prepared for the impacts of climate change.			
Actively encourage future development and businesses to prioritize access to public or non-motorized transportation	ONGOING		
Engage more businesses in Devens and the surrounding region with the Devens Eco-Efficiency Center (DEEC) and its educational programs and technical assistance	SHORT		
GOAL ED.2: Devens has a diverse, 24-hour economy that supports emerging industries, such as the creative economy, tourism, technology, and manufacturing.			
Develop and promote services, recreation, and amenities to attract/keep people on Devens after work and on weekends	MEDIUM		
Facilitate the sharing of building space and resources for businesses, schools, and organizations	SHORT		
Facilitate the sharing of information and services to promote a collaborative regional economy	SHORT		
GOAL ED.3: Devens' economy is supported by trainings and workforce development opportunities to meet the needs of current and potential future industries.			
Locate and site industries that contribute to and capitalize on environmental and emerging technologies (Reuse Plan)	ONGOING		
Partner with local and regional schools and colleges to incorporate climate curricula and job training opportunities	SHORT		
Partner with Devens Eco-Efficiency Center and local and regional schools to provide workforce development/retraining programs tied to business, industry, institutions, and diverse populations throughout the region	SHORT		
Collaborate with industries that can use the by-products of existing businesses in the region	LONG		

* **SHORT** = less than 1 year **MEDIUM** = 1-3 years **LONG** = 4-5 years

Economic Development Indicators of Success

Metric	Baseline	Short-Term Target (2030)	Long-Term Target (2050)
Number of businesses and employees in emerging industries in Devens	6,000	7,000	8,500
Number/Percent of Devens businesses reporting on sustainable business practices and/or adaptation actions	New Metric	50%	100%
Number of businesses participating in Devens Eco-Efficiency Center	24% (2019)	80%	100%
Number of workforce trainings held annually in Devens	New Metric	Upward Trend	

Housing

GOALS

H.1: Housing development and redevelopment in Devens minimizes negative impacts on the environment.

H.2: Devens features diverse, affordable housing options that are accessible to all, reducing commuting needs of the local and regional workforce.

As Devens continues to grow and redevelop itself into a 24-7 community, the need for diverse and affordable housing options has become greater. At the same time, housing development will need to be completed sustainably to avoid negative impacts on the environment. Sustainable housing construction and maintenance, including adaptive reuse of existing buildings, can reduce community-wide emissions, preserve green space, and allow for a safe, accessible, and thriving residential life in Devens. MassDevelopment and the Devens Enterprise Commission's (DEC) commitment to providing sustainable and affordable housing options will continue to make it an attractive community to live, work, learn, and play.

Devens is already home to a number of restored military homes, as well as affordable, veterans, and women's shelter housing units. Devens also contains a number of existing and new Net Zero Energy (NZE) and energy positive (E+) homes. Following a pilot project in 2011 to demonstrate how energy and water efficient homes can be built at no extra cost than traditional homes, a series of regulation amendments were drafted and adopted by the DEC that have led to the permitting and phased development of an additional 124 units of highly energy efficient homes in a sustainable New Urbanist style neighborhood. This development, Emerson Green, is currently under its second phase of construction, contains a mix of single-family homes, multi-unit condos, and apartments, and contributes to Devens' 25% low-income and workforce housing.

Sustainable Housing Pilot

In 2012, MassDevelopment and the DEC partnered on a sustainable housing pilot project that resulted in the construction of 20 units of single and multi-family super-energy efficient housing that ended up exceeding expectations. Designed to be Net Zero Energy homes, a number of the 20 units actually ended up producing more energy than they consume over a year and feed electricity back into the grid (E+).

Residential Development Regulations

The DEC's Innovative Residential Development Regulations require higher energy efficiency standards for residential structures, including passive house energy performance measures, in exchange for allowing higher density development that preserves more open space and furthers the State's Smart Growth/Smart Energy development goals

The DEC also offers a number of regulatory and financial incentives for projects that incorporate sustainable and green infrastructure elements that help combat future climate change impacts.

To continue to support Devens' sustainable housing goals, the following set of actions have been prioritized for implementation. Detailed implementation blueprints have been developed for the highest priority actions, as noted below, and those blueprints can be found in Appendix A.

Action	Timeframe*	Relation to Other Elements	Implementation Blueprint
GOAL H.1: Housing development and redevelopment in Devens minimizes negative impacts on the environment.			
Collaborate with developers and community stakeholders to further advance DEC's high-performance building standards with education and technical assistance	SHORT		
Continue reuse of existing housing stock, compatible new housing types, and transit-oriented development	MEDIUM		
Initiate an educational campaign on ways to improve residential energy efficiency and resilience in existing housing	SHORT		
GOAL H.2: Devens features diverse, affordable housing options that are accessible to all, reducing commuting needs of the local and regional workforce.			
Support housing developments that will provide adequate and diverse housing options for seniors, local workforce, veterans, low/mid income levels, and people with disabilities	MEDIUM		
Redevelop Vicksburg Square zoning district into a mixed use residential/retail center	LONG		
Remove or modify the housing cap	SHORT		

* **SHORT** = less than 1 year **MEDIUM** = 1-3 years **LONG** = 4-5 years

Housing Indicators of Success

Metric	Baseline	Short-Term Target (2030)	Long-Term Target (2050)
Percent of new development built to a green performance standard	100% meeting stretch code	10% Net Zero	100% Net Zero
Percent of Devens workforce who live within the community	5.00%	13%	24%
Housing units	282	Upward Trend	
Percent affordable and special needs housing	25%	Maintain 25%	

Infrastructure

GOALS

I.1: Devens is recognized as a regional hub for resource recovery, sustainable materials management, and designing waste out of systems.

I.2: New and redevelopment projects regularly incorporate green infrastructure, low impact development, and water and energy efficiency measures.

I.3: Critical utilities and infrastructure are resilient to climate hazards.

Just as Devens is committed to efficiency and resilience in its buildings, it strives for the same in its infrastructure. This includes roadways, sidewalks, water and wastewater infrastructure, as well as green infrastructure, which helps to manage stormwater and waste management systems and reduce urban heat island. The way we build and maintain our infrastructure systems impacts how we are able to adapt to changing climate conditions, such as increased precipitation and storm events. Our consumption patterns and waste management practices also impact our greenhouse gas emissions and the local, regional, and global environment and economy.

While much of Devens' infrastructure has been constructed or redeveloped for efficiency and long-term durability, the risks of climate change will continue to place pressure and risk on drainage systems, culverts, and utility infrastructure. For this reason, continued focus on upgrading and incorporating redundancy into Devens' infrastructure is essential to its long-term resilience to climate change.

Devens as a testing ground for a circular economy

Devens embraces the principles of a "circular economy" and aims to be a leader in providing resources and infrastructure to support this. The Circular Economy Lab defines it as such:

"The circular economy is an approach to maximize value and eliminate waste by improving (and in some cases transforming) how goods and services are designed, manufactured and used. It touches on everything from material selection to business strategy to the configuration of regulatory frameworks, incentives and markets."[1]

1 https://circulareconomylab.com/circular-economy-framework/#:~:text=The%20circular%20economy%20is%20an,are%20designed%2C%20manufactured%20and%20used.&text=CEL's%20Circular%20Economy%20Framework%20diagram,move%20through%20a%20circular%20economy.

An eco-industrial park is an environmentally friendly version of an industrial park, where a group of companies exchange and make use of by-products and/or energy – similar to the processes within a natural ecosystem. Through the Devens Eco-Efficiency Center, Devens operates as an Eco-Industrial Park and builds on the circular economy concepts by capitalizing on the co-location of businesses, bringing them together as a group to share and exchange resources and improve operating efficiencies. This ultimately saves time and money while at the same time achieving the goal of sustainability to share services, products and resources.

The Great Exchange: Avoiding Upstream GHGs Through Reuse

The Devens Eco-Efficiency Center helps local entities reduce the demand on natural and material resources and improve environmental and social conditions in Devens and the surrounding communities. The Great Exchange is an ongoing program hosted by the Center that facilitates partnerships and networks to reuse surplus goods, from furniture to art supplies. In 2015, the Great Exchange repurposed 7 tons of material. Four years later in 2019, that number has grown to over 25 tons! These repurposed materials found new uses in schools, the arts, and other organizations serving community needs. Not only did this help reduce the cost of new materials, but also avoided significant amounts of energy and emissions in the production of new consumer goods.

Devens is also home to the Devens Regional Household Hazardous Products Collection Center (DevensHHW). Preventing pollution by the collection and safe disposal of hazardous waste from Devens and 13 neighboring communities, DevensHHW is yet another example of regional environmental leadership. The center has seen consistent year over year growth in the quantity of materials collected as more area residents and small businesses learn about the option to dispose of chemicals and hazardous materials responsibly. Additionally, the Recycling Drop-Off Center at the Devens Public Works facility is a resource for residents and businesses to drop off a variety of recyclable items, including electronics, further diverting waste from landfills and incineration. Devens collaborates on a number of other regional infrastructure elements, including shared wastewater disposal, back-up potable water supplies, and public works equipment. These partnerships help further a regional collaboration goal of the Devens Reuse Plan and make Devens and partnering communities more resilient and better prepared to adapt to the impacts of Climate Change.

Devens has implemented numerous green infrastructure projects that provide benefits for stormwater management, groundwater recharge, improved air quality, and reduced urban heat island:

- Vegetated roadside swales and natural open drainage instead of piping and catch basins
- Micro-infiltration basins
- Porous pavement parking lots
- Reinforced turf for overflow parking and emergency access
- Pavement reduction strategies
- Reduced lawn areas and more native wildflower and grass field areas that also support wildlife, including pollinator species grasses
- Bio-filtration landscape islands
- Rainwater harvesting for irrigation and non-potable water use.

To further Devens' strength as a community with resilient, connected, and sustainable infrastructure, the following set of actions have been prioritized for implementation. Detailed implementation blueprints have been developed for the highest priority actions, as noted below, and those blueprints can be found in Appendix A.

Action	Timeframe*	Relation to Other Elements	Implementation Blueprint
GOAL I.1: Devens is recognized as a regional hub for resource recovery, sustainable materials management, and designing waste out of systems.			
Implement a community curbside composting program (and continue yard waste program)	SHORT		
Regionalize commercial waste diversion and reuse strategies	MEDIUM		
Maximize the collection and proper disposal of specialty waste items	MEDIUM		
Design and implement effective waste reduction and recycling programs in businesses and schools	SHORT		
GOAL I.2: New and redevelopment projects regularly incorporate green infrastructure, low impact development, and water and energy efficiency measures.			
Promote sustainable construction & demolition practices (i.e. Life Cycle Analysis, Zero Waste, solar ready homes, wood-based construction, green roofs, resale/salvage of building materials)	SHORT		
Increase efficiency of all water users through the promotion of water conservation measures for business and residential users	SHORT		
Continue to improve stormwater management by reducing impervious surface and incentivizing rain barrels, rain gardens, and green roofs	MEDIUM		
Encourage industries and businesses to share infrastructure to lower costs and increase efficiency	MEDIUM		

Action	Timeframe*	Relation to Other Elements	Implementation Blueprint
GOAL I.3: Critical utilities and infrastructure are resilient to climate hazards.			
Upgrade and maintain drainage infrastructure	ONGOING		
Ensure redundancy of critical infrastructure, community facilities, and utilities	ONGOING		

* **SHORT** = less than 1 year **MEDIUM** = 1-3 years **LONG** = 4-5 years

Infrastructure Indicators of Success

Metric	Baseline	Short-Term Target (2030)	Long-Term Target (2050)
Percent of Devens-based businesses committed to zero waste programs	2%	30%	100%
Quantity of household hazardous waste collected	100,696 lbs	Upward Trend	
Quantity of materials recovered by Devens' recycling facilities	183,928 tons	Upward Trend	
Quantity of material repurposed from Devens companies through the Devens Eco-Efficiency Center	25.88 tons	Upward Trend	
Percent of projects that incorporate green infrastructure components	100%	Maintain and share innovations	
Percent of businesses and residents composting	New Metric	Establish reporting through sustainable business and resident engagement	
Percent of stormwater managed on-site at properties on Devens	New Metric	Review onsite storage within 5-year cycle, document storm design criteria against capacity	
Percent of infrastructure assets reviewed for climate hazards, deemed safe, or improvements made	New Metric	Demonstrate all inspections made within 5-year cycle and document storm design criteria	

Natural Resources

GOALS

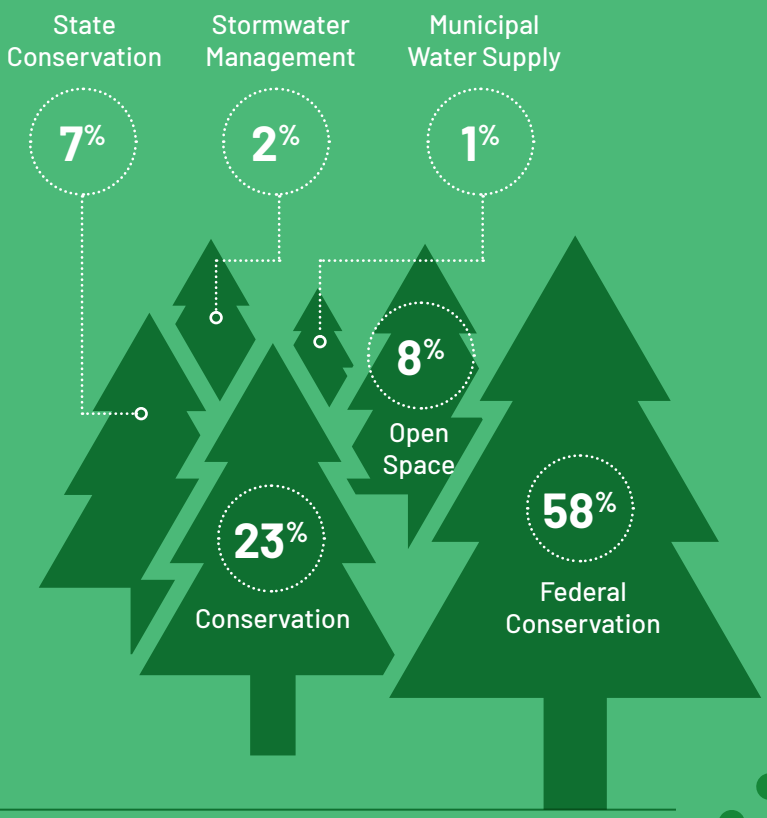
NR.1: Devens' open spaces are healthy, resilient places that are accessible to all residents and visitors.

NR.2: Air, water, and soil quality meet or exceed state and federal standards.

NR.3: Devens manages protected open space to protect ecosystem services and maximize carbon sequestration.

One of Devens' greatest assets as a community is its abundance of natural resources. Devens contains significant areas of varied, unfragmented, and connected undeveloped land. These areas extend beyond the boundaries of Devens and are part of regionally important wildlife habitats such as the Oxbow National Wildlife Refuge and numerous land trust holdings. Devens' commitment to sustainable development and adaptive reuse of this former military base has minimized encroachment into these areas and maintained them as attractive regional and community assets with access to trail networks, boating, hunting, fishing, and other outdoor recreation in nearly every direction.

Protected conservation land has been a key strategy for Devens to maintain and manage open space within its boundaries and the community relies on a range of actors to collectively steward these resources for future generations. While some of Devens' lands are protected for recreation, others are protected for the natural ecosystem services they provide for wildlife habitat and to protect our water quality and air quality.



Acres of Tree Conservation by Use

PROTECTED LAND

1,400+

acres that support wildlife habitat and numerous rare, endangered, and threatened plant and animal species

HIKING AND NATURE TRAILS

13

miles

OPEN SPACE

100%

of residents live within .5 mile of open space

OPEN SPACE/ RECREATIONAL LAND

2,100

acres

FOREST

1,500

acres

STREAMS

8

miles

OPEN WATER

100

acres

For the continued protection and enhancement of Devens' natural resources, the following set of actions have been prioritized for implementation. Detailed implementation blueprints have been developed for the highest priority actions, as noted below, and those blueprints can be found in Appendix A.

Action	Timeframe*	Relation to Other Elements	Implementation Blueprint
GOAL NR.1: Devens' open spaces are healthy, resilient places that are accessible to all residents and visitors.			
Continue implementing multi-use trail network plan	ONGOING		
Boost awareness about recreational options, trails, open space through events	SHORT		
Proactively educate residents and developers on sustainable landscaping best practices that minimize water and chemical use and maximizes native species	SHORT		
Adopt a community-wide policy to use low-input landscaping, with a focus on pollinator plantings	SHORT		
GOAL NR.2: Air, water, and soil quality meet or exceed state and federal standards.			
Continue to assure that the Army's agreement with EPA to clean up Superfund contamination is successfully completed to allow for future development of once contaminated lands	LONG		
Continue implementing Devens Water Resources Protection Plan	ONGOING		
Continue to implement NPDES MS4 Permit requirements to improve water quality	ONGOING		
GOAL NR.3: Devens manages protected open space to protect ecosystem services and maximize carbon sequestration.			
Develop a Resource Management Plan as part of Devens Open Space and Recreation Plan that emphasizes best management practices for natural systems and environmental issues within Open Space Zones	MEDIUM		
Update the Open Space and Recreation Plan with prioritized short list of actions, including completing the permanent protection of identified open space parcels	SHORT		
Coordinate land management with neighboring towns, land managing agencies, and organizations to maintain the health of the tree canopy and protect the functioning of its ecosystem-services	MEDIUM		

* **SHORT** = less than 1 year **MEDIUM** = 1-3 years **LONG** = 4-5 years

Natural Resources Indicators of Success

Metric	Baseline	Short-Term Target (2030)	Long-Term Target (2050)
Percent of public parks and other amenities with ADA compliance	New Metric	Upward Trend	
Watershed water quality index	Average Score: 75.35	Maintain Average Score <88	
Percent of available public tree spaces planted	New Metric	80%	100%
Acreage of wetlands	115 (2008)	Demonstrate no net loss	
Acreage of tree canopy cover	2,275 (2016)	Demonstrate no net loss	
Number of contaminated site cleanups	54 sites completed or in progress	Completion of cleanup at sites in progress and newly identified sites	

Public Health and Safety

GOALS

PHS.1: Residents, businesses, and municipal operations are prepared to recover quickly from climate impacts.

PHS.2: Residents and employees working in Devens have access to fresh, affordable, and healthy food.

PHS.3: Residents and employees have safe access to open space and opportunities to actively participate in recreational activities that contribute to a healthy, active lifestyle.

Supporting public health and safety is core to mission of the Devens Enterprise Commission and its continued development of the Devens Community. Through its 2013 Healthy Communities Proclamation, Devens resolved to encourage increased physical activity, injury prevention, and improved nutrition through local efforts. This commitment is built into the way Devens approaches community development and the actions in this plan work to further that mission. Devens has carried out this commitment by utilizing a Health Impact Assessment to improve and compare new regulations against conventional regulations and to better understand how policies and regulations can influence community health and sustainable development.

Devens also understands that the protection of the health and safety of its residents and employees of local businesses is essential to the community's resilience to climate change and the risks that climate change presents, including extreme storms and increasing extreme heat events. This includes an understanding of the importance of access to fresh and healthy food and supporting local farms and the local agricultural economy.

Partnered with walkBoston, an interactive map was created for visitors to learn more about the historic and cultural walking trail passing through the heart of Devens.

AMENITIES

100%

of residents live within 1 mile of a community amenity/venue

HIKING TRAILS

13

miles of hiking trails that link to a larger regional trail system

HOMELESS SHELTER

13-unit

USGBC LEED Gold certified shelter for homeless women and their children

Devens Recreation Department

The Recreation department organizes the annual Devens Fishing Derby at Mirror Lake, bird walks, game nights, activity sessions, and more, while also hosting various sports tournaments, adventure races, and fundraisers. The department also works with local businesses to engage them in active living - with activities such as free yoga on Rogers Field - an activity made possible by a partnership between the Dragonfly Wellness Center and Devens Recreation.

Little Leaf Farms

Little Leaf Farms is a local business that is already helping us meet our healthy, local food goals. Using one of the most technically advanced greenhouses in the world, the Devens-based farm provides fresh baby lettuce to New England consumers. In 2018, Little Leaf Farms doubled in size from 2.5 acres to 5 acres, and are set to have 10 acres of fresh lettuce under glass in 2020. Their greenhouse also supports food security by providing ideal year-round growing conditions, making it less susceptible to changing climate conditions.

In continued support of the safety, health, and wellness of the Devens community, the following set of actions have been prioritized for implementation. Detailed implementation blueprints have been developed for the highest priority actions, as noted below, and those blueprints can be found in Appendix A.

Action	Timeframe*	Relation to Other Elements	Implementation Blueprint
GOAL PHS.1: Residents, businesses, and municipal operations are prepared to recover quickly from climate impacts.			
Update DEC pest and vector-borne disease management plan	SHORT		
Improve access to mental and physical health and wellness services	MEDIUM		
Pilot a microgrid, district energy, or self-contained power system in an area of greatest need	MEDIUM		
Launch a coordinated preparedness campaign that encourages residents and businesses to take actions that improve their ability to protect themselves and our community in advance of a crisis	SHORT		
Expand the reach and accessibility of emergency preparedness communications	SHORT		
Invest in resilient energy systems at critical facilities	MEDIUM		
Build out the community's "cooling capacity" through parks, recreational sites, and designated cooling centers	MEDIUM		
GOAL PHS.2: Residents and employees working in Devens have access to fresh, affordable, and healthy food.			
Support the production and consumption of healthy, local food	SHORT		
Partner with local public and private health and wellness services to promote access for residents and employees (ex: Dragonfly Wellness Center, Nashoba Associated Boards of Health)	SHORT		
GOAL PHS.3: Residents and employees have safe access to open space and opportunities to actively participate in recreational activities that contribute to a healthy, active lifestyle.			
Develop and promote an array of programs that encourage active lifestyles for a diverse population	SHORT		
Develop an ADA transition plan for those sites lacking access and incorporate ADA compliance measures as part of future planning proposals	SHORT		
Expand sidewalk, trail, and bike lanes to provide safe alternative modes of transportation and access to recreational resources	SHORT		

* **SHORT** = less than 1 year **MEDIUM** = 1-3 years **LONG** = 4-5 years

Natural Disaster Response Team

A result of the Montachusett Region's Natural Hazard Mitigation Plan, a quick-acting natural disaster response team is in place for any natural disasters that occur in the area. This helps to lessen damage by being reactive to time sensitive situations. The team is sent out through the fire department and the emergency management director and is made up of Devens staff and volunteers.

DEVENS FIRE DEPARTMENT
specialty training and disaster response (in coordination with surrounding towns and military)

Public Health and Safety Indicators of Success

Metric	Baseline	Short-Term Target (2030)	Long-Term Target (2050)
Number of residents and businesses with emergency plans and or kits	New Metric	100%	
% of residents and employees signed up for emergency communications	New Metric	100%	
Number of vendors, sales at farmers markets	New Metric	Upward Trend	
Percent of Devens food service businesses sourcing from regional farms	New Metric	50%	100%
Number of farmers market days	1 (2019)	10 (bi-weekly 5 mo/year)	20 (weekly 5 mo/year)
Number of local recreational sports teams/other fitness programs available at low/no cost	New Metric	Upward Trend	
Number of beach closures	0 (2019)	Maintain	
Number of residents and businesses within ¼ mile of active or passive recreation	100%	Maintain	

Transportation and Land Use

GOALS

TLU.1: Devens provides multimodal, universally accessible, safe, and, efficient community and regional links between housing, schools, recreation facilities, conservation areas, shops, workplaces, parking areas, and public transportation stops.

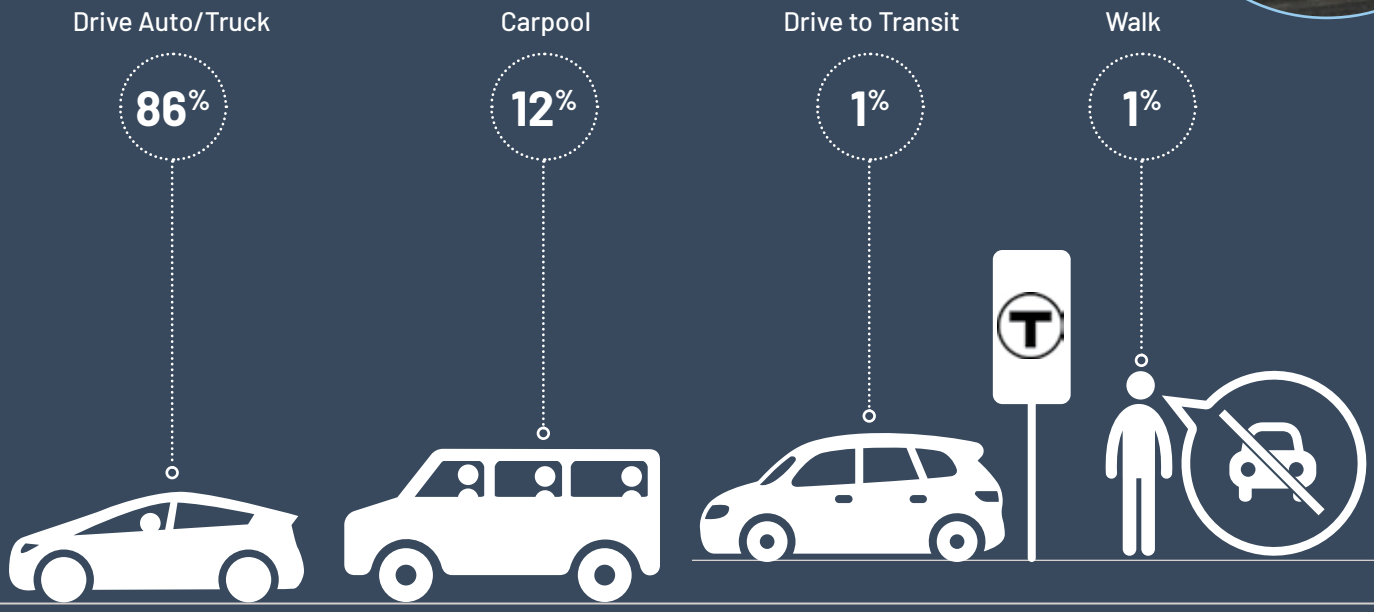
TLU.2: Devens designs for and promotes the proliferation of transportation choices that reduce GHG emissions.

TLU.3: As a regional logistics hub, Devens is a leader in electrified freight transportation.

The link between transportation demand and land use is well established, and poorly planned communities can find themselves in an endless cycle of simultaneously attempting to ease traffic congestion while stimulating more of it by increasing accommodations for more cars on the road. This is a risk that Devens aims to avoid as it continues to grow its economy and attract more residents, workers, and visitors.

As a former military base, Devens' redevelopment has maximized the reuse of previously developed land which helps reduce sprawling development patterns and inefficient use of land and resources. The Devens Reuse Plan lays out a land use pattern that respects and protects critical components of the natural environment. Devens will continue to promote infill and brownfield development while preserving open space and natural lands for their ecosystem services and for future generations – one of the key principles of sustainable development. As Devens continues to grow and the impacts of climate change become more prevalent, this land use strategy becomes even more important for climate mitigation and adaptation in the Devens region.

Devens Resident and Business Employee Mode Share



Complete Streets Policy

Complete Streets principles contribute toward the safety, health, economic viability, and quality of life in a community by providing accessible and efficient connections between home, school, work, recreation, and cultural destinations by improving the pedestrian and vehicular environments throughout communities. Through this Complete Streets Policy, Devens will advance its efforts to provide safety and accessibility for all users of our roadways, trails, and transit systems, including pedestrians, bicyclists, transit riders, motorists, commercial vehicles, and emergency vehicles, and for people of all ages and of all abilities.

In an effort to encourage the electrification of the trucking industry, Massachusetts is one of 15 states that recently signed on to a joint memorandum of understanding (MOU) to eliminate the sales of new diesel trucks by 2050. The MOU targets 30% zero-emissions vehicles by 2030. By promoting and investing in electric freight and buses, and the charging and fueling infrastructure needed to serve these vehicles, Devens will help support green job creation, improved air quality in an environmental justice community (Ayer) and contribute to a cleaner and more resilient economy.

TARGET:

30%

ZERO-EMISSIONS VEHICLES BY 2030

Devens' commuting demand is one aspect that can be managed by better connecting services and building location-efficient housing for its growing commercial and industrial base, as well as improving infrastructure for transit and alternative-fueled vehicles, especially electric vehicle charging infrastructure.

One of the goals of the 1994 Devens Reuse Plan is reconnecting Devens transportation networks to the surrounding towns. For trips within Devens, an increasing network of sidewalks and bike lanes support options to use more active and healthy modes of transportation. Ensuring these connections link up with surrounding towns and are woven into new development with forethought for universal accessibility, bikes, and other micro-mobility options, members of the Devens community will require less extensive use of streets and single-occupancy vehicles to accommodate their travel needs. There are also two commuter rail stations (Shirley and Ayer) nearby to serve Devens-related trips along the MBTA Fitchburg line and make commuting options to and from Devens more feasible for residents, businesses and their employees, students, and visitors.

Devens is also home to several logistics companies, and with access to rail, has the infrastructure for more multi-modal freight operations. Over the past decade, Devens has increased rail access to businesses in Devens by working with Pan Am and private businesses to permit and construct 5 new additional rail spurs in Devens. Its proximity to major highways and rail lines creates great opportunities in a world that needs additional freight solutions. As companies and their customers seek greener supply chains, Devens' actions to support cleaner transportation and freight options, while developing more locally generated clean energy, position the community to lean into a quickly evolving logistics and freight landscape where electrified, and in some cases automated, companies will take pole position.

The links between Devens' housing, health and safety, and economic development goals and the demands placed on transportation are clear. In order to support this growing community, Devens must emphasize sustainable, safe, multimodal transportation options and plan land uses to accommodate them. The following set of actions have been prioritized for implementation. Detailed implementation blueprints have been developed for the highest priority actions, as noted below, and those blueprints can be found in Appendix A.

Action	Timeframe*	Relation to Other Elements	Implementation Blueprint
GOAL TLU.1: Devens provides multimodal, universally accessible, safe, and, efficient community and regional links between housing, schools, recreation facilities, conservation areas, shops, workplaces, parking areas, and public transportation stops.			
Continue work on a forward-looking regional plan for bike/ pedestrian transportation that creates an interconnected system with neighboring towns	MEDIUM		
Continue implementing the Complete Streets priority actions	ONGOING		
Encourage reuse of previously developed sites that are transit-oriented and mixed-use	SHORT		
Provide clear, efficient links between housing, schools, recreation facilities, conservation areas, shops, workplaces, parking areas, and public transportation stops	MEDIUM		
Explore regional Transfer of Development Rights (TDR)	LONG		
GOAL TLU.2: Devens designs for and promotes the proliferation of transportation choices that reduce GHG emissions.			
Expand low-carbon transportation options for the workforce that commutes to Devens	SHORT		
Encourage multimodal transportation through outreach and installation of necessary infrastructure	SHORT		
Encourage local businesses to adopt commuter incentives for employees, to promote alternative modes of commuting such as walking, biking, and transit	SHORT		
Enforce anti-idling laws	SHORT		
Expand infrastructure and promote policies that encourage the use of electric vehicles (EV)	MEDIUM		
Require all new commercial construction to meet electric vehicle (EV) readiness requirements	SHORT		

Action	Timeframe*	Relation to Other Elements	Implementation Blueprint
GOAL TLU.3: As a regional logistics hub, Devens is a leader in electrified freight transportation.			
Engage with Devens logistics companies to identify opportunities for the development of electric or hydrogen fueled freight truck fueling and support infrastructure	LONG		
Electrify the municipal fleet as electric vehicle options are available for fleet needs	MEDIUM		
Utilize an electric community shuttle	SHORT		
Work with intermodal facility (PanAm) to electrify freight rail and all supporting freight infrastructure	LONG		

* **SHORT** = less than 1 year **MEDIUM** = 1-3 years **LONG** = 4-5 years

Transportation and Land Use Indicators of Success

Metric	Baseline	Short-Term Target (2030)	Long-Term Target (2050)
Greenhouse gas emissions from transportation	4,100 $MTCO_2e$	2,460 $MTCO_2e$ (40% Reduction)	820 $MTCO_2e$ (80% Reduction)
Number of Devens workforce commuting via shared public or private transit	1% drive to transit (baseline 2015)	5%	20%
Number of electric vehicle charging stations	8 (2019)	20	40
Miles of dedicated bike lanes	2.4 miles (2017)	4	8
Length of sidewalks	12.4 miles (2017)	15	30
Miles of recreational trails	13 miles (2017)	15.5	20
Percentage of roads with sidewalks	57% (12 baseline)	60	75
Number of rail spurs (or # of businesses served by rail)	6 rail spurs (2010) 11 rail spurs (2018)	Upward Trend	
Number of transportation demand management (TDM) strategies implemented (public and private)	New Metric	Upward Trend	

Be Part of the Solution

You are essential to moving Devens Forward! Devens' sustainable future depends on our ability to work together to identify and prioritize opportunities to strengthen our community and to be prepared for the impacts of a changing climate. Whether you live, work, learn, or play in Devens, commit to being part of the solution.

Climate & Energy

- Turn off lights and electronics when not in use – or even better, unplug them. Some electronics continue to use power, even when turned off.
- Switch your lightbulbs to more energy efficient LED lights.
- Turn your heat down and A/C up by two degrees, especially if you are not home or away on a trip.
- Install a smart thermostat.
- Upgrade to Energy Star appliances.

Economic Development

- Consult Devens' Climate Action Toolkit for Businesses.
- Shop at small, locally owned businesses.
- Support businesses that have transparent and sustainable practices.
- Mentor a young person to support them in their studies and careers.
- Visit the Eco-Efficiency Center's Great Exchange to pick up supplies for your business.
- Attend a tour of the Eco-Efficiency Center's facilities to learn about new technologies and best practices.

Housing

- Reduce your water heater temperature to 130° F to save energy and money on heating water.
- Seal air leaks and properly insulate windows to save up to 20% on heating and cooling bills, while also increasing the comfort of your home.
- Trade your shower heads and faucets for low-flow, water-efficient options.

Infrastructure

- Bring your own reusable produce and tote bags when grocery shopping to avoid using single-use plastics.
- Purchase reusable goods like water bottles, cutlery, to-go containers, and straws to avoid using single-use plastics.
- Make sure to wash and wipe dry your recyclable goods to lower contamination in recycling streams.
- Minimize your food waste by first eating what you already have in your fridge. Meal planning and making grocery lists can also reduce your food waste.
- Start composting.
- Properly dispose of hazardous waste at the Devens Regional Household Hazardous Products Collection Center.

Natural Resources

- Construct and plant a rain garden with native plants to absorb storm water.
- Avoid using fertilizers and pesticides to prevent harmful runoff from ending up in our waterways after storms.
- Ditch your grass lawn and plant native pollinators that support our wildlife and don't require mowing.
- Learn how to identify and eliminate invasive species on your property.
- Eat more plants, which have proven to be less carbon and resource intensive than eating animal products.
- Do not dump anything in the storm drains - these drains lead to our waterways.
- Pick up litter.

Public Health & Safety

- Shop at the Devens Farmers Market for fresh, healthy food.
- Put together an emergency preparedness kit for your household by visiting Ready.Gov.
- Check in on the people in your life, especially the elderly and those experiencing mental health conditions.
- Stay active: pick up a sport, get into jogging or biking, or attend exercise classes.
- Sign up for CodeRED to get key emergency notifications.

Transportation & Land Use

- Opt to walk, bike, or take the Devens Shuttle, if possible. Otherwise carpool!
- Drive an electric, hybrid or low-emission vehicle.
- Turn off your car if you are idling for more than 30 seconds.
- Keep your personal vehicle well-tuned and tires inflated properly, saving up to 20% in gasoline use.

Devens Forward Climate Action Toolkit for Businesses

In order to support businesses and ensure a resilient local economy, a toolkit was developed alongside the Devens Forward Climate Action and Resilience Plan. This toolkit contains a set of recommendations, sample projects, and resources that business owners can use to help us achieve our sustainability goals and keep Devens a safe, thriving community for years to come.

Check out the ***Devens Forward*** **Online Community Engagement Dashboard** to track our progress:

http://devensforward.com

Appendices

A. Implementation Blueprints

B. References

C. GHG Inventory Summary

D. Survey Summaries

A Implementation Blueprints

Engage Businesses

Action: Engage Devens businesses to share and promote results of energy efficiency and sustainability projects.

DESCRIPTION OF ACTION	Develop best practice guidance and utilize local business leader forums to expand the adoption of sustainability and energy saving practices in the private sector. Businesses will learn from each other and potentially identify opportunities to leverage shared resources for enhanced sustainability performance.
CHAMPION	Devens Eco-Efficiency Center

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe[1]	Key Partners
Review existing energy efficiency practices and sustainability projects from local businesses and engage local business leaders to identify replicable best practices	Short	• Devens Enterprise Commission • Businesses • Developers
Convene a regional educational forum of local business leaders for a best practice exchange and highlight replicable projects	Medium	• Devens Enterprise Commission • Mount Wachusett Community College • Nashoba Valley Chamber of Commerce
Build off existing program and continue partnership between Devens Eco-Efficiency Center and Industrial Assessment Center to provide energy audits and other technical assistance	Medium	• Devens Enterprise Commission • Industrial Assessment Center, UMass Amherst Center for Energy Efficiency and Renewable Energy
Follow up with participating businesses to create new case studies and to hone best regional practices	Long	• Devens Enterprise Commission

1 Short = less than 1 year; Medium = 1-3 years; Long = 4-5years

FUNDING RESOURCES

- Devens Enterprise Commission
- Performance contracting – energy service companies
- Property Assessed Clean Energy (PACE) financing

TECHNICAL RESOURCES

- Devens Utilities Department
- GRESB – ESG Performance of Real Assets
- ICP – Investor Confidence Project

LINKS TO OTHER PLANS & ACTIONS

How does this action connect to other Devens goals?

- Connects to Economic Development sustainable business goals
- Relevant STAR Objectives: Green Market Development
- Relevant LEED Credits: Green Building Policy and Incentives, Energy Efficiency

EQUITY CONSIDERATIONS

How can the community incorporate equity into the implementation of this action?

- Outreach to minority and women-owned businesses will ensure that multiple voices are being heard at educational forum events
- Develop and/or highlight case studies that demonstrate a Triple Bottom Line approach to business operations that consider social, environmental, and economic costs and benefits in decision-making

MEASURING SUCCESS

How can we measure the progress and success of this action?

Outputs

- Development of case studies
- Ongoing meeting and participation of local businesses in education forums

Outcomes

- Reduction in local economy carbon intensity in $MTCO_2e$/million dollars goods and services

ENGAGING THE COMMUNITY

How can we engage the populations that benefit from implementing this action?

- The Devens Eco-Efficiency Center is already a great resource for engaging the business community in Devens around sustainability practices. This action should emphasize expanding awareness of the resources offered through the Center to more business in Devens and surrounding communities.

Clean Tech Transition to Renewable Energy

Action: Engage with Devens' business community to identify opportunities for demonstration projects that advance the transition to clean renewable energy.

DESCRIPTION OF ACTION	Identify local businesses that have installed onsite renewable energy and partner with them to host demonstration visits by other business leaders to share best practices.
CHAMPION	Devens Eco-Efficiency Center

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe[1]	Key Partners
Identify existing businesses with installed renewable energy (solar, wind, biofuels, etc.)	Short	• Devens Enterprise Commission
Host Round Table Forums through DEEC to inform business leaders on best practices in the region	Medium	• Devens Enterprise Commission • Businesses • MassDevelopment
Provide access to information on local DEC funding for reduced fee schedule, and federal grants available for renewable energy projects	Short	• Devens Enterprise Commission • MassDOER
Evaluate new projects as potential demonstration sites	Long	• MassDevelopment • Universities • Industry • U.S. Army

1 Short = less than 1 year; Medium = 1-3 years; Long = 4-5years

FUNDING RESOURCES

- Database of State Incentives for Renewables & Efficiency
- MA Executive Office of Energy and Environmental Affairs

TECHNICAL RESOURCES

- UMass Amherst Clean Energy Extension
- EcoStar Action Guide
- MassCEC
- Green Infrastructure Guidelines
- National Renewable Energy Laboratory
- Built Environment +

LINKS TO OTHER PLANS & ACTIONS

How does this action connect to other Devens goals?

- Connects to CE.1 goal on energy efficiency upgrades. Renewable energy can be part of larger sustainability retrofits
- Can be linked with I.2 and TLU.2 where excess capacity from solar projects can be shared with adjacent businesses or funneled into EV infrastructure
- Relevant STAR Objectives: Green Market Development
- Relevant LEED Credits: Integrative Planning and Leadership, Renewable Energy, Low Carbon Economy

EQUITY CONSIDERATIONS

How can the community incorporate equity into the implementation of this action?

- Highlight diverse projects and implementation sizes across numerous business types.
- Focus workshops on renewable energy projects that are scalable to many types of operations.

MEASURING SUCCESS

How can we measure the progress and success of this action?

Outputs

- Round Table Forums
- Site visits
- Ongoing coordination with DEEC

Outcomes

- Increase in MW of renewable energy installed
- Reductions in $MTCO_2e$ per square foot in businesses
- Decrease in $MTCO_2e$ per million dollars goods and services

ENGAGING THE COMMUNITY

How can we engage the populations that benefit from implementing this action?

- Highlight examples of cost savings from renewable energy
- Publishing case studies
- Include discussions on the benefits to local businesses from LEED and STAR Community recognition

Encourage Efficiency Upgrades

Action: Encourage energy efficiency upgrades in residential and commercial buildings through incentives and education and partnerships with programs such as the Industrial Assessment Center.

DESCRIPTION OF ACTION	Develop resources and provide outreach to community members to promote energy saving renovations and upgrades. Host local business forums to illustrate best practices in efficiency upgrades.
CHAMPION	Devens Eco-Efficiency Center

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe[1]	Key Partners
Compile existing residential and commercial incentives available and create fact sheets including DEC incentives, reduced fee schedules, expedited permitting, and green building certification	Short	• Devens Enterprise Commission • MassCEC • Devens Utilities • Residents • Businesses • Energy services professionals
Create a website with benefits of assorted upgrades and with instructions for homeowners and business leaders to access local DEC funding and state/federal funding	Short	• Devens Enterprise Commission • Devens Utilities • Energy New England • Media Power Inc.
Invite representative of the UMass-Amherst Industrial Assessment Center (IAC) to address common opportunities to improve the energy efficiency in small and medium sized manufacturing facilities at a Roundtable hosted by Devens Eco-Efficiency Center. Encourage businesses to take advantage of the IAC's comprehensive and free energy audit	Medium	• Devens Enterprise Commission • Businesses • Developers • UMass-Amherst Industrial Assessment Center
Find demonstration sites for efficient practices and distribute follow up questionnaires to business and community leaders to ascertain level of implementation and cost	Long	• Devens Enterprise Commission • Devens Utilities Division • New England Forestry Foundation • Mass Energy Insight • MassCEC • Nashoba Valley Chamber of Commerce • U.S. Army

1 Short = less than 1 year; Medium = 1-3 years; Long = 4-5years

FUNDING RESOURCES

- Database of State Incentives for Renewables & Efficiency
- Property Assessed Clean Energy (PACE) financing
- USDA
- Federal and State tax rebates
- Energy service companies

TECHNICAL RESOURCES

- UMass-Amherst Industrial Assessment Center
- UMass Clean Energy Extension program
- MassCEC
- Built Environment + (former USGBC MA Chapter)
- International Living Future Institute
- International Society of Industrial Ecology
- Green Roofs for Healthy Cities
- ENERGY STAR
- EnergySage
- MA Office of Technical Assistance
- MA NZE Building Advisory Council
- MA Heat Smart Alliance
- Northeast Energy Efficiency Partnerships
- Passive House Institute
- New Buildings Institute
- Institute for Market Transformation
- EDGE – Energy and Water Savings
- GRESB – ESG Performance of Real Assets
- ICP – Investor Confidence Project

LINKS TO OTHER PLANS & ACTIONS

How does this action connect to other Devens goals?

- Works in concert with ED.1 goal of implementing sustainable business practices
- Supports I.2 goal of incorporating energy efficiency measures in commercial redevelopment
- Relevant STAR Objectives: Energy Efficiency, Water Efficiency, Community Water Systems
- Relevant LEED Credits: Green Building Policy and Incentives, Energy Efficiency

EQUITY CONSIDERATIONS

How can the community incorporate equity into the implementation of this action?

- Provide additional resources to minority groups, low-income residents, and small/disadvantaged businesses
- Educate building owners and occupants about energy efficient buildings and how they are more affordable to operate, can be more comfortable, have better indoor air quality, generate less GHG's and are more resilient
- New opportunities for job/skills training and workforce development

MEASURING SUCCESS

How can we measure the progress and success of this action?

Outputs

- Web portal for residents and businesses
- Well attended business forums and residential outreach events
- Number of audits conducted by IAC and recommended actions subsequently taken
- Tracking of building permits to measure number of efficiency projects for both residential and commercial sectors

Outcomes

- Reduction in $MTCO_2e$ per square foot of residential and commercial space
- Reduction in $MTCO_2e$/million dollars of goods and services
- Reduction in per household energy use and $MTCO_2e$ from baseline GHG inventory

ENGAGING THE COMMUNITY

How can we engage the populations that benefit from implementing this action?

- Promote free services, such as the IAC audits, and emphasize related savings they typically provide
- Provide homeowners with information on renovation investments
- Engage surrounding communities for a regional Community Development Block Grant (CDBG) affordable housing project
- Include staff from Devens Enterprise Commission at outreach events to give residents and businesses clear guidance on local regulations, guidelines and incentives for reduced fee schedules, expedited permitting and green building certification
- Provide recognition to exemplary residential and commercial projects at forums
- Publicize resources and partner with local organizations like the Devens Eco-Efficiency Center and Nashoba Valley Chamber of Commerce to reach a broader audience

24-hour Community

Action: Develop and promote services, recreation, and amenities to attract/keep people on Devens beyond the workday.

DESCRIPTION OF ACTION	Expand the available services, recreation options, and other amenities to encourage Devens-based employees to stay beyond the workday and others to seek out Devens as a place to visit and spend time.
CHAMPION	MassDevelopment

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe[1]	Key Partners
Conduct outreach to residents and employees about what amenities they would like to see in Devens through an online survey and a public brainstorming workshop	Short	• Nashoba Valley Chamber of Commerce • Devens Enterprise Commission • Residents • Businesses
Encourage the expansion of local food and beverage attractions (e.g. opening of a brewery or additional restaurants, continuation and expansion of the farmers market)	Long	• Dick's Market Garden • Existing restaurants and services • Little Leaf Farms • Nashoba Valley Chamber of Commerce • Devens Recreation • Surrounding towns Farms and Markets
Encourage public transportation for the late/swing shift while increasing multimodal and connected transportation system options	Medium	• Neighboring communities • Montachusett Regional Transportation Authority • MBTA • Private Shuttle Services • Devens Engineering and Public Works • Regional Transportation groups like Littleton Landline Group
Publicize trails, open space, wellness programs, and recreation options	Short	• Devens Enterprise Commission • Devens Open Space and Recreation Advisory Committee • Montachusett Regional Planning Agency • Nashua River Watershed Association • MassAudubon • US Fish and Wildlife Service • MA Fish and Wildlife • Dragonfly Wellness Center • Recreation/sports clubs • MassDevelopment • MRPC Trails Committee

1 * Short = less than 1 year; Medium = 1-3 years; Long = 4-5years

FUNDING RESOURCES

- MassDOT's Workforce Transportation Program
- MA Complete Streets Program
- MassWorks

TECHNICAL RESOURCES

- Montachusett Regional Planning Commission's T Committee
- MRPC Trails Committee

LINKS TO OTHER PLANS & ACTIONS

How does this action connect to other Devens goals?

- Expanding diversity of the local economy
- Creating a thriving 24-hour community
- Relevant STAR Objectives: Arts & Culture, Community Cohesion
- Relevant LEED Credits: Compact, Mixed Use and Transit Oriented Development

EQUITY CONSIDERATIONS

How can the community incorporate equity into the implementation of this action?

- Ensure affordable late shift transportation options
- Expand offerings of free community events
- Accept SNAP and HIP benefits at farmers market

MEASURING SUCCESS

How can we measure the progress and success of this action?

Outputs

- Resident and employee surveys
- Print and online brochures highlighting local service and recreational options

Outcomes

- # of local establishments providing recreational/entertainment services
- # of local and regional events hosted in Devens

ENGAGING THE COMMUNITY

How can we engage the populations that benefit from implementing this action?

- Publicize community events at businesses to attract the workforce
- Provide shuttle information to residents and employees
- Increase the marketing and promotion of services and attractions in Devens
- In the wake of COVID-19, advertise the great potential for safe, socially distant activities in Devens

Business Access to Public Transportation

Action: Actively encourage future development and businesses to prioritize access to public or non-motorized transportation.

DESCRIPTION OF ACTION	Collaborate with businesses and residents to improve access to public or non-motorized transportation in order to encourage low-carbon commuting options for residents, employees, and visitors.
CHAMPION	Devens Enterprise Commission

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe[1]	Key Partners
Partner with Devens businesses to assess existing level of service and survey employees on public and multimodal transportation needs (i.e. frequency and location of MART shuttle stops, access to bike infrastructure, availability of sidewalks)	Short	• Montachusett Regional Transit Authority • Nashoba Valley Chamber of Commerce
Using the Complete Streets Policy and list of priority actions, develop a set of guidelines to encourage multimodal transportation consistent with Devens' final Environmental Impact Report that can be incorporated into businesses' operations and built environment (e.g. installing bike racks, improving sidewalks, increasing wayfinding, etc.)	Medium	• MassDevelopment • MassDOT • Surrounding Towns • Montachusett Regional Planning Commission
Host a workshop for Devens businesses to share resources and best practices on how to implement the guidelines	Short	• Nashoba Valley Chamber of Commerce • Devens Eco-Efficiency Center • Montachusett Regional Planning Commission
Develop a forward-looking plan for the incorporation of new businesses into a connected network of bike and pedestrian paths and shuttle routes	Medium	• Montachusett Regional Transit Authority • MassDOT • Montachusett Regional Planning Commission • Surrounding Towns • Private Shuttle Services • Ride share services • MassRides • Micro-mobility companies
Work with surrounding towns to improve regional connectivity and accessibility through local regulations	Long	• Ayer, Harvard, Shirley • Littleton Landline Group • Acton TAG • Montachusett Regional Planning Commission • Montachusett Regional Transit Authority (MART) • Minuteman Advisory Group on Interlocal Coordination (MAGIC) • MBTA

1 Short = less than 1 year; Medium = 1-3 years; Long = 4-5years

FUNDING RESOURCES

- MassDOT Massachusetts Complete Streets Funding Program
- Community Transit Grant
- Public-Private Partnerships
- EPA Smart Ways

TECHNICAL RESOURCES

- MassDOT
- Healthy Transportation Policy Directive
- Devens Open Space and Recreation Plan
- Devens Main Post Trails Plan
- Devens Complete Streets Policy
- Smart Growth America National Complete Streets Coalition
- Minuteman Advisory Group on Interlocal Coordination (MAGIC)
- Montachusett Regional Planning Commission
- Devens Transportation Management Initiative and TDM strategies from the final Environmental Impact Report
- Transportation and Climate Initiative
- EPA Smart Ways
- Safe Routes to Schools Program

LINKS TO OTHER PLANS & ACTIONS

How does this action connect to other Devens goals?

- Alignment with Complete Streets Policy
- Alignment with Healthy Communities Proclamation
- Transportation & Land Use goals
- Relevant STAR Objectives: Transportation Choices, Greenhouse Gas Mitigation, Active Living
- Relevant LEED Credits: Access to Quality Transit, Alternative Fuel Vehicles, Smart Mobility & Transportation

EQUITY CONSIDERATIONS

How can the community incorporate equity into the implementation of this action?

- Consider the transportation needs of the elderly and those with disabilities
- Consider the affordability of proposed solutions both for employees and small businesses

MEASURING SUCCESS

How can we measure the progress and success of this action?

Outputs

- Multimodal transportation guidelines for businesses

Outcomes

- Miles of multi-use paths
- Miles of bike lanes
- # of daily passengers on shuttle
- Reduction of % of employees driving to work alone
- Greenhouse gas reduction from transportation sector

ENGAGING THE COMMUNITY

How can we engage the populations that benefit from implementing this action?

- Survey employees on their needs
- Provide communication materials and strategies to businesses to share with employees
- Partner with Nashoba Valley Chamber of Commerce and Devens Eco-Efficiency Center to reach businesses
- Partner with schools and military

Collaborative Regional Economy

Action: Facilitate the sharing of information and services to promote a collaborative regional economy.

DESCRIPTION OF ACTION	Build off the existing efforts to facilitate the sharing of information and services to promote a collaborative regional economy.
CHAMPION	Devens Enterprise Commission

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe[1]	Key Partners
Encourage the expansion of engagement and membership at the Devens Eco-Efficiency Center to businesses both within Devens and in the surrounding towns	Ongoing	• Devens Eco-Efficiency Center • Neighboring communities • Businesses
Leverage the local and regional business organizations to assess and summarize what information and services are most needed to create a more collaborative regional economy	Short	• North Central Massachusetts Development Corporation • Devens Eco-Efficiency Center • Nashoba Valley Chamber of Commerce • MassDevelopment
Based on the expressed needs, expand networking and collaboration opportunities and regional service offerings that could be made more efficient at scale (e.g. emergency preparedness trainings, emergency response teams, recycling/composting programs, carpool services)	Medium	• North Central Massachusetts Development Corporation • MassDevelopment • Devens Eco-Efficiency Center • Nashoba Valley Chamber of Commerce • Nashoba Associated Boards of Health

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FUNDING RESOURCES

- Regional Economic Development Organization Grant
- Community Foundation of North Central MA

TECHNICAL RESOURCES

- MAPC Shared Services Manual
- Massachusetts Clean Energy Center

LINKS TO OTHER PLANS & ACTIONS

How does this action connect to other Devens goals?

- Supports vision of being an innovative eco-industrial park
- Supports sustainable redevelopment
- Promotes sustainability and efficiency by taking advantage of economies of scale
- Relevant STAR Objectives: Targeted Industry Development
- Relevant LEED Credits: Integrative Planning and Leadership, Low Carbon Economy

EQUITY CONSIDERATIONS

How can the community incorporate equity into the implementation of this action?

- Ensure low barriers of entry to business organization membership and attendance at events
- Assess need for translation services at events/ meetings

MEASURING SUCCESS

How can we measure the progress and success of this action?

Outputs

- Summary of regional collaboration opportunities and needs

Outcomes

- # of attendees at networking and business development events
- More efficient and collaborative regional business operations
- Reduced cost of services for business operations

ENGAGING THE COMMUNITY

How can we engage the populations that benefit from implementing this action?

- Reach existing businesses through the Chamber of Commerce, Devens Eco-Efficiency Center, and North Central MA Development Corporation
- Solicit feedback from businesses from a range of methods: online survey/poll, in-person/ virtual events, etc.

Workforce Development Retraining

Action: Partner with Devens Eco-Efficiency Center and local and regional schools to provide workforce development/retraining programs tied to business, industry, institutions, and diverse populations throughout the region.

DESCRIPTION OF ACTION	Expand workforce development and retraining programs that will enhance businesses, industries, and institutions that contribute to environmental and other emerging fields and support the diverse populations throughout the region. This effort should provide workforce training and job creation while also supporting industries that contribute to efficiency, sustainability, and a circular economy.
CHAMPION	Devens Enterprise Commission

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe[1]	Key Partners
Conduct interviews and focus groups with local and regional business organizations and educational institutions to identify workforce development and training opportunities and needs	Short	• Local and regional businesses • Devens Eco-Efficiency Center • Nashoba Valley Chamber of Commerce • Mount Wachusett Community College • Shriver Job Corps
Identify emerging opportunities for businesses and industries that contribute to and capitalize on environmental and emerging technologies and that can collaborate to share resources and use the by-products of existing businesses in the region	Medium	• Devens Enterprise Commission • Nashoba Valley Chamber of Commerce • Devens Eco-Efficiency Center • Devens and surrounding region businesses • Sustainable Business Network of MA • MA Office of Green Business Development
Identify regional experts and best practice examples for the identified opportunities to guide workforce development and retraining programs	Medium	• Built Environment Plus • Devens Eco-Efficiency Center • North Central Massachusetts Development Corporation • Sustainable Business Network of MA • MA Office of Green Business Development • Nashoba Valley Chamber of Commerce
Partner with Devens Eco-Efficiency Center and regional schools to host workforce development and retraining programs	Medium	• Mount Wachusett Community College • Shriver Job Corps • Built Environment Plus • Local and regional schools • Sevens Hills Foundation/Aspire • Clear Path for Veterans

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WORKFORCE DEVELOPMENT RETRAINING (CONT.)

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe	Key Partners
Advertise workforce development programs to a diverse group of existing and potential future employees	Long	• Nashoba Valley Chamber of Commerce • Massachusetts Executive Office of Labor and Workforce Development • Sustainable Business Network of MA • MA Office of Green Business Development

FUNDING RESOURCES

- Workforce Training Fund
- Urban Agenda Program
- Regional Economic Development Organization

TECHNICAL RESOURCES

- Workforce Regional Labor Market Blueprints
- Built Environment Plus Green Building Training Program
- Massachusetts' Green Business Development Resources
- Sustainable Business Network of Massachusetts

LINKS TO OTHER PLANS & ACTIONS

How does this action connect to other Devens goals?

- Reuse Plan goal to locate and site industries that contribute to and capitalize on environmental and emerging technology
- Sustainable Redevelopment Goal of Reuse Plan and Devens Eco-Industrial Park strategy
- Devens Bylaws Zoning District Development Goals (Environmental Business, Special Use, Innovation and Technology)
- Relevant STAR Objectives: Business Retention & Development, Quality Jobs & Living Wages, Workforce Readiness
- Relevant LEED Credits: Integrative Planning and Leadership

EQUITY CONSIDERATIONS

How can the community incorporate equity into the implementation of this action?

- Consider ways to include a diverse group of job training participants (income, race, gender, age, etc.)
- Engage disadvantaged business enterprises (DBEs), minority, veteran, and woman-owned businesses
- Engage groups that work with minority or at-risk populations, such as Clear Path, Seven Hills/Aspire, Transitions Women's Shelter, United Native American Cultural Center, and Shriver Job Corps
- Provide financial assistance options for accessing training programs
- Assess the need for translation services at training programs

MEASURING SUCCESS

How can we measure the progress and success of this action?

Outputs

- Workforce development programming
- Established partnerships with providers

Outcomes

- # of new businesses in environmental and emerging sectors
- # of job training and workforce development programs
- # of material, information, and/or service exchanges and collaborations
- # of participants at job training and workforce development programs

ENGAGING THE COMMUNITY

How can we engage the populations that benefit from implementing this action?

- Utilize existing workforce development channels through Shriver Job Corps, Mt. Wachusett Community College, Devens Eco-Efficiency Center, including opportunities for businesses to train staff on new skills (ex: Workforce Training Fund's Small Business Direct Access Program)
- Advertise opportunities through local businesses
- Work with the Nashoba Valley Chamber of Commerce
- Establish mentorship programs that target young people before they enter the workforce

HOUSING

Existing Housing Stock

Action: Continue reuse of existing housing stock, compatible new housing types, and transit-oriented development.

DESCRIPTION OF ACTION	Build off existing DEC regulations to encourage smart, connected, and compact development in Devens. Maximize the reuse of existing property and housing stock for meeting Devens' growing housing needs.
CHAMPION	Devens Enterprise Commission

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe[1]	Key Partners
Assess overlay of transit services with existing housing stock and new housing stock and identify gaps and opportunities for increased connectedness of services	Short	• Montachusett Regional Transit Authority
Promote and expand incentive programs for reuse or redevelopment of existing housing stock	Medium	• MassDevelopment • Developers
Develop incentive program for developers to build transit-oriented development communities	Medium	• MassDevelopment • Developers • Surrounding Towns • MRPC
Design and develop additional compatible new housing types to meet remaining needs	Medium	• MassDevelopment • Developers • Real Estate Bar Association of Massachusetts • Metro West Collaborative • LISC Boston • Passive House MA

1 * Short = less than 1 year; Medium = 1-3 years; Long = 4-5years

FUNDING RESOURCES

- US EPA Smart Growth Funding
- National Association of Realtors

TECHNICAL RESOURCES

- Devens Regional Shuttle Maps
- Built Environment +
- LEED for Homes
- Living Building Challenge
- Northeast Energy Efficiency Partnerships
- Green Communities (MA NZE Stretch Code)
- Sidewalk Labs
- EPA Energy Star
- EPA Water Sense
- Passive House MA
- MA Smart Growth Alliance
- MA Smart Growth Smart Energy Toolkit
- Existing Net Zero Energy homes at Devens

LINKS TO OTHER PLANS & ACTIONS

How does this action connect to other Devens goals?

- Alignment with elements of Complete Streets Program
- Alignment with Transportation and Land Use as well as Economic Development goals
- Relevant STAR Objectives: Waste Minimizations, Infill & Redevelopment, Transportation Choices
- Relevant LEED Credits: Compact, Mixed Use and Transit Oriented Development, High Priority Site, Responsible Sourcing for Infrastructure, Material Recovery, Housing and Transportation Affordability

EQUITY CONSIDERATIONS

How can the community incorporate equity into the implementation of this action?

- Ensure existing housing stock and new housing developments are affordable and accessible to a diversity of residents
- Ensure transit paths are accessible and equitably distributed across Devens' residents' needs

MEASURING SUCCESS

How can we measure the progress and success of this action?

Outputs

- Inventory of housing stock
- Inventory of transit services
- Incentive program to encourage the use of existing housing stock
- Incentive program to attract developers who use sustainable development techniques

Outcomes

- A more connected and compact Devens
- Reduction in material consumption associated with brand new construction

ENGAGING THE COMMUNITY

How can we engage the populations that benefit from implementing this action?

- Promote variety of housing options and benefits of living in transit-oriented development to attract more Devens residents and businesses
- Educate developers on incentives and benefits of reuse and transit-oriented development

Mixed-Use Housing

Action: Support housing developments that will provide adequate and diverse housing options for seniors, local workforce, veterans, low/mid income levels, and people with disabilities.

DESCRIPTION OF ACTION	Utilize a variety of mixed-use development to encourage housing developments that will support a wide range of Devens residents' needs. Adaptive reuse (maximizing reuse of embodied energy), brownfield redevelopment, and reduced carbon footprint of building materials should all be prioritized in housing development wherever feasible.
CHAMPION	Devens Enterprise Commission

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe[1]	Key Partners
Evaluate the existing Reuse Plan cap on housing units that can be built	Short	• MassDevelopment • Surrounding towns • Legislature/local Reps and Senator
Collaborate with surrounding communities to identify any co-benefits and regional development needs	Medium	• MassDevelopment • State representatives and senators • Neighboring towns
Inventory requirements and collected feedback from public outreach and assess development and/or reuse options and preliminary estimates for design, costs, and timeline for pilot program	Medium	• Devens Enterprise Commission • Developers • LISC Boston • Metro West Collaborative (DEC affordable Housing Consultant)
Pilot mixed use development program at Vicksburg Square focusing on adaptive reuse (maximizing reuse of embodied energy), brownfield redevelopment, and reduced carbon footprint of building materials, where feasible	Long	• MassDevelopment • Devens Enterprise Commission • Massachusetts Historical Commission • Town of Harvard • Town of Ayer • Passive House MA • Built environment +

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MIXED-USE HOUSING (CONT.)

FUNDING RESOURCES

- Brownfields Redevelopment Fund
- Historic Preservation Fund
- Save America's Treasures Grant Program
- Massachusetts Housing and Urban Development, Rental Help
- Massachusetts Department of Housing and Community Development
- Private developers

TECHNICAL RESOURCES

- Devens Innovative Residential Development Regulations
- CoUrbanize website for Vicksburg Square
- Sidewalk Labs
- Built Environment +
- City of Boston Boston E+Program (BPDA)
- MA Department of Housing and Community Development
- Passive House MA

LINKS TO OTHER PLANS & ACTIONS

How does this action connect to other Devens goals?

- Aligns with goal to encourage reuse of existing stock and promote new housing types
- Supports economic development goals by bringing in more residents
- May contribute to Devens' Net Zero Energy and E+ building goals
- Relevant STAR Objectives: Housing Affordability, Community Health, Aging in the Community, Environmental Justice
- Relevant LEED Credits: Housing and Transportation Affordability

EQUITY CONSIDERATIONS

How can the community incorporate equity into the implementation of this action?

- Current regulation mandates 25% of residential developments to be affordable housing – meet or exceed this capacity
- Ensure housing accommodates those with disabilities or special needs
- Ensure development is accessible by a variety of transit options
- Rezoning should also provide options for non-age restricted rental options or multi-family units not currently available or widespread in Devens

MEASURING SUCCESS

How can we measure the progress and success of this action?

Outputs

- Inventory of resident housing needs
- Increased residential housing stock
- Vicksburg Square redevelopment
- Preservation and reuse of a historic Devens property

Outcomes

- Increased # of Devens residents
- Increased # of housing units
- Increased # of affordable housing units

ENGAGING THE COMMUNITY

How can we engage the populations that benefit from implementing this action?

- Public outreach to target populations
- Engagement with surrounding communities in advance of Super Town Meeting
- Showcase benefits of piloting green development
- Engage historic preservationists for Vicksburg Square
- CoUrbanize site for Vicksburg Square redevelopment is live and provides information to the public

Redundancy of Critical Infrastructure

Action: Ensure redundancy of critical infrastructure, community facilities, and utilities.

DESCRIPTION OF ACTION	Increase community resilience by ensuring redundancy of critical infrastructure, community facilities, and utilities so as to reduce disruptions during normal operations and during disaster operations.
CHAMPION	Devens Enterprise Commission

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe[1]	Key Partners
Explore the formation of an infrastructure resilience planning committee charged with assessing gaps and opportunities in Devens critical infrastructure, community facilities, and utilities	Short	• Devens Utilities • Residents and businesses • Community organizations • Utility providers • Devens Fire/Public Safety • Surrounding communities • Devens Public Works • U.S. Army • Federal Bureau of Prisons
Conduct an assessment of current infrastructure conditions and resident and business uses and needs for critical infrastructure, community facilities, and utilities	Medium	• Infrastructure resilience planning committee • Residents and businesses • Community organization
Develop an evaluation framework to use for project selection to maximize infrastructure reliability and/or redundancy	Short	• Infrastructure resilience planning committee • Northeast Energy Efficiency Partnership
Prioritize projects and programs based on evaluation framework, urgency, funding, and other factors	Medium	• Infrastructure resilience planning committee
Pursue grants and external funding for project implementation	Medium	• Infrastructure resilience planning committee
Implement infrastructure projects	Medium to Long	• Devens Utilities • Devens Public Works • Devens Fire/Public Safety

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FUNDING RESOURCES

- Massachusetts Municipal Vulnerability Preparedness Action Grant
- MassWorks Infrastructure Grants
- DOER Community Clean Energy Resiliency Initiative
- MassCEC

TECHNICAL RESOURCES

- ICP – Investor Confidence Project
- Performance Excellence in Electricity Renewal (PEER)
- US DOE Energy Storage

LINKS TO OTHER PLANS & ACTIONS

How does this action connect to other Devens goals?

- Enhances Public Health & Safety goals, particularly PHS.1
- Relevant STAR Objectives: Climate Adaptation
- Relevant LEED Credits: Resilience Planning, Integrated Water Management, Stormwater Management, Power Access, Reliability and Resiliency

EQUITY CONSIDERATIONS

How can the community incorporate equity into the implementation of this action?

- Ensure the needs of vulnerable populations are considered in project selection
- Divert any cost savings to low-income residents

MEASURING SUCCESS

How can we measure the progress and success of this action?

Outputs

- Infrastructure committee
- Infrastructure assessment results
- Prioritized list of projects

Outcomes

- Redundancy of critical infrastructure, community facilities, utilities
- Increased community resilience

ENGAGING THE COMMUNITY

How can we engage the populations that benefit from implementing this action?

- Collaborate with a diverse range of residents and businesses in Devens and the immediate surrounding communities, especially those that may live in flood-prone or other disaster-prone areas

Sustainable Materials

Action: Promote sustainable construction & demolition practices (i.e. Life Cycle Analysis, Zero Waste, solar ready homes, wood-based construction, green roofs, resale/salvage of building materials).

DESCRIPTION OF ACTION	Provide pathways for materials reuse and promote sustainable construction and demolition practices.
CHAMPION	Devens Enterprise Commission

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe[1]	Key Partners
Research best practices and case studies for sustainable construction & demolition practices	Short	• Developers • MA Construction Industry • MassDevelopment • Devens Recycling • MassDEP • US EPA Waste Wise • Center for Eco Technology • Universities • Surrounding communities • International Living Future Institute • Built Environment + • USGBC • WELL Building Certification • Green Roofs for Healthy Cities • Sidewalk Labs (cross laminated timber sustainable construction) • Associated Builders and Contractors of MA (ABC MA)
Identify practices most feasible for Devens' new developments and demolition projects	Short	• MassDevelopment • Devens Recycling • MassDEP • US EPA Waste Wise
Conduct outreach to assess community support and participation for identified practices	Short	• DEEC members • MassDevelopment • Residents and local businesses
Explore funding opportunities to expand The Great Exchange to include construction materials	Medium	• Devens Eco-Efficiency Center

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IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe	Key Partners
Work with developers and key partners (listed under #1) to design a Devens' guidebook for sustainable construction & demolition practices.	Medium	• MassDevelopment
Provide incentives, such as bidding priority for projects that incorporate Devens' sustainable construction & demolition practices guidelines.	Medium	• MassDevelopment

FUNDING RESOURCES

- MassDEP's Sustainable Materials Recovery Program Municipal Grant

TECHNICAL RESOURCES

- EPA guide to Sustainable Management of Construction and Demolition Materials
- EPA guide to Best Practices for Reducing, Reusing, and Recycling Construction and Demolition Materials
- LEED for Existing Buildings and New Construction Rating system
- Living Building Challenge Rating system
- LEED Operations and Maintenance Rating system

LINKS TO OTHER PLANS & ACTIONS

How does this action connect to other Devens goals?

- Supports Devens' sustainable development and eco-industrial goals
- Enhances resource management from other Infrastructure goals
- Relevant STAR Objectives: Infill & Redevelopment, Waste Minimization, Green Infrastructure
- Relevant LEED Credits: Integrated Water Management, Energy Efficiency, Responsible Sourcing for Infrastructure, Material Recovery

EQUITY CONSIDERATIONS

How can the community incorporate equity into the implementation of this action?

- Ensure guidelines are attainable and achievable for a variety of projects and developers
- Keep costs affordable and support donations and connections with other reuse programs like Habitat for Humanity

MEASURING SUCCESS

How can we measure the progress and success of this action?

Outputs

- Sustainable materials & demolition practices guidebook
- Community materials swap location
- Incentives program for developers

Outcomes

- Reduction in materials used for construction
- Cost savings

ENGAGING THE COMMUNITY

How can we engage the populations that benefit from implementing this action?

- Offer recovered materials from demolition for residents and local businesses to use
- Share best practices with other businesses/ developers, including details on costs and savings, material availability, and more

Hazardous Waste

Action: Maximize the collection and proper disposal of specialty waste items.

DESCRIPTION OF ACTION	Prevent environmental contamination by increasing responsible disposal, recycling, reuse, and replacement of specialty waste items (i.e. hazardous waste, electronics, textiles, appliances with high global warming potential refrigerants) with the long-term goal of eliminating these products from the waste stream entirely.
CHAMPION	Devens Enterprise Commission

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe[1]	Key Partners
Conduct waste audits to benchmark and understand what specialty waste items and hazardous materials are currently being collected at Devens HHW and Devens Public Works	Medium	• Devens Eco-Efficiency Center • Devens Regional Household Hazardous Products Collection Center and members • Clean Harbors • MassDEP • Devens' businesses and residents • Devens Public Works
Continue assessing existing markets for waste items and/or existing recycling protocols to understand best life cycle approach for specialty waste items and hazardous waste	Short	• Devens Eco-Efficiency Center • MassDEP • US EPA • Toxic Use Reduction Institute • Clean Harbors
Host roundtable discussions with local businesses to provide education about and support for their utilization of the hazardous waste collection center and the Devens DPW specialty waste item collection	Short	• Devens Eco-Efficiency Center • Devens HHW member towns and businesses
Develop a companion community education program on reducing the need and use of specialty items and hazardous waste materials, especially those with high global warming potential refrigerants	Short	• Devens Eco-Efficiency Center • Devens HHW member towns and businesses • Toxic Use Reduction Institute
Offset HHW and specialty waste item drop-off fees by pursuing grant funding	Medium	• Devens Eco-Efficiency Center • DevensHHW member towns and businesses • Devens Public Works

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FUNDING RESOURCES

- Sustainable Materials Recovery Program (SMRP) Municipal Grant
- SMRP Recycling Dividends Program Funds
- Closed Loop Infrastructure Fund

TECHNICAL RESOURCES

- Existing DevensHHW Flyers
- ReThink Recycling Household Hazardous Waste Toolkit
- EPA's Learn the Basics of Hazardous Waste content
- Haz-Ed: Classroom Activities for Understanding Hazardous Waste

LINKS TO OTHER PLANS & ACTIONS

How does this action connect to other Devens goals?

- Enhances Natural Resources goal towards air and water quality standards
- Companion to Economic Development goal of encouraging businesses to participate in sustainable business practices
- Relevant STAR Objectives: Waste Minimization
- Relevant LEED Credits: Solid Waste Management, Special Waste Streams Management, Material Recovery

EQUITY CONSIDERATIONS

How can the community incorporate equity into the implementation of this action?

- Offering a diverse set of HHW collection days and times
- Consider offering fee waivers for low-income residents

MEASURING SUCCESS

How can we measure the progress and success of this action?

Outputs

- Benchmark of specialty items and hazardous materials waste stream
- Community education programs
- Additional disposal markets and protocols for items received by the HHW

Outcomes

- % reduction of contaminated solid waste and recycling streams
- % reduction of overall materials use by the community
- % increase in proper disposal of specialty items and hazardous waste materials

ENGAGING THE COMMUNITY

How can we engage the populations that benefit from implementing this action?

- Education through a variety of mediums – flyers, workshops, mailer inserts
- Consider utilizing resident and business pledges to properly dispose of specialty items and hazardous waste materials

Regional Collaboration

Action: Regionalize commercial waste diversion and reuse strategies.

DESCRIPTION OF ACTION	Scale up commercial waste diversion strategies to maximize effectiveness of waste management, leverage more funding opportunities, and encourage regional leadership on waste diversion.
CHAMPION	Devens Eco-Efficiency Center

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe[1]	Key Partners
Conduct outreach to regional businesses to identify barriers and opportunities for regional collaboration on waste diversion strategies	Short	• Devens Enterprise Commission • Businesses around the region • Devens Public Works • Neighboring communities • MassDEP • US EPA
Form a regional commercial waste management committee tasked with developing programs to increase waste diversion and reuse. • Waste management contracting options • Textile recycling program • Expanded offerings for Great Exchange and Devens Regional Household Hazardous Products Collection Center • Incentive program for product exchanges • Improvements to collection and handling of waste resources • Organics composting	Short	• Devens Enterprise Commission • Businesses around the region • Neighboring communities Public Works and/or Sustainability Committees/ Waste Managers/Recyclers • Devens Public Works • Devens Regional Household Hazardous Products Collection Center • MassDEP • US EPA
Identify and establish regional waste management goals, including those on resource recovery, circular economy, and sustainable materials management	Medium	• Devens Enterprise Commission • Businesses around the region • Devens Public Works • Devens Regional Household Hazardous Products Collection Center • Neighboring communities • MassDEP • US EPA
Contract for and implement/construct shared infrastructure across facilities/communities for use in regional waste hauling and materials reuse	Long	• Devens Enterprise Commission • Neighboring communities • Devens Regional Household Hazardous Products Collection Center

1 Short = less than 1 year; Medium = 1-3 years; Long = 4-5years

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe	Key Partners
Pursue funding opportunities to pilot regional commercial waste management programs or expand existing programs (e.g. the Great Exchange).	Medium	• Devens Enterprise Commission • Businesses around the region • Devens Eco-Efficiency Center • Devens Regional Household Hazardous Products Collection Center • MassDEP • US EPA
Develop and launch a regional waste challenge to encourage collaboration.		• Devens Enterprise Commission • Businesses around the region • MassDevelopment • Recycling Works MA • Center for EcoTechnology

FUNDING RESOURCES

- MassDEP grant programs:
  - Sustainable Materials Recovery Program (SMRP)
  - Reduce, Reuse, Repair Micro-Grant
  - SMRP Municipal Technical Assistance

TECHNICAL RESOURCES

- Regionalbestpractices.org – A Guide to Sharing Public Services in MA
- MassDEP – Solid Waste Management Contracts & Contracting
- Lessons learned from Western MA Regional Recycling Program
- MA Solid Waste Master Plan
- Massachusetts Clean Energy Center
- US EPA Waste Wise Program
- Recycling Works MA
- Center for Eco-Technology
- MassNatural
- Re-Store
- TRUE: Total Resource Use and Efficiency

LINKS TO OTHER PLANS & ACTIONS

How does this action connect to other Devens goals?

- May support regional collaborative relationships and efforts in Transportation and Land use and Economic Development
- Regional collaboration and benefits in Devens Reuse Plan
- Sustainable redevelopment goals of Devens Reuse Plan
- Relevant STAR Objectives: Waste Minimization
- Relevant LEED Credits: Integrative Planning and Leadership, Solid Waste Management, Responsible Sourcing for Infrastructure, Material Recovery

EQUITY CONSIDERATIONS

How can the community incorporate equity into the implementation of this action?

- Encourage businesses at a variety of waste management proficiencies to participate
- Ensure new policies and/or fees to not disproportionately burden low-income residents or small businesses
- Make education/communication materials available in multiple languages

MEASURING SUCCESS

How can we measure the progress and success of this action?

Outputs

- Regional agreements
- Regional waste management committee
- Regional pilot program and funding
- Regional waste challenge

Outcomes

- $ saved on waste management services
- Increase in waste diversion rate
- Increase in materials repurposed and events by Devens Eco-Efficiency Center

ENGAGING THE COMMUNITY

How can we engage the populations that benefit from implementing this action?

- Include input from residents and businesses on regional programs needed, willingness to pay/ participate in various program options
- Educate residents and businesses on waste management practices/requirements through signage, videos, mobile applications, website, etc


DISPOSAL • DEMOLITION
3

Resource Management Plan

Action: Develop a Resource Management Plan as part of Devens Open Space and Recreation Plan that emphasizes best management practices for natural systems and environmental issues within Open Space Zones.

DESCRIPTION OF ACTION	Develop a Resource Management Plan as part of the Devens Open Space and Recreation Plan updates that includes best management practices for open spaces, forests, and water resources, including continued opportunities for integrating green infrastructure into the management strategy.
CHAMPION	Devens Open Space and Recreation Advisory Committee

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe[1]	Key Partners
Reconvene Devens Open Space and Recreation Advisory Committee and appoint new town representatives	Short	• Devens Enterprise Commission • Chair of Devens Open Space and Recreation Advisory Committee • Surrounding Towns
Build off of existing Green Infrastructure Guidelines and update to identify and map key areas and habitats that support biodiversity and climate resilience (e.g. carbon sinks, large open spaces, areas with flooding mitigation, etc.)	Short	• Devens Open Space and Recreation Advisory Committee New England Forestry Foundation • Nashua River Watershed Association • Conservation Commissions from surrounding communities • Devens Enterprise Commission • US Fish and Wildlife Service • MA Division of Fisheries and Wildlife • MassAudubon • Devens Public Works and those of surrounding communities • Trustees of Reservations
Build off the Municipal Vulnerability Preparedness vulnerability assessment and identify current management issues (i.e. invasive species, flooding, runoff)	Medium	• Devens Open Space and Recreation Advisory Committee • Federal Emergency Management Agency • Massachusetts Emergency Management Agency • Nashua River Watershed Association • Devens Fire Department (Public Safety Officer) • US Fish and Wildlife Service • MA Wildlife • Devens Public Works • Trustees of Reservations • Federal Bureau of Prisons • US Job Corps • U.S. Army

1 Short = less than 1 year; Medium = 1-3 years; Long = 4-5years

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe	Key Partners
Incorporate soil, wetland, forest management best practices into the plan (i.e. permanent land protection, invasive species elimination, promoting biodiversity, supporting pollinators)	Medium	• All of the above entities • Surrounding communities • New England Forestry Foundation
Incorporate water resource management into the plan (i.e., stormwater management, , land management for surface and sub-surface water quality/quantity protection)	Medium	• Devens Open Space and Recreation Advisory Committee • Nashua River Wild and Scenic River Steering Committee • Nashua River Watershed Association • Surrounding communities • Devens Department of Public Works • Devens Engineering
Incorporate best practice examples and recommendations about how to use green infrastructure to improve natural resource management (i.e. habitat connections, flooding mitigation)	Medium	• Devens Open Space and Recreation Advisory Committee • Devens businesses • Devens Enterprise Commission • Developers • Surrounding communities • MassAudobon • MassDEP • UNH Stormwater Center • MA Executive Office of Energy and Environmental Affairs

FUNDING RESOURCES

- Municipal Vulnerability Preparedness Action Grant
- MA Executive Office of Energy and Environmental Affairs

TECHNICAL RESOURCES

- Devens Open Space and Recreation Plan
- Devens Municipal Vulnerability Preparedness Summary of Findings
- New England Forestry Foundation's Exemplary Forestry standards
- Nashua River Wild and Scenic Steering Committee
- Devens Green Infrastructure Guidelines
- Devens Stormwater Management Plan
- Woods Hole Research Center
- MA Healthy Soils Action Plan
- BioMap2
- UNH Stormwater Center
- EPA Nonpoint Source Low Impact Development
- MassAudobon Shaping the Future of Your Community Program
- MA DEP Stormwater Management Standards Vol 2
- MA Department of Conservation and Recreation
- Open Space and Recreation Planner's Workbook

LINKS TO OTHER PLANS & ACTIONS

How does this action connect to other Devens goals?

- Reuse Plan goal to maintain and enhance natural resources
- Devens Open Space and Recreation Plan goal of preserving and conserving open space.
- Increasing carbon sequestration potential
- Relevant STAR Objectives: Biodiversity & Invasive Species, Natural Resources Protection, Water in the Environment, Working Lands
- Relevant LEED Credits: Ecosystem Assessment, Green Spaces, Natural Resources Conservation and Restoration

EQUITY CONSIDERATIONS

How can the community incorporate equity into the implementation of this action?

- Consider equitable access and proximity of businesses and residents to open space and forest resources
- Implement resource management improvement projects throughout the community

MEASURING SUCCESS

How can we measure the progress and success of this action?

Outputs

- Resource Management Plan as part of Devens Open Space and Recreation Plan Updates

Outcomes

- Maintained or improved water quality
- Improved biodiversity and habitat health
- More connected open spaces and habitats

ENGAGING THE COMMUNITY

How can we engage the populations that benefit from implementing this action?

- Host public workshops to learn about and provide feedback for the plan
- Post informational placards around some of the implemented projects
- Promote Devens Open Space and Recreation Advisory Committee Meetings

Superfund Cleanup

Action: Continue to assure that the Army's agreement with EPA to clean up Superfund contamination is successfully completed to allow for future development of once contaminated lands.

DESCRIPTION OF ACTION	Continue to assist, monitor, and guide the Army's efforts to clean up Superfund contamination with the goal of sustainable reuse of contaminated sites.
CHAMPION	MassDevelopment

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe[1]	Key Partners
Assist, as needed, in the long-term management of the identified Study Areas and Areas of Contamination	Ongoing	• U.S. Environmental Protection Agency (EPA) • U.S. Army • U.S. Army Corps of Engineers (USACE) • MA Department of Environmental Protection (MassDEP) • Devens Enterprise Commission (DEC) • People of Ayer Concerned about the Environment (PACE) • Neighboring communities • Base Realignment and Closure Clean-Up Team (BCT) • Restoration Advisory Board (RAB) • Other Local, State, and Federal Agencies • Licensed Site Professionals (LSPs)
Monitor the status of sites with ongoing cleanup actions to ensure the selected remedy remains protective of human and environmental health	Ongoing	
Continue regular meetings with the Devens Base Realignment and Closure Clean Up Team to review and discuss the status of ongoing cleanup activities	Ongoing	
Continue forward looking planning for the sustainable reuse of successfully cleaned up and transferred land	Long	

1 Short = less than 1 year; Medium = 1-3 years; Long = 4-5years

SUPERFUND CLEANUP (CONT.)

FUNDING RESOURCES

- U.S. Army under a Federal Facilities Agreement with U.S. EPA
- EPA Superfund Technical Assistance Grant
- Comprehensive Environmental Response, Compensation, and Liability Act Grants

TECHNICAL RESOURCES

- EPA Superfund Program
- United States Army Corps of Engineers
- Spill pollution, Prevention, Control and Countermeasure Plan
- Former Fort Devens Environmental Cleanup website
- MassDEP Contingency Plan
- EPA Information Repository at the Ayer Library
- EPA Superfund Records Center at the BRAC Office in Fort Devens

LINKS TO OTHER PLANS & ACTIONS

How does this action connect to other Devens goals?

- Environmental protection goals of the Reuse Plan (natural resource protection and water quality)
- Ensuring an effective, expeditious, and efficient cleanup of contaminated sites
- Relevant STAR Objectives: Infill & Redevelopment, Community Health, Natural Resources Protection
- Relevant LEED Credits: Natural Resources Conservation and Restoration, High-Priority Site, Water Access and Quality

EQUITY CONSIDERATIONS

How can the community incorporate equity into the implementation of this action?

- Clean up sites to unrestricted standards to ensure reuse plans benefit the maximum number of residents and businesses
- Fulfill the requirements of EPA's Environmental Justice Program

MEASURING SUCCESS

How can we measure the progress and success of this action?

Outputs

- Sustainable reuse of previous Superfund sites

Outcomes

- Acres of land remediated
- Acres of remediated land redeveloped
- Improved air, soil, and water quality

ENGAGING THE COMMUNITY

How can we engage the populations that benefit from implementing this action?

- Updates in the Devens Weekly News
- Educational placards around successfully cleaned up areas
- Continue publicizing and keeping Remedial Action Board meetings open to the public

Sustainable Landscaping Education

Action: Proactively educate residents and developers on sustainable landscaping best practices that minimize water and chemical use and maximize native species.

DESCRIPTION OF ACTION	Launch an educational campaign to residents, business owners, and developers in Devens and surrounding towns, on sustainable landscaping best practices that minimize water and chemical use and maximize native species and reduce invasive species.
CHAMPION	Devens Enterprise Commission

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe[1]	Key Partners
Establish a baseline assessment of residential and commercial landscaping at Devens and compile a list of sustainable landscape best practices and resources, as well as invasive species identification and management through interviews with experts in the field	Short	• Local landscaping companies • Nurseries • Devens Public Works • Housing developments • Northeast Organic Farming Association • Ecological Landscape Alliance • MassAudubon • Nashua River Watershed Association • Devens businesses • Developers • DEC Peer Review Landscape Architects and Engineers • International Living Future Institute (Living Building and Living Community Challenge) • Green Roofs for Healthy Cities • Boston Society of Landscape Architects • US Fish and Wildlife Service • MA Division of Fisheries and Wildlife
Host a series of public events with guest speakers who can speak to implementable design, installation, and maintenance principles for sustainable landscaping and invasive species management	Medium	• Department of Public Works • Experts listed above

1 Short = less than 1 year; Medium = 1-3 years; Long = 4-5years

SUSTAINABLE LANDSCAPING EDUCATION (CONT.)

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe	Key Partners
Expand upon the Devens Green Infrastructure Guidelines to develop sustainable landscape guidelines and invasive species management for residential and commercial projects	Medium	• Nashua River Watershed Association • MassAudubon
Expand distribution of new and existing sustainable landscaping and invasive species resources through social media, hosting public landscaping work parties, tabling at existing events, and partnering with local businesses and organizations	Short/ Ongoing	• Local businesses • Schools • Neighboring communities • Housing developments • Developers • Public Works Departments • Nashua River Watershed Association • MassAudobon • US Fish and Wildlife Service • MA Division of Fisheries and Wildlife • Friends of the Oxbow

SUSTAINABLE LANDSCAPING EDUCATION (CONT.)

FUNDING RESOURCES

- Massachusetts Municipal Vulnerability Preparedness Action Grant
- Toxic Use Reduction Institute Grants

TECHNICAL RESOURCES

- American Society of Landscape Architects – Sustainable Landscapes
- Sustainable SITES Initiative/ SITES rating system
- Devens Green Infrastructure Guidelines
- UMASS Extension, Landscape, Nursery and Urban Forestry Program
- DEC Peer Review Landscape Architects and Engineers
- International Living Future Institute (Living Building and Living Community Challenge)
- Green Roofs for Healthy Cities
- MA DEP Stormwater Management Standards
- Sustainable Concord Landscaping Handbook
- EPA Water Sense Program (irrigation)
- Invasive Plant Atlas of New England
- Shifting Planting Zones (USDA Forest Service)

LINKS TO OTHER PLANS & ACTIONS

How does this action connect to other Devens goals?

- Reuse Plan goal to maintain and enhance natural resources
- Promotion of green infrastructure and street trees
- Relevant STAR Objectives: Water Efficiency, Biodiversity & Invasive Species, Natural Resource Protection
- Relevant LEED Credits: Green Spaces, Natural Resources Conservation and Restoration, Water Performance, Smart Water Systems

EQUITY CONSIDERATIONS

How can the community incorporate equity into the implementation of this action?

- Ensure communications are reaching a diverse audience
- Take affordability into account: “Sustainable landscapes on a budget”

MEASURING SUCCESS

How can we measure the progress and success of this action?

Outputs

- Comprehensive resource that combines and expands on Devens existing green infrastructure guidelines

Outcomes

- # of native species planted
- Maintained or improved water quality
- Improved biodiversity and habitat health
- Reduced chemical levels tested in soils
- Reduced outdoor water use

ENGAGING THE COMMUNITY

How can we engage the populations that benefit from implementing this action?

- Work with housing developments and local businesses to host educational events and demonstrations
- Roundtables through the Devens Eco-Efficiency Center
- Collaborate with neighboring towns to reach a broader audience
- Partner with Public Works to ensure these principles are being used on DEC-operated land and Department of Public Works networks in other towns
- Partner with schools to include sustainable landscapes and invasive species as part of climate change and sustainability curriculum

Active Recreation

Action: Develop and promote an array of programs that encourage active lifestyles for a diverse population.

DESCRIPTION OF ACTION	Taking into account the needs of young, elderly, and disabled residents and employees, develop and promote an array of programs and opportunities that encourage active lifestyles.
CHAMPION	Devens Open Space and Recreation Advisory Committee

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe[1]	Key Partners
Create an inventory of active recreation programs and opportunities offered at Devens, noting options available for those with disabilities or limited mobility	Short	• Devens Recreation • Senior centers • Shirley Commons • Clear Path for Veterans • Dragonfly Wellness Center • Devens Eco-Efficiency Center • Businesses • Schools • Surrounding communities • Conservation organizations • United Native American Cultural Center • Devens Committee
Through an online survey, focus groups, and public events, collect feedback on what additional active recreation programs or opportunities are missing and desired in Devens	Short	• See key partners listed in step #1
Based on the largest gaps in offerings for underrepresented populations, prioritize a list of active recreation programs to launch and identify a champion to lead the effort	Medium	• Devens Recreation • Senior centers • Recreational sport leagues • Schools • Dragonfly Wellness Center • Surrounding communities
Support and publicize the launch and continuation of active recreation programs and opportunities	Medium	• See key partners listed in step #1

1 Short = less than 1 year; Medium = 1-3 years; Long = 4-5years

FUNDING RESOURCES

- Massachusetts Land and Recreation Grants & Loans
- Massachusetts Division of Conservation Services
- Private developers

TECHNICAL RESOURCES

- Open Space and Recreation Plan
- Devens Eco-Efficiency Center Environmental Health and Safety Roundtable Members
- Department of Conservation and Recreation

LINKS TO OTHER PLANS & ACTIONS

How does this action connect to other Devens goals?

- Related to Economic Development goals of this plan by supporting enhancements for a 24-7 community
- Relevant STAR Objectives: Arts & Culture, Community Cohesion, Social & Cultural Diversity, Aging in the Community, Active Living, Community Health
- Relevant LEED Credits: Integrative Planning and Leadership

EQUITY CONSIDERATIONS

How can the community incorporate equity into the implementation of this action?

- Consider the needs of the elderly, special needs populations, minorities, and those with limited mobility
- Prioritize programs that can be offered at low or no cost
- Ensure a variety of locations for programming to increase accessibility for all
- Engage with United Native American Cultural Center, Clear Path for Veterans, Transitions at Devens, Shriver Job Corps, and Seven Hills/ Aspire Academy

MEASURING SUCCESS

How can we measure the progress and success of this action?

Outputs

- Inventory of local recreation opportunities
- List of gaps and opportunities for recreation in Devens
- Launch of active recreation programs and opportunities

Outcomes

- Reduced rates of obesity, reported mental health issues, and disease
- # of local recreational sports teams / other fitness programs available at low or no cost
- # of residents and businesses within ¼ mile of active or passive recreation opportunities

ENGAGING THE COMMUNITY

How can we engage the populations that benefit from implementing this action?

- Publicize offerings at schools, workplaces, and group housing facilities
- Post community events in the Devens Weekly News
- Targeted outreach to populations that are often excluded from active recreation offerings
- Encourage developers to incorporate on-site recreational facilities, hiking, and bike trails, etc. on their properties for their employees and allow public access

Health Service Access

Action: Improve access to mental and physical health and wellness services.

DESCRIPTION OF ACTION	Increase the accessibility of health and wellness services at and around Devens, especially for vulnerable populations.
CHAMPION	Nashoba Associated Boards of Health

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe[1]	Key Partners
Inventory current health and wellness services and providers in the region and identify gaps, especially for low-income, minority, elderly residents, and those with limited accessibility	Short	• Nashoba Valley Medical Center • Transitions at Devens • TaraVista Behavioral Health • Clear Path for Veterans • U.S. Army • Senior care facilities • Surrounding towns • Dragonfly Wellness Center • Devens Fire Department • Businesses • State Department of Public Health • Montachusett Regional Planning Commission
Create recruitment and retention strategies to attract and maintain primary care providers at and around Devens, including strategies to create more satellite locations of existing providers	Medium	• MassDevelopment • Nashoba Valley Chamber of Commerce • Neighboring communities' Boards of Health • Nashoba Valley Medical Center • Department of Public Health
Build on existing partnerships between health and wellness providers and institutions serving vulnerable populations (low-income, seniors, youth, chronically ill, etc.) to increase access to free or affordable health and wellness programs	Short	• See key partners listed in step #1
Actively promote healthy lifestyle programming in the community	Medium/ Ongoing	• Recreation Division • Dragonfly Wellness Center • Schools • Clear Path for Veteran • Senior care facilities • Natural Café • U.S. Army • Businesses • State Department of Public Health • Montachusett Regional Planning Commission

1 Short = less than 1 year; Medium = 1-3 years; Long = 4-5years

FUNDING RESOURCES

- New England Healthy Communities Grant
- Massachusetts Special Initiatives Grants
- MA Department of Public Health
- Health Care Insurance Providers

TECHNICAL RESOURCES

- MA Department of Public Health Bureau of Community Health and Prevention
- APA Plan 4 Health
- Montachusett Regional Planning Commission

LINKS TO OTHER PLANS & ACTIONS

How does this action connect to other Devens goals?

- Supports Economic Development goals of this plan
- Relevant STAR Objectives: Equitable Service & Access, Community Health, Health Systems
- Relevant LEED Credits: Distributional Equity, Environmental Justice

EQUITY CONSIDERATIONS

How can the community incorporate equity into the implementation of this action?

- Consider affordability of health care services when identifying gaps
- Remove barriers to entry for receiving quality medical care for low-income residents
- Consider transportation barriers for elderly, those with disabilities, and low-income residents

MEASURING SUCCESS

How can we measure the progress and success of this action?

Outputs

- Inventory of local health and wellness service providers
- Recruitment and retention strategies

Outcome

- Reduced rates of obesity, reported mental health issues, and disease
- # of primary care providers in a 15-mile radius
- % of residence reporting having a checkup in the last year

ENGAGING THE COMMUNITY

How can we engage the populations that benefit from implementing this action?

- Health units in schools
- Education through shelters, elderly housing, veterans' organizations, etc.
- Surveying the public on health service needs
- Publicizing wellness services and programs

Local Food

Action: Support the production and consumption of healthy, local food.

DESCRIPTION OF ACTION	Expand Devens' capacity to produce and distribute healthy and local food, especially to youth and low-income residents.
CHAMPION	Devens Enterprise Commission

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe[1]	Key Partners
Promote and expand farms in the region through preservation of viable farmland, zoning for local food production and sales, incentives, and development resources	Medium/ Ongoing	• Northeast Organic Farming Association • Nashoba Valley Chamber of Commerce • Surrounding town Farmer's Markets • Dick's Market Garden • Montachusett Regional Planning Commission • Surrounding communities
Facilitate smoother distribution channels between local farms and local food vendors and schools	Short	• Little Leaf Farms • Local restaurants • Schools • Local farms • Local farmers markets
Expand the farmers market through more diverse offerings, additional locations or dates, and more advertisement	Short	• Little Leaf Farm • Neighboring towns • SNAP, HIP, WIC • Local farms • Local farmers markets (Groton, Harvard, etc.)
Develop community gardens in neighborhoods and other community gathering spaces	Short	• Schools • Prisons • Shriver Job Corps • U.S. Army
Launch an educational campaign about the importance of healthy food and available places to acquire it, with a focus on youth and low-income residents	Short	• Schools • Dragonfly Wellness Center • Transitions at Devens • MassDevelopment • Department of Public Health • Nashoba Associated Boards of Health

1 Short = less than 1 year; Medium = 1-3 years; Long = 4-5years

FUNDING RESOURCES

- Matching Enterprise Grants for Agriculture Program
- USDA Farm to School Grant Program
- Buy Local Grant Program
- Massachusetts Food Trust Program
- USDA Agricultural Marketing Service

TECHNICAL RESOURCES

- Massachusetts Food Policy Council
- MassGrown
- Municipal Food Systems Planning Toolkit for MAPC Communities
- NOFA's Beginning Farmers Resources
- USDA Agricultural Marketing Service

LINKS TO OTHER PLANS & ACTIONS

How does this action connect to other Devens goals?

- Protects and enhances the quality of life of the citizens in the community and the region
- Relevant STAR Objectives: GHG Mitigation, Green Market Development, Community Health, Food Access & Nutrition, Working Lands
- Relevant LEED Credits: Green Spaces, Compact, Mixed Use and Transit Oriented Development, Distributional Equity

EQUITY CONSIDERATIONS

How can the community incorporate equity into the implementation of this action?

- Prioritizing access to healthy food for low-income residents and youth
- Financial assistance for healthy food
- Provide transportation to and from the farmers market for those with limited mobility

MEASURING SUCCESS

How can we measure the progress and success of this action?

Outputs

- Smoother food distribution channels
- Farmer's market expansion
- Educational campaign

Outcomes

- Lower rates of obesity and chronic illness
- # of farms in the region
- # weekly visitors to Devens Farmers Market
- # of establishments/institutions sourcing food from local farms

ENGAGING THE COMMUNITY

How can we engage the populations that benefit from implementing this action?

- Education in schools about where their food comes from and the benefits of healthy food
- Suggestion box at the farmers market about what additional food customers would like to see
- Information at restaurants and other food vendors about the source of their food
- Case studies showing sustainability practices (growing operations/technology, rainwater harvesting, pollinator plantings, etc.)

Bike-Ped Regional Plans

Action: Continue work on a forward-looking regional plan for bike/pedestrian transportation that creates an interconnected system with neighboring towns.

DESCRIPTION OF ACTION	Build off existing plans to create a forward-looking regional plan for bike and pedestrian transportation that creates an interconnected system of sidewalks, bike lanes, and multi-use trails with neighboring towns.
CHAMPION	Devens Enterprise Commission

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe[1]	Key Partners
Assemble a formal bike/pedestrian working group with the Complete Streets Committee members and Department of Public Works directors and planners from surrounding communities	Short	• MassDevelopment • Devens Public Works • Representatives from surrounding communities • Devens businesses/institutions • Montachusett Regional Planning Commission • MAPC Landline • Montachusett Regional Transit Authority • MBTA • Devens Open Space and Recreation Advisory Committee • Devens Complete Streets Committee • U.S. Army
Conduct a regional survey to identify greatest areas of need for additional bike/pedestrian connections between towns	Short	• Regional Bike/Pedestrian Working Group • Businesses • Universities • Residents • Montachusett Regional Planning Commission • Surrounding communities
Building off local bike/pedestrian plans (e.g. Devens Complete Streets Prioritization Plan, Devens Main Post Trails Plan) and the survey results, create a comprehensive regional bike/ped plan with a focus on connectivity between towns	Medium	• Regional Bike/Pedestrian Working Group
Prioritize bike/pedestrian improvement projects based on feasibility, access to funding, and potential to improve health and safety for the greatest number of people	Short	• Regional Bike/Pedestrian Working Group

1 Short = less than 1 year; Medium = 1-3 years; Long = 4-5years

FUNDING RESOURCES

- Complete Streets Program
- Community Connections Funding Program
- MA Pedestrian and Bicyclist Safety Grant Program

TECHNICAL RESOURCES

- Massachusetts Bicycle Transportation Plan
- 2019 Municipal Resource Guide for Bikeability
- Devens Complete Streets Prioritization Plan
- Town of Ayer's Transportation and Circulation report
- Landline Working Group
- Transportation plans from surrounding communities
- National Complete Streets Coalition
- Devens Open Space and Recreation Plan
- Healthy Transportation Policy Directive (P-13-0001)
- ABB 521 CMR
- NACTO Urban Street Design Guide
- NACTO Urban Bikeway Design Guide

LINKS TO OTHER PLANS & ACTIONS

How does this action connect to other Devens goals?

- Devens Reuse Plan Open Space and Recreation goals
- Reuse Plan goal of regional connectivity
- Transit-oriented development goals
- Helps reduce GHGs from on-road vehicles
- Devens Main Post Trails Plan
- Devens Healthy Communities proclamation
- Relevant STAR Objectives: Compact& Complete Communities, Transportation Choices, Community Cohesion, Equitable Services & Access, Active Living, Community Health
- Relevant LEED Credits: Integrative Planning and Leadership, Compact, Mixed Use and Transit Oriented Development, Access to Quality Transit

EQUITY CONSIDERATIONS

How can the community incorporate equity into the implementation of this action?

- Ensure plan takes into account resident, employee, and visitor accessibility for the elderly and for those with disabilities

MEASURING SUCCESS

How can we measure the progress and success of this action?

Outputs

- Completed Regional Bike & Pedestrian Plan
- Establishment of regional working group

Outcomes

- Reduction in GHG emissions from the transportation sector
- Miles of bike lanes, sidewalks, and multiuse trails
- Reduction in single occupancy vehicle miles traveled

ENGAGING THE COMMUNITY

How can we engage the populations that benefit from implementing this action?

- Work with businesses, employers, residents, community organizations, and surrounding municipalities to promote the public survey
- Host interviews or focus groups with key stakeholders about transportation, micro-mobility, and accessibility needs
- Post plans and progress on relevant community websites
- Host events (charity walks, runs, bikes, hikes) to highlight accessibility and connectivity of Devens and surrounding communities

Encourage Multimodal Transportation

Action: Encourage multimodal transportation through outreach and installation of necessary infrastructure.

DESCRIPTION OF ACTION	Provide commuter-related assistance and information to residents, industries, businesses, and visitors about transit and transportation options in Devens along with installation of transit-related infrastructure.
CHAMPION	Devens Complete Streets Committee

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe[1]	Key Partners
Review existing plans and initiatives and assess gaps in current transportation options	Short	• Devens Enterprise Commission • MassDevelopment • MassDOT • Montachusett Regional Transit Authority • Existing businesses
Design outreach materials for residents and businesses to encourage full range of travel modes – including biking, walking, and transit	Short	• Nashoba Valley Chamber of Commerce • Montachusett Regional Transit Authority • Surround Towns • Councils on Aging • MassDOT
Partner with Devens Eco-Efficiency Center to host Green Round Table forums with business leaders about best practices for commuter incentives and employee outreach to encourage multi-modal transit	Medium	• Devens Eco-Efficiency Center • Devens businesses • Businesses from surrounding communities
Install transportation-related infrastructure to ensure access to all travel modes	Long	• Montachusett Regional Planning Commission • Devens businesses • MassDevelopment • Surrounding communities

1 Short = less than 1 year; Medium = 1-3 years; Long = 4-5years

FUNDING RESOURCES

- Complete Streets Grant Program
- Private developers

TECHNICAL RESOURCES

- Devens Reuse Plan
- Transportation Management Initiative
- Healthy Transportation Policy Directive
- Final Environmental Impact Report for Devens
- Baystate Commute

LINKS TO OTHER PLANS & ACTIONS

How does this action connect to other Devens goals?

- Encourages economic development goal of increased access to non-motorized transportation
- Encourages transit-oriented development
- Expands Complete Streets Plan
- Relevant STAR Objectives: Compact & Complete Communities, Transportation Choices, Mitigation, Equitable Services & Access
- Relevant LEED Credits: Compact, Mixed Use and Transit Oriented Development, Access to Quality Transit

EQUITY CONSIDERATIONS

How can the community incorporate equity into the implementation of this action?

- Partner with Nashoba Valley Chamber of Commerce to determine optimal connections for workforce destinations
- Address issues of costs or accessibility that may be associated with certain modes
- Engage with MassMobility
- Partner with Council on Aging departments from surrounding communities

MEASURING SUCCESS

How can we measure the progress and success of this action?

Outputs

- Outreach materials
- Installation of EV charging stations
- Installation of bike racks and shower/changing facilities

Outcomes

- Reduction in single occupancy VMT
- Increase in transit ridership
- # of multimodal transportation infrastructures installed
- # of businesses enrolled in Baystate Commutes program

ENGAGING THE COMMUNITY

How can we engage the populations that benefit from implementing this action?

- Encourage local businesses to adopt commuter incentives for employees, to promote alternative modes of commuting such as walking, biking and transit
- Provide communication materials to businesses with employees that would be served by new transit connections and routes
- Create printed visitor guides for transit options in Devens

Development of Electric or Hydrogen Freight

Action: Engage with Devens logistics companies to identify opportunities for the development of electric or hydrogen fueled freight truck fueling and support infrastructure.

DESCRIPTION OF ACTION	Investigate the fuel shifting potential of converting diesel freight trucks to electricity or hydrogen by conducting a study with local logistics companies to site fueling stations and ways for Devens to support this shift.
CHAMPION	U.S. EPA Smart Ways Program

IMPLEMENTATION STEPS	PLANNING CONSIDERATIONS	
	Timeframe[1]	Key Partners
Research best practices around the U.S. for communities and regions that have successfully transitioned to electric and hydrogen freight vehicles	Short	• Devens Enterprise Commission • Pan Am Intermodal • MassDOT • MassDevelopment • Devens businesses
Host a freight trucking forum with local logistics companies and surrounding towns to learn more about existing fleet plans and potential for fuel switching	Medium	• Devens Eco-Efficiency Center • Devens Enterprise Commission • Nashoba Valley Chamber of Commerce • Devens businesses • Businesses from surrounding communities • Pan Am Intermodal
Conduct a community survey to determine the support for installing additional fueling infrastructure and the co-benefits of serving both freight and local resident needs	Medium	• Montachusett Regional Planning Commission • Devens Enterprise Commission
Complete a Fuel Switching for Freight Vehicles Report that outlines the potential GHG savings, monetary costs of infrastructure placement and charts a road map for how to achieve these goals in partnership with logistics companies	Long	• Montachusett Regional Planning Commission • Surrounding communities
Explore a pilot program with a local freight/ Logistics company (public/private partnership)	Long	• Devens Business • MassDOT

1 Short = less than 1 year; Medium = 1-3 years; Long = 4-5years

FUNDING RESOURCES

- US DOE Clean Cities
- MassDOER electric vehicle rebates
- Plug In America
- US EPA Smart Way Program

TECHNICAL RESOURCES

- Massachusetts Freight Plan
- EPA SmartWay Transport Partnership
- Boston Region Metropolitan Panning Organization
- Trucking Association of Massachusetts
- MA State Rail Plan

LINKS TO OTHER PLANS & ACTIONS

How does this action connect to other Devens goals?

- Helps reduce GHGs from on-road vehicles
- Facilitates coordination between local communities for a collaborative regional economy
- Relevant STAR Objectives: Mitigation, Greening the Energy Supply, Transportation Choices, Green Market Development, Targeted Industry Development, Outdoor Air Quality
- Relevant LEED Credits: Alternative Fuel Vehicles, Energy and GHG Emissions Performance, Smart Mobility and Transportation Policy

EQUITY CONSIDERATIONS

How can the community incorporate equity into the implementation of this action?

- Include environmental justice populations in Devens and surrounding communities.
- Highlight the benefits of lower particulate emissions and improved air quality along freight corridors

MEASURING SUCCESS

How can we measure the progress and success of this action?

Outputs

- Inventory of best practices
- Freight trucking forum
- Estimates for GHG reduction potential from fuel switching
- Regional coordination on freight with MPO and surrounding towns

Outcomes

- # of electric and hydrogen fueling stations
- Reduction in GHG and particulate emissions from heavy trucks
- # of Devens businesses enrolled in US EPA Smart Ways Program

ENGAGING THE COMMUNITY

How can we engage the populations that benefit from implementing this action?

- Community survey for electric and hydrogen vehicle preferences
- Provide links and publicity to trucking companies that are most poised to transition to clean fuels
- Highlight community air quality benefits of fuel switching
- Work to involve/communicate with Environmental Justice populations in Devens and surrounding communities

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C GHG Inventory Summary

Devens 2015 Community and Municipal Greenhouse Gas Emissions Inventory

Methodology and Results Summary

Prepared by Kim Lundgren Associates

August 18, 2019

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Section 1: Overview

Introduction

This greenhouse gas (GHG) inventory report summarizes community-wide and municipal government GHG emissions in the Devens Regional Enterprise Zone (Devens), MA for the baseline year of 2015. The report also contains descriptions of the methodologies and data sources used in the study, which can be replicated in subsequent years to track progress on emissions reduction goals. This GHG inventory report was prepared by Kim Lundgren Associates, Inc. (KLA) from November 2018 through April 2019. The results of the GHG inventory will be used for climate action planning for Devens.

Executive Summary

The results of the community-wide GHG inventory indicate that most of Devens' GHG emissions are a result of industrial and institutional buildings' electricity and natural gas usage. Emissions from buildings accounted for 94% of all GHG emissions in Devens. Transportation was the second highest sector, representing only 5%. Water delivery, wastewater treatment, and solid waste disposal accounted for approximately 1% of total emissions in Devens.

In terms of emissions sources, electricity (48.8%), natural gas usage (45.5%), and fugitive natural gas (0.7%) combined represent more than 95% of Devens GHG emissions. Emissions from gasoline (3.1%) and diesel (1.5%) combine for 4.6% of emissions.

On the municipal side, electricity was the largest source of municipal GHG emissions (58%), followed by natural gas usage (23%). In terms of departments, Wastewater Treatment, which includes both the energy use and inevitable process emissions associated with managing all of Devens' and some surrounding community's wastewater was the largest emitter at 28% of municipal emissions, followed by Public Works (19%) and Administrative (17%).

This baseline GHG inventory is the first step toward tracking emissions over time. Subsequent studies shall be performed to monitor GHG emissions in Devens once targets are established and the climate action plan is completed.

Scopes Framework

The scopes framework is a standard method of organizing emissions sources first developed by the World Resources Institute (WRI) in the GHG Protocol Corporate Standard in order to differentiate between emissions sources with varying degrees of overlapping responsibility such that double counting across reporting entities can be avoided. Scope 1 sources are direct emissions from sources like natural gas burned by the reporting entity in the inventory year. Scope 2 are indirect emissions from electricity use, with emissions occurring outside the boundary but as a result of in-boundary activity by the reporting entity. Scope 3 are all other indirect emissions that generally occur outside the boundary or over a timeframe outside of the reporting year. Emissions from the decomposition of solid waste, which occur over decades, are an example of a scope 3 source.

Boundary definitions are an important part of how the Scopes concept is applied to each part of the inventory. Within municipal operations, boundaries are determined through operational control of the source of emissions. At the community scale, boundaries are set by the geographic boundary of the community.

Global Warming Potentials

Three primary greenhouse gases are included in the GHG inventory: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Each of these gases has a unique lifespan and effect on the atmosphere, thus a common unit of "CO_2 equivalent" (CO_2e) is used to describe the gases in like-terms. The multiplier that converts a metric ton of CH_4 or N_2O to a metric ton CO_2e is called its global warming potential (GWP). The science behind our understanding of the effect of these gases is constantly evolving. The Intergovernmental Panel on Climate Change (IPCC) collects data from climate scientists and publishes Assessment Reports detailing the latest research on the effect of GHGs on the atmosphere. This inventory uses GWPs from the IPCC's Fourth Assessment Report (AR4).[1] While newer IPCC reports are available, many US agencies such as the EPA use GWPs from the IPCC's Fourth Assessment report and this report follows suit. The primary GWPs used for this inventory are listed in **Table 1.**

Table 1. Activities That Release GHGs into Our Atmosphere and their Global Warming Potential[2]

Greenhouse Gas	Source Activity	GWP
Carbon dioxide (CO_2)	Burning fossil fuels	1
Methane (CH_4)	Burning fossil fuels, agriculture activities, landfills, wastewater treatment practices	25
Nitrous oxide (N_2O)	Burning fossil fuels, agricultural activities, industrial activities, landfills	298

Section 2: Devens Community Greenhouse Gas Emissions Inventory

The Devens community greenhouse gas (GHG) emissions inventory was prepared by Kim Lundgren Associates, Inc. (KLA) following the Global Protocol for Community-Scale Greenhouse Gas Emissions Inventories (GPC).[3] The GPC is adopted by communities around the world to ensure that GHG reports are relevant, complete, consistent, transparent, and accurate. The GPC city-induced Basic reporting level approach was used for this GHG inventory report. The Basic reporting level provides an inventory of the GHGs released as a result of the energy use and waste material generated within the geographical boundary of Devens. The GPC provides guidance on what activities need to be included in the inventory and a framework for how to calculate the GHG emissions associated with various activities. There are some activities, like transportation, where the GPC guidance is not specific. In those situations, KLA used guidance provided in ICLEI's U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (Community Protocol) to ensure that the inventory adhered to GPC principles.[4] The methodology is included in each of the inventory sector summaries below. Methods from the Local Government Operations Protocol (LGOP) were used for process and fugitive wastewater emissions in the interest of synchronizing calculations with the Devens Municipal GHG Inventory.

The GPC provides recommendations on what activities and sources should be included in a GHG inventory for any community worldwide, as well as a general framework for the types of data to collect and calculations to be used. The GPC recognizes that country specific GHG protocols may have calculation methods more applicable to communities in that country. US-specific calculation methods in the Devens Community Inventory were obtained, or adapted from, the Community Protocol and the LGOP. Methods from the IPCC were used when no guidance was available from the GPC, Community Protocol, or LGOP.

[1] http://www.ipcc.ch/report/ar4/
[2] The GWP used in this report is from the IPCC AR4 and is the 100-year time horizon.
[3] http://ghgprotocol.org/greenhouse-gas-protocol-accounting-reporting-standard-cities
[4] http://icleiusa.org/publications/us-community-protocol/

Overall Community Greenhouse Gas Emissions

Activities by residents, visitors and workers in Devens resulted in 95,992 metric tons of GHG emissions ($MTCO_2e$) in 2015. Emissions from 2015 are equivalent to those released by an average passenger vehicle driven approximately 235 million miles.[5]

Emissions are reported below by both the sector (buildings, transportation, waste) and source (electricity, natural gas, and more). Buildings accounted for the vast majority of GHG emissions at 94% in 2015. The high percentage is due to a large number of industrial and commercial energy users relative to residents and vehicle travel. The second highest emitting sector is transportation, accounting for 5% of community emissions in 2015. Wastewater sector emissions accounted for approximately 1% while emissions from the waste and water treatment & delivery sectors accounted for less than 1% of total emissions in 2015. See **Table 2** for GHG totals by sector and **Figure 1** for a visualization of the GHG contribution from each sector.

Table 2. Devens Community Greenhouse Gas Emissions by Sector

Sector	2015 ($MTCO_2e$)	% of Total 2015
Buildings	90,570	94%
Transportation	4,460	5%
Wastewater	544	1%
Waste	218	<1%
Water Treatment & Delivery	200	<1%
Total	**95,992**	**100%**

Figure 1. Devens Community Greenhouse Gas Emissions by Sector

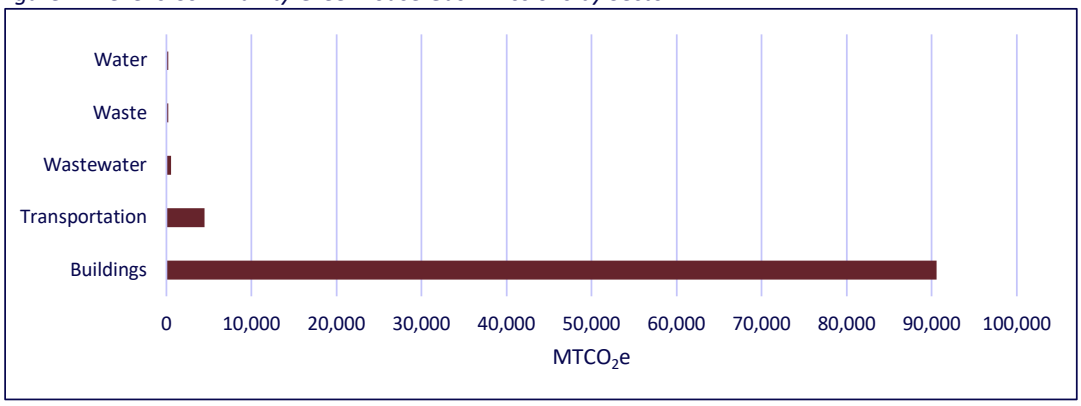


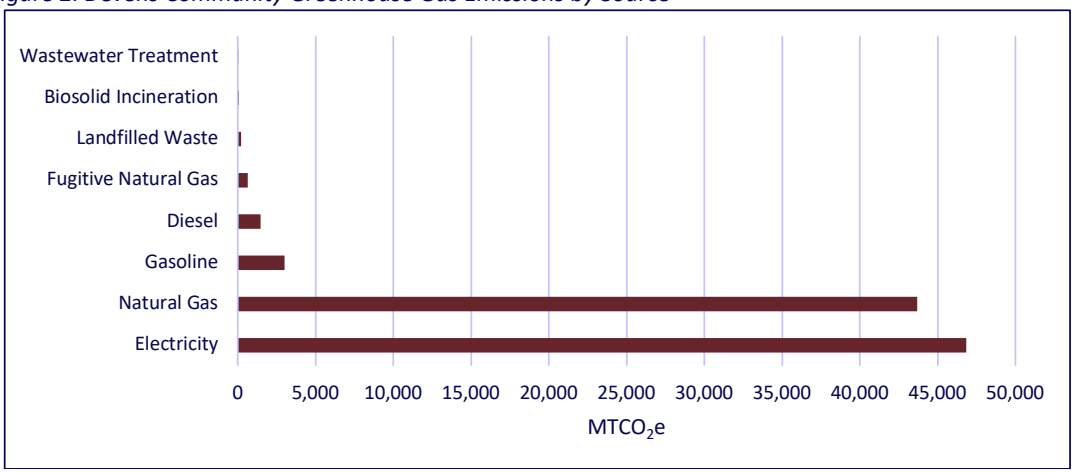
Table 3 lists emissions by source, and **Figure 2** shows the relative contribution of each source for 2015.

[5] Assumes 4.71 $MTCO_2e$ per vehicle per year and 11,507 VMT per year per vehicle. See EPA Greenhouse Gas Equivalencies Calculator available at: https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references

Table 3. Devens Community Greenhouse Gas Emissions by Source

Sector	2015 ($MTCO_2e$)	% of Total 2015
Electricity	46,853	48.8%
Natural Gas	43,701	45.5%
Gasoline	3,006	3.1%
Diesel	1,454	1.5%
Fugitive Natural Gas	646	0.7%
Landfilled Waste	218	0.2%
Biosolid Incineration	62	0.1%
Wastewater Treatment	52	0.1%
Total	**95,992**	**100%**

Figure 2. Devens Community Greenhouse Gas Emissions by Source



Information Items

Total GHG emissions reported for the community inventory, where possible, account for all sources and activities that are a direct result of consumption or energy use by residents, businesses, institutions and industries that reside in Devens. The focus here is to target the activities and sources that Devens is directly responsible for and has the most control over when considering GHG reduction measures. There are other emission sources from wastewater treatment, however, that occur within the geopolitical boundary of Devens but have been excluded from this analysis. These additional sources are listed below as Information Items.

The wastewater treatment plant located in Devens serves the Town of Shirley and a portion of the Town of Ayer. Emissions resulting from energy use at wastewater facilities, process and fugitive emissions at the treatment center, and the landfilling of extracted biosolids from the wastewater treatment process have been apportioned to Devens throughout this report based on the population of Devens relative to total population served by the wastewater treatment plant. The data for the population served was broken down by community and was provided by the Devens Utilities Department.

Note that all emission from the wastewater treatment facility have been included in the municipal GHG inventory since the facility is operated by MassDevelopment.

Table 4 contains total emissions for the wastewater treatment facility and the resulting landfilled biosolids for the portion generated within Devens, the portion imported from Shirley and Ayer and the total.

Table 4 Emissions from wastewater generated by Devens and Imported as Information Items, MTCO2e

Sector	Source	Devens Generated	Imported (Information Item)	Total 2015
Waste	Landfilled Waste	15	5	20
Stationary	Electricity	406	131	537
Stationary	Natural Gas	24	8	32
Wastewater	Wastewater Treatment	52	19	71
Wastewater	Biosolid Incineration	62	20	81
Total				**742**

Community Emissions by Sector

This section outlines the methods used to calculate emissions for each sector of the community inventory and details fuel use and emissions by source. For more detail on calculation methods and activity data, see the Devens Community GHG Inventory Workbook.xlsx.[6]

Stationary Energy

The Stationary Energy sector is comprised of emissions that result from energy consumption in the residential, commercial, institutional and industrial sectors. Emissions were calculated on the basis of the community's electricity and natural gas use following methodologies in the Community Protocol. Fugitive emissions from natural gas pipelines within the community boundary were calculated based on total natural gas consumption. A summary of the results and methodologies used for 2015 is provided in **Table 5.**

[6] https://www.dropbox.com/s/0q1fsr197pv376g/Devens_Community_GHG_Emissions_Inventory_Final.xlsx?dl=0

Table 5. Summary of Stationary Energy Sector Data and Methodologies

Sub-sector	Source/Activity	Methodology	Activity Data	Units	$MTCO_2e$
Residential	Electricity	USCP BE 2.1	910,145	kWh	311
Commercial	Electricity	USCP BE 2.1	8,126,403	kWh	2,775
Institutional***	Electricity	USCP BE 2.1	27,734,726	kWh	9,471
Industrial	Electricity	USCP BE 2.1	98,668,964	kWh	33,693
Residential	Natural Gas	USCP BE 1.1	140,035	therms	744
Commercial	Natural Gas	USCP BE 1.1	564,243	therms	2,997
Institutional***	Natural Gas	USCP BE 1.1	2,089,545	therms	11,099
Industrial	Natural Gas	USCP BE 1.1	5,428,744	therms	28,835
Residential	Fugitive Natural Gas	IPCC Chap. 4.2*	**3,886	therms	11
Commercial	Fugitive Natural Gas	IPCC Chap. 4.2*	**15,657	therms	44
Institutional***	Fugitive Natural Gas	IPCC Chap. 4.2*	**58,167	therms	164
Industrial	Fugitive Natural Gas	IPCC Chap. 4.2*	**150,643	therms	427

**No methodology exists in the Community Protocol for calculating emissions from fugitive natural gas, so a method from IPCC was used.*

*** This is the amount of natural gas leaked. Emissions factors for fugitive natural gas are based on total throughput which includes community usage and the amount leaked each year.*

****The "Institutional" sector includes energy used at federal, municipal, military, schools, and non-profit buildings and facilities.*

In **Table 5**, the "Institutional" subsector includes energy usage from federal (7,746 $MTCO_2e$), municipal, (1,973 $MTCO_2e$) military (8,444 $MTCO_2e$), school (2,168 $MTCO_2e$) and non-profit buildings (404 $MTCO_2e$). Electricity use from residential, commercial, institutional and industrial customers was provided by the Utilities Department at MassDevelopment. For 2015 electricity emissions, an ISO New England[7] CO_2 factor was used in conjunction with 2016 NEWE New England Region factors for CH_4 and N_2O[8] from eGRID. A 2016 eGRID emission factor was used as a proxy for 2015 since eGRID values are only published every couple of years. ISO New England does not publish CH_4 or N_2O factors. KLA investigated the opportunity to create a custom electricity emission factor since Devens operates its own municipal utility. Due to the energy mix used by energy suppliers, the propensity for suppliers to supplement their generated power with grid energy, and the fact that Devens either does not own or sold the RECs associated with dedicated renewable energy suppliers, it was determined that grid electricity factors were the most appropriate and accurate factor to apply to the GHG inventory.

The blended ISO New England and eGRID electricity emission factor used to calculate emissions for Devens community electricity use in 2015 is 752.83 lbs. CO_2e/MWh.

Natural gas activity data for the residential and commercial sectors was provided by the Utilities Department at MassDevelopment. Natural gas emissions factors from EPA Mandatory Reporting Rule, published in November 2015, and last updated in March 2018, were used to calculate natural gas emissions for 2015.[9]

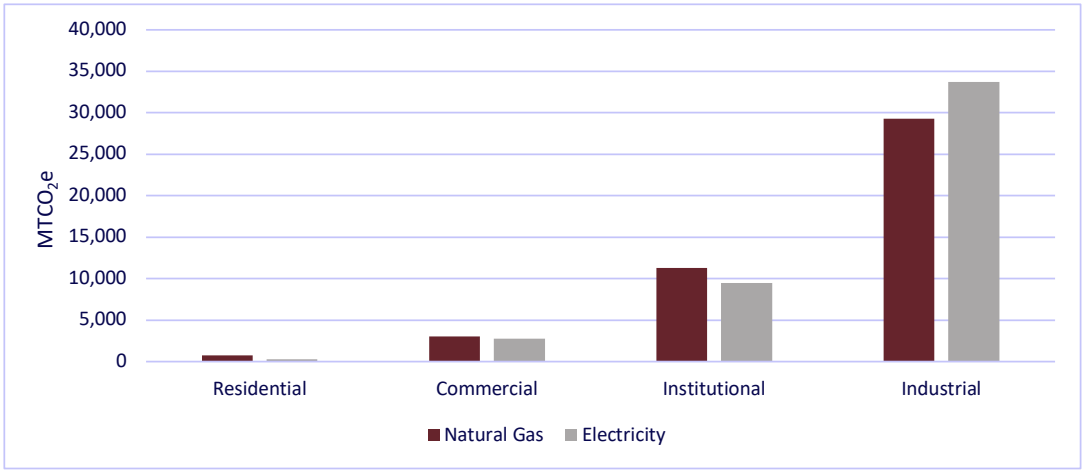
The amount of fugitive natural gas from distribution attributable to Devens was determined using a Harvard University study conducted in 2015 finding that 2.7% of all natural gas distributed in the Boston area is leaked and released into the atmosphere.[10] The amount of natural gas leaks in the Devens area are assumed to be similar to those of Boston. No Devens-specific natural gas leak study was available. Total

[7] ISO NE emissions reports available at: https://www.iso-ne.com/system-planning/system-plans-studies/emissions
[8] https://www.epa.gov/sites/production/files/2018-02/documents/egrid2016_summarytables.pdf
[9] https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf
[10] Summary of study available at: https://www.seas.harvard.edu/news/2015/01/boston-s-natural-gas-infrastructure-releases-high-levels-of-heat-trapping-methane

natural gas distributed to Devens (including community consumption and leaked gas) was used to calculate the emissions from natural gas leaked into the atmosphere based on guidance provided in Chapter 4 of the 2006 IPCC Guidelines for Greenhouse Gas Inventories.[11] IPCC emission factors for fugitive natural gas from distribution based on total throughput were used to determine the associated GHG emissions with this source.

No community fuel oil was reported by Devens. It is noted that a small number of net-zero homes use propane for backup heating purposes, however because no data exists and the actual use at these homes is likely to be both very small and a-typical of reference data, this fuel use is deemed de-minimis. **Figure 3** shows GHG emissions by fuel type in the stationary energy sector.

Figure 3. Greenhouse Gas Emissions from Devens Stationary Energy Sector by Building Type and Energy Source



Transportation

The Transportation sector comprises emissions that result from vehicle miles travelled (VMT) and fuel consumption by vehicle trips that begin or end within the Devens community boundary. Pass-through traffic was not included. Transportation activity data was obtained from the 2015 Devens Traffic Monitoring Program. Vehicle types on the road in Devens were obtained from the Devens Traffic Monitoring Program 2012 Biennial Traffic Report. Emissions were calculated following the methodologies in the Community Protocol. Activity data for the MBTA commuter rail serving Devens was obtained from 2015 Devens Traffic Monitoring Program and calculated using factors from EPA Climate Leaders Program.[12] A summary of the results and methodologies used for 2015 are provided in **Table 6.**

[11] https://www.ipcc-nggip.iges.or.jp/public/2006gl/
[12] https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf

Table 6. Summary of Transportation Sector Data and Methodologies

Sub-sector	Source/Activity	Methodology	Activity Data	Units	$MTCO_2e$
On-road Transport	Gasoline Motorcycles	USCP TR.1.B	103,632	VMT	21
On-road Transport	Gasoline Passenger Vehicles	USCP TR.1.B	4,518,133	VMT	1,703
On-road Transport	Gasoline Light Trucks	USCP TR.1.B	1,357,369	VMT	696
On-road Transport	Gasoline Medium Trucks	USCP TR.1.B	438,783	VMT	586
On-road Transport	Diesel Passenger Vehicles	USCP TR.1.B	22,367	VMT	9
On-road Transport	Diesel Light Trucks	USCP TR.1.B	54,462	VMT	29
On-road Transport	Diesel Heavy Trucks	USCP TR.1.B	254,956	VMT	930
On-road Transport	Diesel Buses	USCP TR.1.B	87,047	VMT	247
Railways	Diesel MBTA Transit Railway	USCP TR.4.A&B	1,473,397	pass miles	239

Activity data in the form of daily VMT for 2015 was obtained from the Devens Traffic Monitoring Program: Five-Year Traffic Report (Traffic Report) from December 2015.[13] The Traffic Report listed a 7-day average for 2015 VMT trips that begin or end in Devens – excluding trips that pass through Devens (trips that neither begin nor end in Devens). As a result, this VMT accounts for miles travelled both inside the community boundary and travelled outside of the community boundary – making on-road transportation emissions a mix of Scope 1 and Scope 3 according to the GPC. Daily VMT was multiplied by the number of days per year to get yearly VMT.

Total VMT was broken out by vehicle type according to surveys and analysis in the Devens Traffic Monitoring Program 2012 Biennial Traffic Report. A more recent report of vehicle types was not available. Data from the Biennial 2012 report enabled VMT to be categorized as motorcycles, passenger cars, light trucks, buses, medium trucks and heavy duty trucks. National averages on the relative proportions of gasoline to diesel vehicles contained in the Community Protocol were used to estimate how much VMT in the passenger car, and light trucks categories came from gasoline versus diesel vehicles. All motorcycle and medium truck VMT was assumed to come from gasoline vehicles. All heavy truck and bus VMT was assumed to come from diesel vehicles. VMT by fuel type and vehicle type was then used to calculate emissions from CH_4 and N_2O. CH_4 and N_2O emission factors for each fuel were obtained from the U.S. EPA's Emission Factors for Greenhouse Gas Inventories.[14]

To estimate emissions from CO_2, VMT was converted to fuel use using fuel efficiencies for each vehicle type obtained from the U.S Department of Energy's Alternative Fuel Data Center.[15] CO_2 emission factors for each fuel were obtained from the U.S. EPA's Emission Factors for Greenhouse Gas Inventories.

Transit railway data from the MBTA was obtained from the Devens Traffic Monitoring Program: Five-Year Traffic Report from December 2015. The Traffic Report determined that 4% of the Devens population used the MBTA railway. Ayer and Fitchburg MBTA stations represent the closest and farthest of the four stations that serve Devens according to the Traffic Report. An average distance between these two stations and the North Boston Terminal was used to estimate the average distance travelled during a passenger trip on the MBTA. All commuter rail miles were assumed to end at the North Boston Terminal for the sake of this analysis. This average commute distance was multiplied by the number of passengers using the MBTA according to the 2015 Devens Traffic Monitoring Report's assumption of 4% ridership, and then multiplying by two to assume a round trip journey.

Total passenger miles were used to calculate emissions from CO_2, CH_4 and N_2O with emission factors obtained from the EPA's Emission Factors for Greenhouse Gas Inventories.

[13] http://www.devensec.com/meetings/Devens_2015_Traffic_Monitoring_Report_&_Appendices.pdf
[14] https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf
[15] https://www.afdc.energy.gov/data/categories/fuel-consumption-and-efficiency

Waste

The Waste sector is comprised of methane emissions that result from the decomposition of residential, commercial, institutional and industrial waste generated and deposited in a landfill in the inventory year. While these emissions occur over time, they are attributed to the year in which the waste was generated and deposited. Waste deposition per capita was estimated based on total waste deposition in the State of Massachusetts available from the Massachusetts Department of Environmental Protection (MassDEP). Alternative Daily Cover (ADC) tons deposited were estimated using state averages of the ratio of ADC to municipal solid waste landfilled. Emissions were calculated following the methodologies in the Community Protocol. A summary of the results and methodologies used for 2015 are provided in **Table 7.**

Table 7. Summary of Waste Sector Data and Methodologies

Sub-sector	Source/Activity	Methodology	Activity Data	Units	$MTCO_2e$
Solid Waste Disposal	Waste Deposited	USCP SW.4	713	tons	198
Solid Waste Disposal	Alternative Daily Cover (ADC)	USCP SW.4	66	tons	5
Solid Waste Disposal	Landfilled Biosolids*	USCP SW.4	171	tons	15

**Only the portion of landfilled biosolids attributable to Devens based on an analysis of population served by the WWTP are included here.*

Yearly waste deposition for all sectors of the community were estimated by computing an average waste disposal rate based on total landfilled waste deposition for the State of Massachusetts in 2015 as reported by MassDEP in the Massachusetts 2015 Solid Waste Data Update published in 2017.[16] Total state landfilled tons were divided by the 2015 population of Massachusetts as listed in the 2011-2015 American Community Survey 5-Year Estimates.[17] Per capita waste disposal was estimated at 0.41 tons per person for Massachusetts was then multiplied by the 2015 population of Devens obtained from the same ACS survey. State level waste data was not able to be disaggregated into residential, commercial, institutional or industrial sectors. Due to the large amount of industrial and commercial facilities in Devens, the waste tonnage estimated here is likely a low estimate.

The characterization or types of materials that comprise the waste stream was estimated using MassDEP's Solid Waste Master Plan's Summary of Waste Combustor Class II Recycling Program Waste Characterization Studies document (Includes 2010, 2013 and 2016 Data).[18] Emissions were determined using emission factors from the California Air Resources Board's Landfill Tool v1.3 and methodologies adapted from the Community Protocol.[19]

ADC used at landfills was estimated using state averages for ratios of ADC/MSW calculated from MassDEP's 2011 Solid Waste Master Plan.[20] Emissions from ADC were determined using emission factors from the California Air Resources Board's Landfill Tool v1.3 and methodologies adapted from the Community Protocol.

Dry weight tons of biosolids landfilled were provided by the Utilities Department of MassDevelopment. Emissions were determined using "sludge" emission factors from the California Air Resources Board's Landfill Tool v1.3 and methodologies adapted from the Community Protocol.

[16] https://www.mass.gov/files/documents/2017/02/zi/15swdata.pdf
[17] https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_DP05&src=pt
[18] https://www.mass.gov/guides/solid-waste-master-plan
[19] https://www.arb.ca.gov/cc/protocols/localgov/pubs/landfill_emissions_tool_v1_3_2011-11-14.xls
[20] https://www.mass.gov/files/documents/2016/08/rr/11swdata.pdf

Roughly half of the biosolids produced in 2015 were landfilled. The other half were incinerated according to the Utilities Department of MassDevelopment. See the Wastewater Treatment section below for more information on how incinerated biosolid emissions were calculated.

Water Treatment and Delivery

The Water Treatment and Delivery sector comprises emissions that result from electricity and natural gas used to treat and convey water throughout the community during the inventory year. A summary of the results and methodologies used[21] for 2015 activities are provided in **Table 8.**

Table 8. Summary of Water Treatment Sector Data and Methodologies

Sub-sector	Source/Activity	Methodology	Activity Data	Units	$MTCO_2e$
Water Treatment	Electricity	USCP BE.2.1	577,480	kWh	197
Water Treatment	Natural Gas	USCP BE.1.1	544	Therms	3

Electricity and natural gas usage data was provided by the Utilities Department at MassDevelopment. Natural gas emissions factors from the EPA's Climate Leaders Program were used to calculate natural gas emissions for 2015.

Wastewater Treatment

The Wastewater Treatment sector comprises emissions that result from electricity[22] and natural gas used to treat and convey wastewater throughout the community during the inventory year. It also includes process, fugitive, and biosolid incineration emissions that result from the treatment of organic materials in wastewater. A summary of the results and methodologies used for 2015 are provided in **Table 9.**

Table 9. Summary of Wastewater Treatment Sector Data and Methodologies

Sub-sector	Source/Activity	Methodology	Activity Data	Units	$MTCO_2e$
Wastewater Treatment and Discharge	Electricity**	USCP BE.2.1	1,189,949	kWh	406
Wastewater Treatment and Discharge	Natural Gas**	USCP BE.1.1	4,599	Therms	24
Wastewater Treatment and Discharge	Process and Fugitive Emissions**	LGOP 10.3, 10.7, 10.9	1,733	pop served	52
Wastewater Treatment and Discharge	Biosolid Incineration**	USCP WW.4, WW.5*	208	Tons	62

**Calculation methodologies from the US Community Protocol were adapted to use dry weight factors from the IPCC and BEAM.*

***All wastewater emissions are the portion attributable to Devens based on population served.*

Electricity and natural gas usage data was provided by the Utilities Department at MassDevelopment. Natural gas emissions factors from EPA Climate Leaders Program were used to calculate natural gas emissions for 2015.[23]

MassDevelopment operates the wastewater treatment plant located in Devens that serves Devens as well as the Town of Shirley and part of the Town of Ayer. The MassDevelopment Utilities Department provided

[21] See the Stationary Sources section for more detail on how the electricity factor was calculated. The blended ISO New England and eGRID electricity emission factor used to calculate emissions for Devens community electricity use in 2015 is 752.83 lbs. CO_2e/MWh.

[22] See the Stationary Sources section for more detail on how the electricity factor was calculated. The blended ISO New England and eGRID electricity emission factor used to calculate emissions for Devens community electricity use in 2015 is 752.83 lbs. CO_2e/MWh.

[23] https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf

the number of wastewater gallons treated for each community. Gallons of wastewater from Devens and Shirley along with the populations from both communities were used to estimate population per million gallons of wastewater produced. This was then applied to the gallons of wastewater processed from Ayer to determine the population served in Ayer. Once a total population served by the wastewater treatment plant was estimated, standard equations from the LGOP were applied to determine CH_4 and N_2O process and fugitive emissions. Facility-specific data on biochemical oxygen demand (BOD5) and nitrogen discharged per day were provided by the Utilities Department at MassDevelopment. Only the portion of emissions for serving the population of Devens is reported here in the community inventory section of this report.

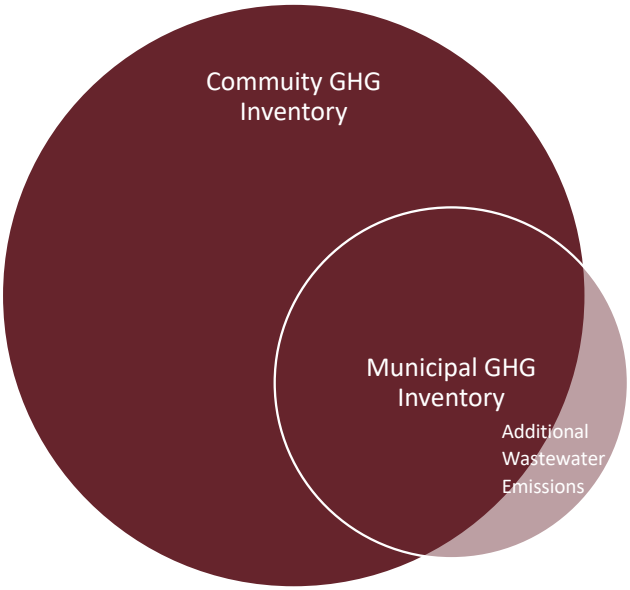
Emissions from biosolid incineration were estimated using data on the total amount of sludge produced in 2015, using data provided by the Utilities Department at MassDevelopment. Since sludge data was provided in dry weight terms, emissions were calculated using methods from the Community Protocol that were adapted to calculate emissions from dry weight of biosolids rather than wet weight. Dry weight emission factors for CH_4 were obtained from the Biosolids Emissions Assessment Model (BEAM).[24] Dry weight emission factors for N_2O were obtained from the IPCC 2006 Chapter 5: Incineration and Open Burning of Waste.[25] The Utilities Department indicated that all biosolids are incinerated at a facility in Woonsocket, Rhode Island, making emission from incinerated biosolids Scope 3. Only the portion of emissions for serving the population of Devens is reported here in the community inventory section of this report. Roughly half of the biosolids produced in 2015 were incinerated. The other half was landfilled according to the Utilities Department of MassDevelopment. See the Waste section above for more information on how landfilled biosolid emissions were calculated.

[24] https://www.ccme.ca/files/Resources/waste/biosolids/beam_final_report_1432.pdf
[25] https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_5_Ch5_IOB.pdf

Section 3: Devens Municipal Greenhouse Gas Inventory

The Devens municipal GHG inventory was prepared by Kim Lundgren Associates, Inc. (KLA) following the Local Government Operations Protocol (LGOP).[26] The LGOP has been used by communities around the United States to ensure that each report strives to align to its principles of relevance, completeness, consistency, transparency, and accuracy. This report uses the operational control reporting level approach. Municipal activities included are those where Devens, through the Massachusetts Development Finance Agency (MassDevelopment), has full authority to introduce and implement operating polices in the year 2015. This report summarizes the results of the GHG inventory and provides details on the methodologies used to calculate emissions.

The municipal GHG inventory reports GHG emissions associated with energy use at facilities owned and operated by Devens, and by activities (such as waste produced) as a result of municipal operations. The is typically a subset of the community GHG inventory. However, since Devens has operational control over the Macpherson Road Water Treatment Facility, this is not the case here. The Devens municipal GHG inventory includes all emissions from energy use, process emission and fugitive emission for the entire population served by the wastewater treatment facility, which includes contributions from Ayer and Shirley. The community inventory includes only the portion of these emissions attributable to the population of Devens.



For more detail on calculation methods and activity data, see the Devens Municipal GHG Inventory Workbook.xlsx.[27]

[26] https://s3.amazonaws.com/icleiusaresources/lgo_protocol_v1_1_2010-05-03.pdf
[27] https://www.dropbox.com/s/u63hy3oms5dft34/Devens_Municipal_GHG_Emissions_Inventory_Final.xlsx?dl=0

Overall Municipal Greenhouse Gas Emissions

Devens municipal operations released 2,623 $MTCO_2e$ in 2015. The 2015 emissions are equivalent to those released by an average passenger vehicle driven approximately 6.5 million miles.[28] For reference, the Scopes framework as applied to local government operations are based around operational control. Scope 1 includes direct emissions sources from facilities and equipment in providing municipal services. This includes direct fuel consumption and fugitive emissions. Scope 2 emissions are those related to the consumption of grid energy, such as electricity to deliver services and Scope 3 are emissions that are indirect but related to municipal operations such as employees operating their own vehicles for commute or the fate of waste and wastewater sludge disposed at facilities outside the control of the local authority. **Table 10** shows emissions by scope and sector for 2015.

Table 10. Devens Municipal Greenhouse Gas Emissions by Scope and Sector

Scope and Sector	2015 $MTCO_2e$	% of $MTCO_2e$
Scope 1	**910**	**35%**
Facilities and Infrastructure	581	**22%**
Vehicle Fleet	222	**8%**
Wastewater Treatment	103	**4%**
Water	3	**0%**
Scope 2	**1,540**	**59%**
Facilities and Infrastructure	691	**26%**
Streetlights and Traffic Signals	115	**4%**
Wastewater Treatment	537	**20%**
Water	197	**8%**
Scope 3	**173**	**7%**
Employee Commute	74	**3%**
Solid Waste	5	**0%**
Wastewater Treatment	94	**4%**
Total	**2,623**	**100%**

In 2015, 58% of Devens municipal GHG emissions were a result of electricity use and are Scope 2. Scope 1 emissions, such as the combustion of natural gas in buildings or combustion of gasoline and diesel in municipal owned vehicles, accounted for 34% of GHG emissions. Scope 3 emissions from solid waste, employee commute, and wastewater biosolids accounted for 8% of emissions.

Table 11 shows emissions by sector for Devens's municipal operations with emissions from all Scopes included in each sector.

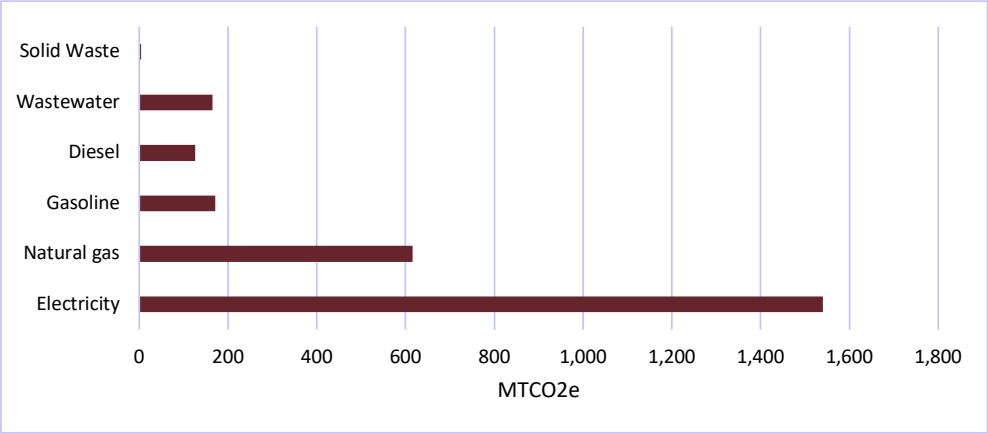
[28] Assumes 4.71 $MTCO_2e$ per vehicle per year and 11,507 VMT per year per vehicle. See EPA Greenhouse Gas Equivalencies Calculator available at: https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references

Table 11. Devens Municipal Greenhouse Gas Emissions by Sector

Sector	2015 $MTCO_2e$
Facilities and Infrastructure	1,272
Wastewater Treatment	734
Vehicle Fleet	222
Water	200
Employee Commute	74
Streetlights and Traffic Signals	115
Solid Waste	5
Total	**2,623**

Figure 4 shows GHG emissions from each emission source for 2015. Electricity accounted for 58% of emissions in 2015. Natural gas was the second highest emitter, accounting for 23% of total emissions. Gasoline accounted for 7% of total emissions while diesel fuel accounted for 6% in 2015. CH_4 and N_2O from wastewater treatment processes and disposal accounted for 6% and CH_4 from municipal solid waste generation was less than 1%.

Figure 4. Devens Municipal Greenhouse Gas Emissions by Source



When organized by department, GHG emissions are shown to be highest in the Wastewater Treatment Department at 28% of total emissions, as this includes both the energy and process emissions from MassDevelopment operating the wastewater treatment plant that serves Devens, Shirley and part of Ayer. Most of these emissions occur as a result of electricity and natural gas use. Unlike the Community GHG inventory, landfilled biosolids are included in the Wastewater sector here in order to more easily categorize emissions by department. Employee Commute is listed below for the purposes of comparison and completeness even though it is not a municipal department. **Table 12** shows emissions by department for 2015.

Table 12. Devens Municipal GHG Emissions by Department

Department	2015 $MTCO_2e$	% of $MTCO_2e$
Wastewater Treatment	734	28%
Public Works	519	20%
Administrative	467	18%
Rental	418	16%
Water	200	8%
Employee Commute	74	3%
Streetlights and Traffic Signals	115	4%
Fire	52	2%
Police	43	2%
Total	**2,623**	**100%**

Municipal Greenhouse Gas Inventory Methodology

The Devens Municipal Operations GHG Inventory followed the recommended guidance in the LGOP.[29] This protocol provides recommended and alternative methods for calculating GHG emissions released as a result of energy use from facilities, vehicles and equipment owned and operated by Devens, water and wastewater treatment, solid waste deposition, and from fuel used for employee commute during 2015. Emissions from biosolid incineration were calculated using methods from ICLEI's U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (Community Protocol).[30]

Typically, a municipal operations inventory is based on activity data that is either from a fiscal year or a calendar year. Due to data availability, this inventory uses both. Electricity and natural gas from municipal buildings were provided on a fiscal year basis. Fuel use in municipally owned vehicles and waste deposition data was provided on a calendar year basis. An employee commute survey was completed for fiscal year 2015 for Devens. The difference between fiscal and calendar year data is not expected to significantly affect the inventory.

Below is a detailed account of how GHGs were calculated for each sector of the municipal inventory.

Facilities and Infrastructure

The Facilities and Infrastructure sector is comprised of emissions that result from energy consumption in buildings that are owned and operated by Devens. Emissions were calculated based on electricity and natural gas use, following the methodologies in the LGOP. A summary of the results and methodologies used for 2015 are provided in **Table 13.**

Table 13. Summary of Facilities and Infrastructure Sector Data and Methodologies

Source/Activity	Methodology	Activity Data	Units	$MTCO_2e$
Electricity	LGOP 6.2.1	2,022,879	kWh	691
Natural Gas	LGOP 6.1.1	109,405	therms	581

Electricity use from municipal buildings was obtained from the Utilities Department at MassDevelopment. For 2015 electricity emissions, an ISO New England[31] CO_2 factor was used in conjunction with 2016 eGRID

[29] http://icleiusa.org/ghg-protocols/
[30] http://icleiusa.org/publications/us-community-protocol/
[31] ISO NE emissions reports available at: https://www.iso-ne.com/system-planning/system-plans-studies/emissions

NEWE New England Region factors for CH_4 and N_2O.[32] See Section 2 for a description of how emissions factors were combined.

Natural gas activity data for municipally owned and operated buildings was provided by the Utilities Department at MassDevelopment. Natural gas emissions factors from EPA Climate Leaders Program, last updated in March 2018, were used to calculate natural gas emissions for 2015.[33]

No municipal fuel oil or propane use was reported by Devens.

Streetlight and Traffic Signals

The Streetlights and Traffic Signals sector is comprised of emissions that result from electricity used to power streetlights, traffic signals and other outdoor lighting that are owned and operated by Devens. Emissions were calculated based off Devens' municipal electricity use in streetlights and traffic signals, following the methodologies in the LGOP[34]. A summary of the results and methodologies used for 2015 are provided in **Table 14.**

Table 14. Summary of Streetlights and Traffic Signals Sector Data and Methodologies

Source/Activity	Methodology	Activity Data	Units	$MTCO_2e$
Electricity	LGOP 6.2.1	336,172	kWh	115

Electricity use from streetlights and traffic signals was provided by the Utilities Department at MassDevelopment. All kWh consumption for "lights", "unmetered lights" and "traffic signals" were included as streetlights and traffic signals.

Vehicle Fleet

The Vehicle Fleet sector is comprised of emissions that result from vehicle miles travelled and fuel consumption by vehicles that are owned and operated by Devens. Emissions were calculated from diesel and gasoline fuel use data provided by The Department of Public Works at MassDevelopment and follow the methodologies in the LGOP.

A summary of the results and methodologies used for 2015 are provided in **Table 15.**

Table 15. Summary of Vehicle Fleet Sector Data and Methodologies

Source/Activity	Methodology	Activity Data	Units	$MTCO_2e$
Gasoline	LGOP 7.1.1	11,536	gallons	102
Diesel	LGOP 7.1.1	11,798	gallons	121

Activity data for FY 2016, in the form of gallons of diesel and gasoline fuel consumed, was obtained from The Department of Public Works at MassDevelopment. Since fuel use was not reported by vehicle type and the vehicle fleet characterization is unlikely to match the local traffic survey, national averages for vehicle types on the road were used. To estimate emissions from CO_2, total gasoline and diesel use was multiplied by CO_2 emission factors obtained from the U.S. EPA's Climate Leaders Program[35].

[32] https://www.epa.gov/sites/production/files/2018-02/documents/egrid2016_summarytables.pdf
[33] https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf
[34] See the Facilities and Infrastructure section for more detail on how the electricity factor was calculated. The blended ISO New England and eGRID electricity emission factor used to calculate emissions for Devens community electricity use in 2015 is 752.83 lbs. CO_2e/MWh.
[35] https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf

To calculate emissions from CH_4 and N_2O, fuel use was converted to VMT by vehicle type using fuel efficiencies obtained from the U.S Department of Energy's Alternative Fuel Data Center.[36] All gasoline fuel use was assumed to be from passenger vehicles. Diesel fuel consumed was assumed to come from an equal mix of light and heavy duty trucks. CH_4 and N_2O emission factors for each fuel were obtained from the U.S. EPA's Emission Factors for Greenhouse Gas Inventories.

Employee Commute

The Employee Commute sector is comprised of emissions that result from fuel consumption by vehicles that are used by employees of Devens to get to-and-from work. A summary of the results and methodologies used for 2015 are provided in **Table 16.**

Table 16. Summary of Employee Commute Sector Data and Methodologies

Source/Activity	Methodology	Activity Data	Units	$MTCO_2e$
Gasoline	N/A	185,724	VMT	70
Diesel	N/A	12,120	VMT	5

A commute survey conducted as part of the Devens 2015 Traffic Monitoring Program[37] was used to estimate employee commute VMT for Devens municipal employees in 2015. This survey was not specific to Devens employees or MassDevelopment. The survey listed the hometowns and cities of people employed in Devens. An average commute distance to work was estimated using the town/city of residence and the distance to the MassDevelopment home office at 33 Andrew Parkway. Distances were calculated using Google Maps. The average commute distance from people employed in Devens was then multiplied by the total number of MassDevelopment employees in 2015, including members of the Devens Enterprise Commission and the Devens Eco-Efficiency Center. Total employees for 2015 were estimated at 35. All employees were assumed to be full time and drive to work Monday through Friday.

Total VMT was broken out by vehicle type according to surveys and analysis in the 2012 Traffic Report. A more recent report of vehicle types was not available. Data from the 2012 Traffic Report enabled VMT to be categorized as motorcycles, passenger cars, light trucks, buses, medium trucks, heavy duty trucks and buses. However, it is unlikely employees use this same mix of vehicles and the final proportions used the study value for motorcycles and all other VMT was assigned to a passenger vehicle class. National averages on the relative proportions of gasoline to diesel vehicles contained in the Community Protocol were used to estimate how much VMT in the passenger car came from gasoline versus diesel vehicles. All motorcycle VMT was assumed to come from gasoline vehicles. VMT by fuel type and vehicle type was then used to calculate emissions from CH_4 and N_2O. CH_4 and N_2O emission factors for each fuel were obtained from the U.S. EPA's Climate Leaders Program.[38]

To estimate fuel use by commuting vehicles, VMT (by fuel and vehicle type) was divided by fuel efficiencies obtained from the U.S. EPA's Climate Leaders Program. Emissions from CO_2 were calculated by multiplying total gasoline and diesel use by CO_2 emission factors obtained from the U.S. Climate Leaders Program.

Solid Waste

The Solid Waste sector is comprised of CH_4 emissions that result from the decomposition of materials deposited in a landfill that are generated at municipally owned and operated facilities, in the GHG inventory year. No waste from businesses or residents is included in this analysis. While these emissions occur over time, and in landfills outside of Devens' jurisdictional boundary, they are attributed to the municipal operations for the year in which the waste was generated. Waste sent to landfills was obtained

[36] https://www.afdc.energy.gov/data/categories/fuel-consumption-and-efficiency
[37] http://www.devensec.com/meetings/Devens_2015_Traffic_Monitoring_Report_&_Appendices.pdf
[38] https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf

from the 2015 Devens Recycling and Solid Waste Survey. Emissions were calculated using methodologies adapted from the LGOP. A summary of the results and methodologies used for 2015 is provided in **Table 17.**

Table 17. Summary of Waste Sector Data and Methodologies

Source/Activity	Methodology	Activity Data	Units	$MTCO_2e$
Waste Landfilled	LGOP, CARB Landfill Tool v1.3	12.0	tons	5
ADC Landfilled	LGOP, CARB Landfill Tool v1.3	0.1	tons	<1

Yearly waste deposition from Devens municipal facilities was estimated using tons of trash and bulky items collected according to the 2015 Devens Recycling and Solid Waste Survey, provided by The Department of Public Works at MassDevelopment. Municipal buildings and schools are included in the survey. There are no residents served by a municipal trash program. All waste collected and reported was assumed to be from municipal facilities and schools. Waste characterization or types and quantities of different materials present in the waste stream was obtained from CalRecycle's Targeted Statewide Waste Characterization Study: Waste Disposal and Diversion Findings for Selected Industry Groups.[39] All of Devens' buildings were assumed to be "large office space" as defined in the CalRecycle report. Emissions were determined using emission factors by waste type obtained from the California Air Resources Board's Landfill Tool v1.3 and methodologies adapted from the LGOP.[40]

Alternative daily cover (ADC) used at landfills was estimated using Massachusetts state averages for ratios of ADC/MSW calculated from MassDEP's 2011 Solid Waste Master Plan.[41] Emissions from ADC were determined using emission factors from the California Air Resources Board's Landfill Tool v1.3 and methodologies adapted from the LGOP.[42]

Water Treatment and Delivery

The Water Treatment and Delivery sector comprises emissions that result from energy consumption in facilities related to water treatment, well water extraction, pumping stations, and other related facilities that are owned and operated by Devens. Emissions were calculated based on Devens' electricity and natural gas use activity data, following the methodologies in the LGOP[43]. Since 1999, United Water has provided operations, maintenance and management services for water treatment and delivery in Devens. This includes services for four wells, 50 miles of water main and 425 hydrants. MassDevelopment is assumed to have full implementation authority over water treatment and delivery facilities operated by United Water. A summary of the results and methodologies used for 2015 are provided in **Table 18.**

Table 18. Summary of Water Treatment and Delivery Sector Data and Methodologies

Source/Activity	Methodology	Activity Data	Units	$MTCO_2e$
Electricity	LGOP 6.2.1	577,480	kWh	197
Natural Gas	LGOP 6.1.1	544	therms	3

Electricity and natural gas usage data from water delivery operations was obtained from the Utilities Department at MassDevelopment. Electricity was reported from four wells: Grove Pond, Macpherson Road, Patton Road and Sheboken wells.

[39] https://www2.calrecycle.ca.gov/Publications/Details/1184
[40] https://www.arb.ca.gov/cc/protocols/localgov/pubs/landfill_emissions_tool_v1_3_2011-11-14.xls
[41] https://www.mass.gov/files/documents/2016/08/rr/11swdata.pdf
[42] https://www.arb.ca.gov/cc/protocols/localgov/pubs/landfill_emissions_tool_v1_3_2011-11-14.xls
[43] See the Facilities and Infrastructure section for more detail on how the electricity factor was calculated. The blended ISO New England and eGRID electricity emission factor used to calculate emissions for Devens community electricity use in 2015 is 752.83 lbs. CO_2e/MWh.

. Natural gas emissions factors from EPA Climate Leaders Program were used to calculate natural gas emissions for 2015.[44]

Wastewater Treatment

The Wastewater Treatment sector is comprised of emissions that result from electricity and natural gas used to treat and convey wastewater throughout the community during the inventory year, process and fugitive emissions that result from the treatment of organic materials in the wastewater, and emissions associated with landfilling or incinerating biosolids removed during wastewater treatment. Electricity and natural gas use were provided by the Utilities Department at MassDevelopment and emissions were calculated following the methodologies in the LGOP[45]. Process and fugitive emissions were estimated at the community-level based on per capita emissions rates contained within the Community Protocol. Landfilled and incinerated biosolids were provided by the Utilities Department at MassDevelopment, and emissions were calculated using methods from the LGOP and Community Protocol. Since 1999, United Water has been providing operations, maintenance and management services for wastewater treatment in Devens. MassDevelopment is assumed to have full implementation authority at the wastewater treatment facility and therefore emissions from all population served are included here. Note that this is different than the treatment on the community scale inventory where contributions from neighboring communities were considered information items, however this section concludes with a breakdown of the relative contributions of each community even though responsibility over the wastewater treatment process remains with Devens A summary of the results and methodologies used for 2015 are provided in **Table 19.**

Table 19. Summary of Wastewater Treatment Sector Data and Methodologies

Sub-sector	Source/Activity	Methodology	Activity Data	Units	$MTCO_2e$
Electricity	Electricity	LGOP 6.2.1	1,573,926	kWh	537
Natural Gas	Natural Gas	LGOP 6.1.1	6,083	therms	32
Process	Methane	LGOP 10.3	50	$MTCO_2e$	50
Process	Nitrous Oxide	LGOP 10.7, 10.10	21	$MTCO_2e$	21
Biosolids Landfilled*	Methane	LGOP 9.7	226	tons	20
Biosolids Incinerated	Methane and Nitrous Oxide	USCP WW.4&5	275	tons	74

**Landfilled biosolids are included in the Wastewater Treatment Sector of the Municipal Inventory because measures to reduce these emissions will have to be aimed at the wastewater treatment plant owned by MassDevelopment. Methodologically, landfilled biosolids are treated similarly to other Solid Waste. At the Community Inventory level, landfilled biosolid emissions are included in the Solid Waste Sector.*

Total electricity and natural gas used to treat wastewater at the Macpherson Road Treatment Center, usage from other related facilities and pump stations at the Town wastewater treatment plant, and pumping stations operated by MassDevelopment were obtained from the Utilities Department at MassDevelopment.

MassDevelopment operates the wastewater treatment plant located in Devens and serving Devens as well as the Town of Shirley and part of the Town of Ayer. The Utilities Department at MassDevelopment provided the number of wastewater gallons treated by each community. Gallons of wastewater from Devens and Shirley along with the populations from both communities were used to estimate people per million gallons of wastewater produced. This was then applied to the gallons of wastewater processed from Ayer to determine the population served from Ayer. Once a total population served for the

[44] https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf

[45] See the Facilities and Infrastructure section for more detail on how the electricity factor was calculated. The blended ISO New England and eGRID electricity emission factor used to calculate emissions for Devens community electricity use in 2015 is 752.83 lbs. CO_2e/MWh.

wastewater treatment plant was calculated, it was applied in standard equations from the LGOP to determine CH_4 and N_2O process and fugitive emissions. Facility-specific data on biochemical oxygen demand (BOD5) and nitrogen discharged per day were provided by the Utilities Department at MassDevelopment.

Emissions from biosolid incineration were estimated using data on the total amount of biosolids produced in 2015, provided by the Utilities Department at MassDevelopment. Because data was obtained in terms of dry weight, emissions were calculated using methods from the Community Protocol, adapted to calculate emissions from dry weight of biosolids rather than wet weight. Dry weight emission factors for CH_4 were obtained from the Biosolids Emissions Assessment Model (BEAM).[46] Dry weight emission factors for N_2O were obtained from the IPCC 2006 Chapter 5: Incineration and Open Burning of Waste.[47] The Utilities Department indicated that all biosolids are incinerated at a facility on Woonsocket, Rhode Island making emission from incinerated biosolids Scope 3.

Dry weight tons of biosolids landfilled were provided by the Utilities Department of MassDevelopment. Emissions were determined using "sludge" emission factors from the California Air Resources Board's Landfill Tool v1.3 and methodologies adapted from the Community Protocol.[48]

While Devens operates the wastewater treatment facility, wastewater from surrounding communities served by that facility contribute to the total emissions from that source. Figure 5 illustrates these contributions based on the volume of wastewater from each community. In 2015 Devens generated 76% of the wastewater treated with 15% imported from Shirley and 9% from Ayer.

Table 20. Attribution of wastewater treatment emissions by wastewater source community

	Devens	Shirley	Ayer	Total
Electricity	408	81	48	**537**
Natural gas	25	5	3	**32**
Process CH4 and N2O	54	11	6	**71**
Biosolids landfilled	15	3	2	**20**
Biosolids incinerated	56	11	7	**74**
Total	**558**	**110**	**66**	**734**

Section 4. Conclusions and Next Steps

The community and municipal GHG inventories are first steps toward completing a climate action plan. Devens' GHG emissions are primarily a result of electricity and natural gas usage in buildings. Emissions reductions in the industrial sector, specifically, will be crucial to lowering overall GHG levels. Opportunities also exist in the institutional (municipal and federal) sector, the second largest category of buildings in Devens. For municipal operations, efficiency improvements that target electricity and natural gas use will be focal points for achieving GHG reductions.

[46] https://www.ccme.ca/files/Resources/waste/biosolids/beam_final_report_1432.pdf
[47] https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_5_Ch5_IOB.pdf
[48] https://www.arb.ca.gov/cc/protocols/localgov/pubs/landfill_emissions_tool_v1_3_2011-11-14.xls

MassDevelopment currently runs Devens and plans to phase out its operations within 15 years. A climate action plan containing specific strategies to achieve GHG reductions should consider how the transition of operational control to local authority will affect the implementation of GHG reduction measures.

Next steps for Devens includes long-term planning, establishing an emissions forecast based on anticipated growth or changes in the community, setting a GHG reduction target, and creating a local Climate Action Plan that ensures Devens can continue to grow into a low-carbon future with successful businesses and a thriving community of local residents.

As the Climate Action Plan takes shape and is implemented, opportunities to generate and record performance data around sources and activities where estimates were needed for this study should be highlighted. This would be particularly useful in the solid waste generation category as well as greater insight into how energy is used across the Devens community for normal building uses versus process energy in manufacturing and other industries in order to best identify opportunities for efficiency investment and demonstration of future savings.

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D Survey Summaries

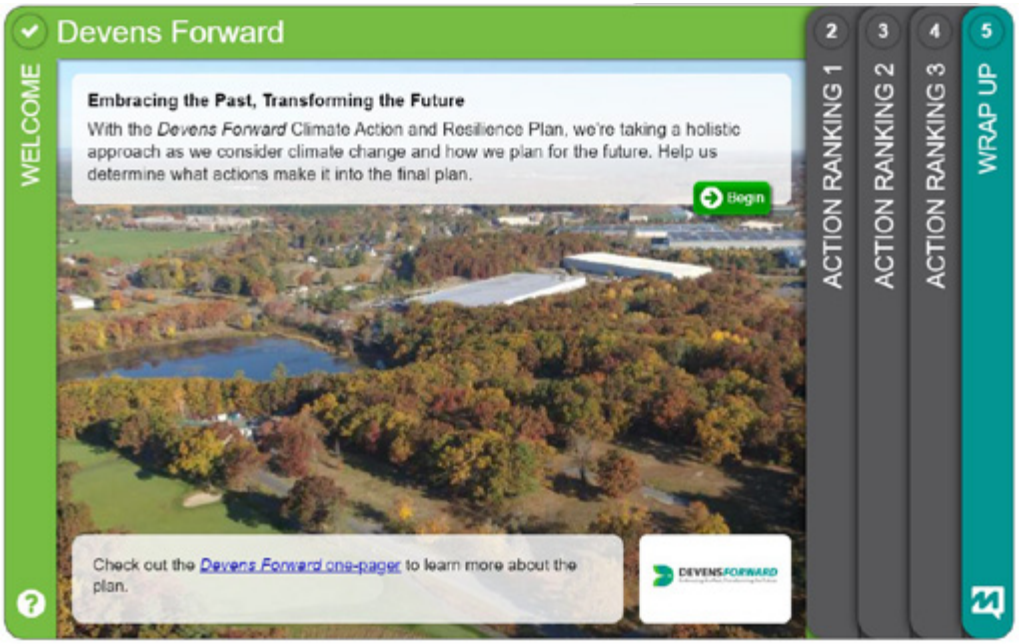
DEVENS FORWARD
Embracing the Past, Transforming the Future

Action Prioritization Survey Results

June 2020

Devens Forward is Devens' climate action and resilience plan. The plan, which will be complete in August of 2020, will build on the efforts of the community to reduce its contribution to climate change and to prepare for the impacts that are already upon us and are projected to intensify.

Along with feedback from Devens Enterprise Commission and MassDevelopment, the plan's development relies on input from the community. Hearing the priorities of the community will help ensure that the final plan is one that effectively serves all of Devens' residents, businesses, and visitors. To achieve this goal, the project team launched an online survey to gather feedback on how to best prioritize actions for the final plan. This report details the results of that survey.



KLA KIM LUNDGREN ASSOCIATES, INC.
Customized Solutions for the Community You Want

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SURVEY RESULTS

The action prioritization survey was open for one month—from April 30th to May 29th. Below are the top-rated actions from each plan element. More detailed results from the prioritization can be found on the following pages.

Total survey Responses: 52

Climate & Energy
Encourage energy efficiency upgrades and renewable energy installations in residential and commercial buildings through incentives, education, and promotion of services.

Public Health & Safety
Support the production and consumption of healthy, local food.

Natural Resources
Continue to support the Army's efforts to clean up Superfund contamination.

Infrastructure
Establish regional collaboration agreements to reduce, reuse, and recycle waste.

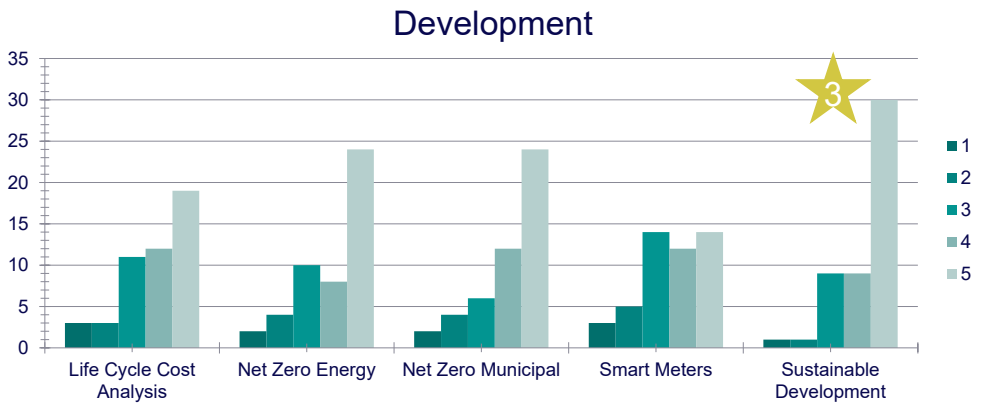
Economic Development
Facilitate the sharing of information and services to promote a collaborative regional economy.

Housing
Redevelop Vicksburg Square zoning district into a mixed use residential/retail center.

Transportation & Land Use
Create a forward-looking regional plan for bike/pedestrian transportation.

SURVEY RESULTS: Climate & Energy

Directions: Survey participants were asked to rank the importance of each action on a scale from 1 to 5, with 5 being the most important. The following charts show the rankings of each action. See the descriptions of each action below the charts for more details. Stars indicate the actions with the three highest average rankings.



Life Cycle Cost Analysis: Promote the use of Life Cycle Cost Analysis in building and infrastructure projects.

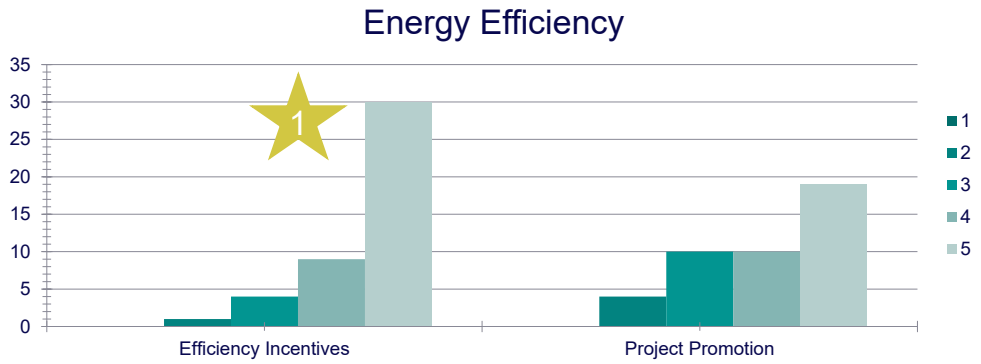
Net Zero Energy: Support Net Zero Energy standards for all new buildings and major redevelopment projects.

Net Zero Municipal: Utilize Net Zero Energy standards for new municipal buildings and redevelopment projects as feasible.

Smart Meters: Promote smart meters for new development to support peak load management.

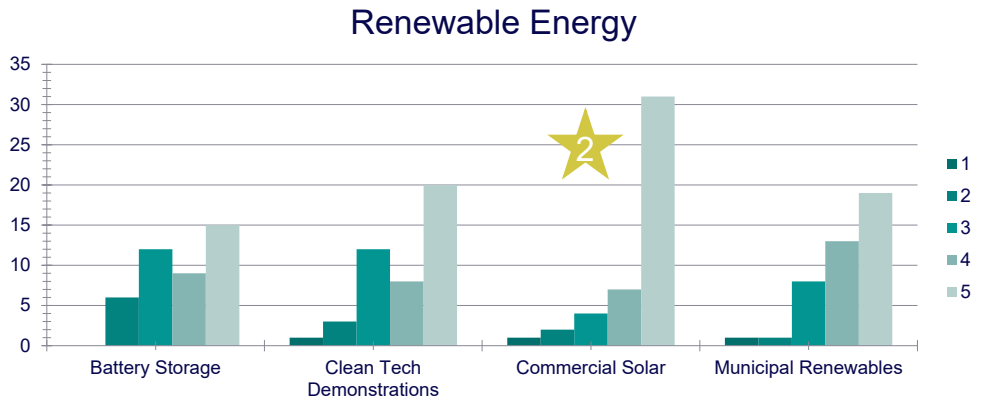
Sustainable Development: Work with developers to encourage sustainable development and redevelopment.

SURVEY RESULTS: Climate & Energy



Energy Incentives: Encourage energy efficiency upgrades and renewable energy installations in residential and commercial buildings through incentives, education, and promotion of services.

Project Promotion: Engage Devens businesses to share and promote results of energy efficiency and sustainability projects.



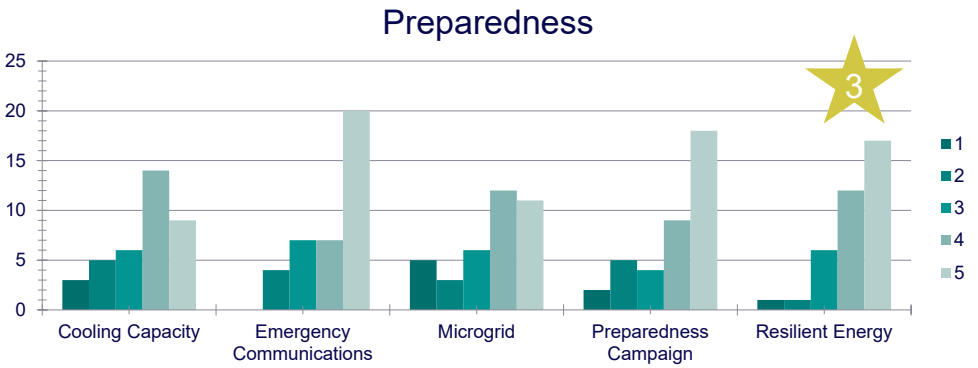
Battery Storage: Support battery storage projects within Devens.

Clean Tech Demonstrations: Work with Clean Tech businesses on demonstration projects that advance the transition to clean energy.

Commercial Solar: Support Devens businesses in development of on-site solar installations.

Municipal Renewables: Increase the type and number of installations of renewable energy on municipal property.

SURVEY RESULTS: Public Health & Safety



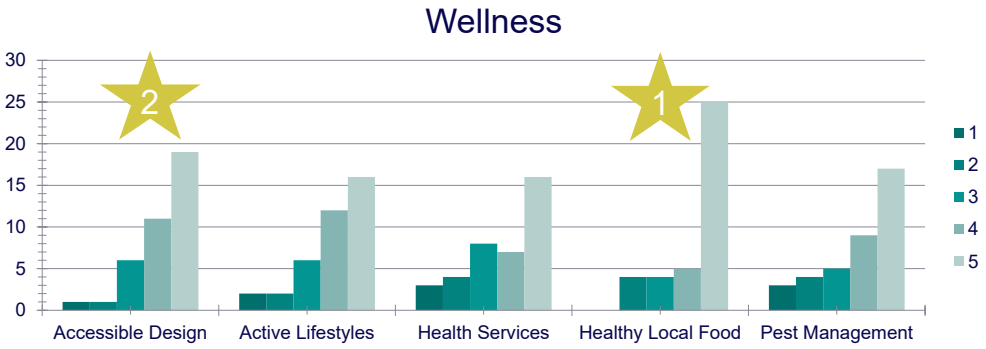
Cooling Capacity: Expand "cooling capacity" through parks, recreational sites, and designated cooling centers.

Emergency Communications: Expand the reach and accessibility of emergency preparedness communications.

Microgrid: Pilot a microgrid, district energy, or self-contained power system in an area of greatest need.

Preparedness Campaign: Launch a coordinated preparedness campaign that helps residents prepare for a potential crisis.

Resilient Energy: Invest in resilient energy systems at critical facilities.



Accessible Design: Ensure ADA compliance at existing sites and in future planning proposals.

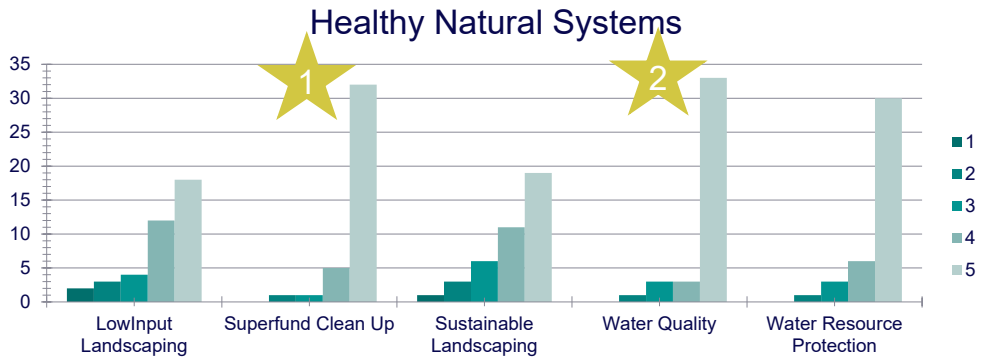
Active Lifestyles: Develop and promote an array of programs that encourage active lifestyles for a diverse population.

Health Services: Improve access to health and wellness services through partnerships with wellness centers.

Healthy Local Food: Support the production and consumption of healthy, local food.

Pest Management: Update DEC pest and vector-borne disease management plan.

SURVEY RESULTS: Natural Resources



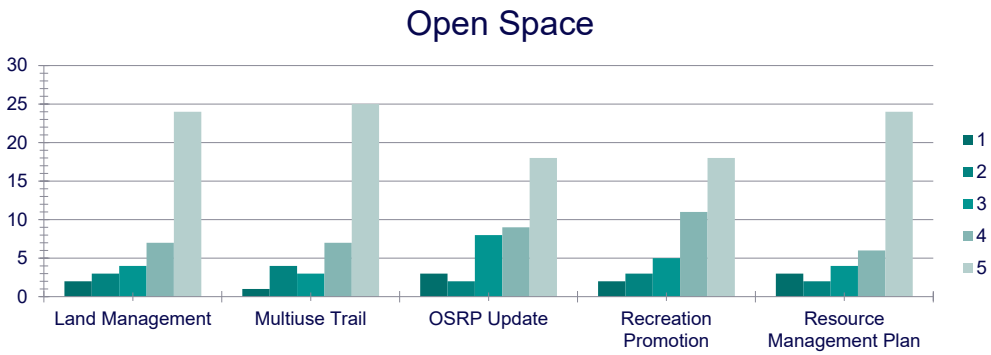
Low Input Landscaping: Adopt a community-wide policy to use low-input landscaping, with a focus on pollinator plantings.

Superfund Clean Up: Continue to support the Army's efforts to clean up Superfund contamination.

Sustainable Landscaping: Educate residents and developers on sustainable landscaping best practices.

Water Quality: Continue to meet national and state requirements to improve water quality.

Water Resource Protection: Continue implementing Devens Water Resources Protection Plan



Land Management: Coordinate regional land management to maintain the health of the tree canopy and ecosystems.

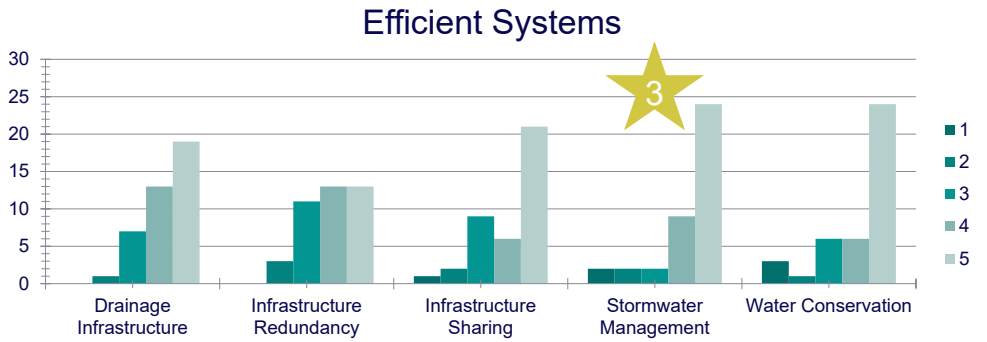
Multiuse Trail: Continue implementing multi-use trail network plan.

OSRP Update: Update the Open Space and Recreation Plan with a prioritized short list of actions.

Recreation Promotion: Boost awareness about recreational options, trails, and open space through events.

Resource Management Plan: Develop a Resource Management Plan with best management practices for natural systems.

SURVEY RESULTS: Infrastructure



Drainage Infrastructure: Upgrade and maintain drainage infrastructure.

Infrastructure Redundancy: Ensure redundancy of critical infrastructure, community facilities, and utilities.

Infrastructure Sharing: Encourage industries and businesses to share infrastructure to lower costs and increase efficiency.

Stormwater Management: Improve stormwater management by reducing impervious surface and incentivizing rain barrels, etc.

Water Conservation: Increase efficiency of all water users through the promotion of water conservation measures.

Curbside Composting: Implement a community curbside composting program and expand yard waste program.

Regional Waste Reduction: Establish regional collaboration agreements to reduce, reuse, and recycle waste.

Schools and Businesses: Design and implement effective waste reduction and recycling programs in businesses and schools.

Specialty Waste Items: Maximize the proper disposal of specialty waste items (i.e. hazardous waste, electronics, textiles).

Sustainable Construction: Promote sustainable construction and demolition practices (i.e. green roofs, salvage of materials).

SURVEY RESULTS: Economic Development

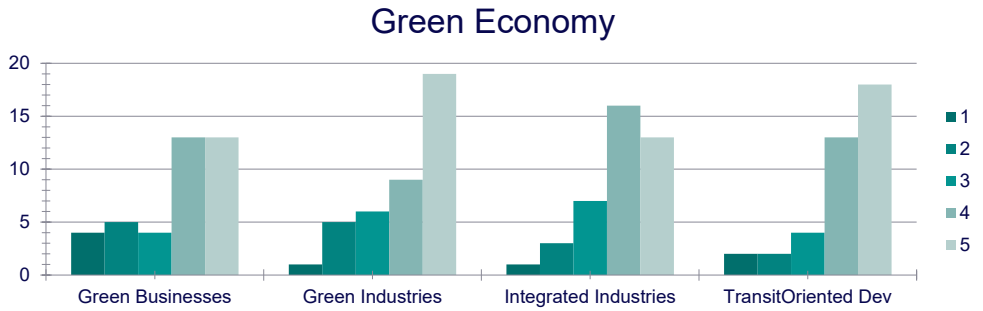
24-Hour Community: Promote services, recreation, and amenities to attract/keep people in Devens beyond the work day.

Information Sharing: Facilitate the sharing of information and services to promote a collaborative regional economy.

Resource Sharing: Facilitate the sharing of building space and resources for businesses, schools, and organizations.

School Partnerships: Partner with schools and colleges to incorporate climate curricula and job training opportunities.

Workforce Development: Provide workforce training programs tied to regional businesses, industries, and diverse populations.



Green Businesses: Create a green business certification program to increase operating efficiency and resiliency.

Green Industries: Attract industries that contribute to and capitalize on environmental and emerging technologies.

Integrated Industries: Attract industries that use the by-products of existing businesses in the region.

Transit-Oriented Development: Encourage developers and businesses to prioritize access to public or non-motorized transportation.

SURVEY RESULTS: Housing

Efficiency Education: Initiate an educational campaign on ways to improve residential energy efficiency and resilience.

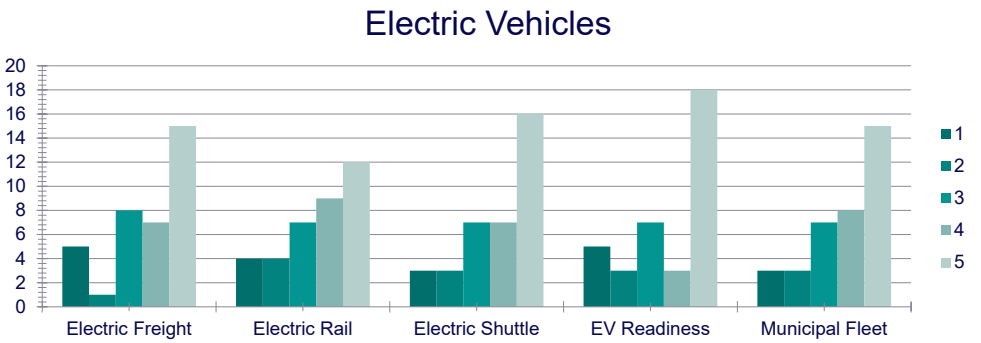
Housing Cap: Remove the housing cap.

Smart Housing: Encourage the reuse of existing housing, compatible new housing types, and transit-oriented development.

Vicksburg Square: Redevelop Vicksburg Square zoning district into a mixed-use residential/retail center.

Vulnerable Populations: Support housing developments that provide diverse housing options for vulnerable populations.

SURVEY RESULTS: Transportation & Land Use



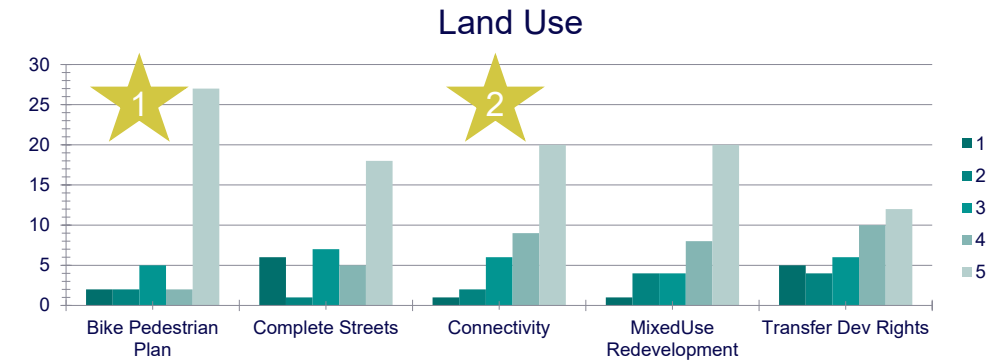
Electric Freight: Identify opportunities for the development of electric or hydrogen fueled freight trucks.

Electric Rail: Work with intermodal facility (PanAm) to electrify freight rail and all supporting freight infrastructure.

Electric Shuttle: Utilize an electric community shuttle.

EV Readiness: Require all new commercial construction to meet electric vehicle readiness requirements.

Municipal Fleet: Electrify the municipal fleet as electric vehicle options are available for fleet needs.



Bike Pedestrian Plan: Create a forward-looking regional plan for bike/pedestrian transportation.

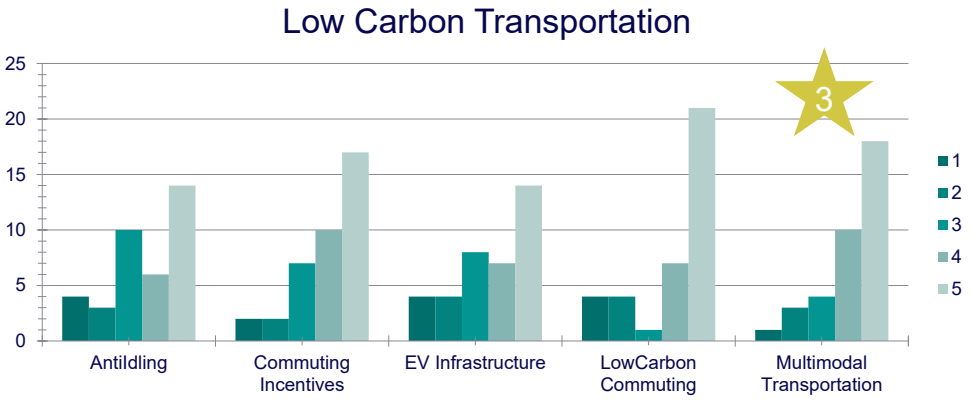
Complete Streets: Continue implementing Complete Streets (a safety and accessibility program) priority actions.

Connectivity: Provide efficient links between housing, schools, workplaces, recreation, and public transportation.

Mixed-Use Redevelopment: Encourage reuse of previously developed sites that is transit-oriented and mixed-use.

Transfer Dev Rights: Explore Transfer of Development Rights—balances denser development with open space protection.

SURVEY RESULTS: Transportation & Land Use



Anti-Idling: Enforce anti-idling laws.

Commuting Incentives: Encourage local businesses to adopt sustainable commuting incentives for employees.

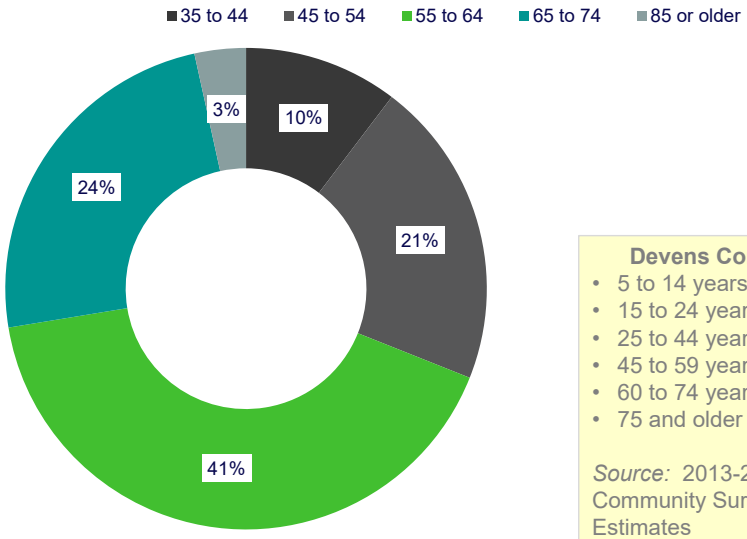
EV Infrastructure: Expand infrastructure and promote policies that encourage the use of electric vehicles.

Low-Carbon Commuting: Expand low-carbon transportation options for those that commute to and within Devens.

Multimodal Transportation: Encourage multimodal transportation through outreach and installation of necessary infrastructure.

SURVEY DEMOGRAPHICS

Age of Participants*



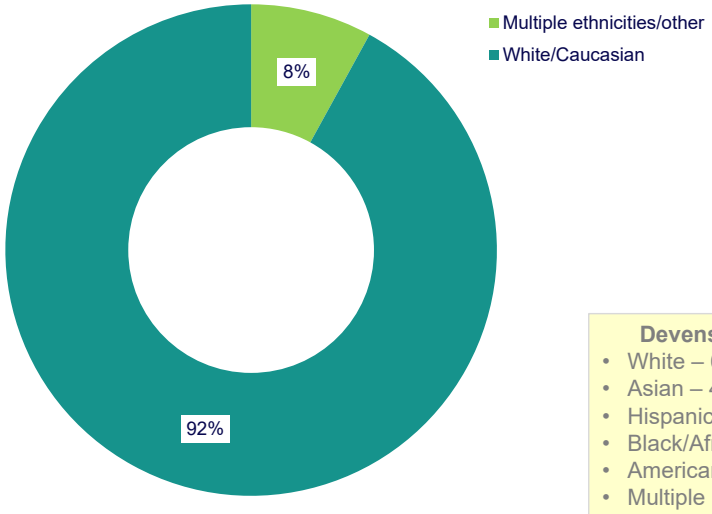
* Based on the 28 people who reported their age on the survey.

Devens Community Profile

- 5 to 14 years -- 2.3%
- 15 to 24 years -- 2.9%
- 25 to 44 years – 44.5%
- 45 to 59 years – 30.5%
- 60 to 74 years – 15.6%
- 75 and older – 1.5%

Source: 2013-2017 American Community Survey 5-year Estimates

Race/Ethnicity of Participants*



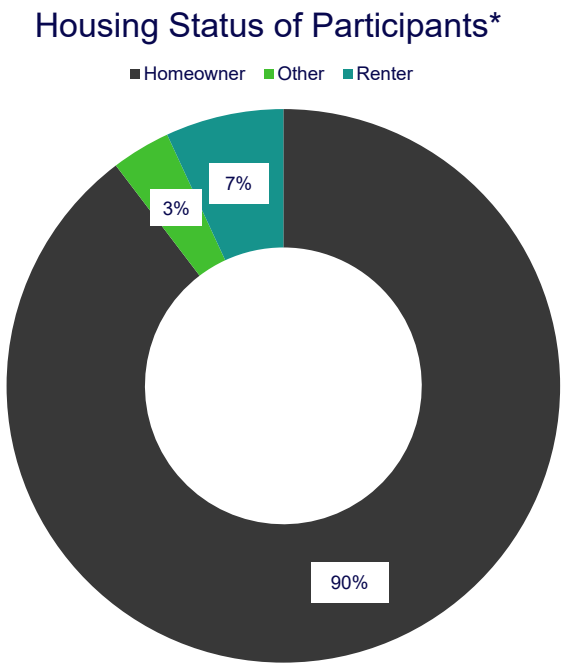
* Based on the 25 people who reported their age on the survey.

Devens Community Profile

- White – 62.7%
- Asian – 4.0%
- Hispanic or Latino – 12.0%
- Black/African American- 17.2%
- American Indian – 1.7%
- Multiple Ethnicities- 2.4%

Source: 2013-2017 American Community Survey 5-year Estimates

SURVEY DEMOGRAPHICS



* Based on the 29 people who reported their housing status on the survey.

Devens Housing Tenure

- Owner-occupied – 46.0%
- Renter-occupied – 54.0%

Source: 2013-2017 American Community Survey 5-year Estimates


Embracing
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Transforming
the Future

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